

Innovative use of ICT as a tool to CSR and Agri-business- A case study of Sugarcane Information System in Uttar Pradesh (India)

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ABSTRACT

Before the end of first decade of 21st century no one would have thought that advantages of information and communication technology (ICT) will reach to the doorsteps of millions of farmers of this country, particularly to the small and marginal farmers of Uttar Pradesh (U.P.). Development and introduction of Sugarcane Information System (SIS) in 2010 can therefore, be considered as an innovative use of ICT for the benefit of millions of sugarcane growers of U.P., having low literacy rate and living in rural area, having low connectivity of information technology, and has rightly won several prestigious National/International awards.

Sugar industry, after textile, is the second largest agro-based industry in India. There are about five million sugarcane growers in country out of which three million are from U.P. alone.

Unlike other crops farmers remain busy in harvesting and marketing of sugarcane for 150 to 180 days (November to April) in a year and prior to implementation of "SIS" they were facing lot of difficulties with regard to estimates of area and production of sugarcane, to get information on schedule of supplying sugarcane to the concerned sugar mills, weighment of sugarcane, payment of cane price etc.

A case study of SIS introduced for sugarcane marketing was conducted in four selected sugar mills of U.P. It was found that with the introduction of SIS measurement of sugarcane area of every farmer is being done with the help of "GPS", with high degree of accuracy, information on schedule of cane supply is sent to individual farmer by SMS, for weighment particularly at collection centres HHC (Hand held computers) are used and information on payment of cane price is sent to individual farmer. SIS has been introduced in all the sugar mills in U.P. Out of four sugar mills covered in this case study SakhotiTanda closely followed by Daurala sugar mills have 100 percent adoption of all the components of SIS, whereas other two are also trying to reach goal of 100 % adoption. All the stakeholders i.e. farmers, sugar mills and sugarcane department were found to be satisfied with the introduction of this system.

There are several advantages of "SIS" to all the stakeholders viz; transparency in marketing system and mutual trust developed between farmers and sugar mills, saving in time of farmers, reduction in stalemant time of sugarcane between harvesting and crushing, resulting into higher cane weight for farmers and increased sugar recovery for sugar mills.

Keywords: Information and Communication Technology (ICT), Sugarcane Information System (SIS)

1. Introduction

In Indian agriculture sugar industry is very important and is second largest agro-based industry, next to textile only. It is also a fact that India is second largest sugar producing country at global level, Brazil being the first. According to latest estimates, area and production of sugarcane in the country is about 4.8 million hectare and 325 million tonnes respectively. Annual production of sugar is about 25 million tonnes which was only 120 thousand tonnes in 1930-31. Number of sugar mills is about 510 which used to be only 29 in 1930-31. Almost half of the national production of sugarcane comes from Uttar Pradesh alone, which is grown in 44 districts of the state having 119 operational sugar mills indifferent crushing seasons.

With annual turnover of about 700 billion rupees and contribution to the tune of about 22.5 billion rupees to tax and excise exchequer, sugar industry is playing pivotal role in national economy. About 50 million sugarcane growers and their families are playing significant role in producing and supplying basic raw material i.e. sugarcane to the industry (source: ISMA 61 (3), 2011) [1].

According to Rizvi (Retrieved on June 2016) [6] about 3 million farmers are involved in cultivation of sugarcane in U.P. alone and supplying sugarcane worth rupees 23 thousand crore each year and sugar industry in U.P. is the largest agro-based industry.

Advancement of Information Technology has revolutionized communication system in world as a whole. India has also made tremendous progress in this sector. In fact meaning of global compact, global village etc. is becoming a reality.

Distance has no meaning and barriers. With the increasing use of mobile service, computer application, digital device etc. speed and accuracy in business world in particular and other sectors have benefitted the society as a whole.

The enormity and persistence of poverty and other developmental problems particularly in the developing countries of Asia and Africa seems to have influenced the U.N., the United Nations Development Programmes (UNDP) and other international bodies to promote CSR as a developmental tool. Eight MDG's (Millennium Development Goals) were adopted in Millennium Summit held on September 6 to 8, 2000 which were announced as target to be fulfilled by 2015 [8].

The "8th F" MDG adopted was "in cooperation with private sector make available benefits of new technology, specially information and communication." Keeping this point in background development of Sugarcane Information System (SIS) with an aim to provide benefit of information technology with particular reference to communication about sugarcane supply schedule to millions of farmers and other related issues about sugarcane marketing can be considered as an innovative approach under the banner of "CSR", linking sugar mills, sugarcane development department and sugarcane growers.

In this paper a brief description of Sugarcane Information System (SIS), its benefits, constraints, if any in its operation and suggestions for wider use of this kind of communication system with benefit to all concerned stakeholders have been given.

Keeping these points into consideration a study on, recently introduced, sugarcane information system was undertaken with following objectives:

2. Objectives

- 2.1 To study problems faced by farmers, sugar mills and sugarcane department prior to introduction of SIS.
- 2.2 To understand SIS (Sugarcane Information System).
- 2.3 To study advantages of SIS to farmers, sugar mills and sugarcane department.
- 2.4 To study adoption pattern and limitations in adoption of SIS.

3. Literature Review

Advancement of information technology (IT) has revolutionized communication system in world as a whole. India has also made tremendous progress in this sector and urban population & business world has been immensely benefitted. Slowly benefit is now percolating to agro-based industries and linking this sector with farmers, who are the main suppliers of raw material to these industries. During UN Millennium meet, held from 6-8 September, 2000, under 8th MDG it was rightly mentioned that in cooperation with private sector, benefits of new technology, especially information and communication should be made available to all concerned. (MDG, 2006) [8]

The enormity and persistence of poverty and other related developmental problems, particularly in developing countries of Asia and Africa in a way seems to have influenced the UN, the UNDP and other international bodies to promote corporate social responsibility (CSR) as a developmental tool. This world body in a way has linked CSR and IT for speeding up developmental activities, particularly in developing parts of this globe.

According to World Business Council for sustainable development, "CSR" has been defined as the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large (SDU, 2007) [3].

Very limited information is available on linking IT with CSR, with particular reference to agro-based industries in India. However, ITC's Agri Business Division's "e-choupal" initiatives are very relevant in context with its CSR initiatives into company's supply chain (Dey and Sircar, 2012) [2]. ITC's Agri Based Division in its e-choupal initiative empowered the small and marginal farmers with information on global and Indian market prices and aggregate demand; weather forecast, as well as scientific farming practices to increase productivity.

In last eight decades, sugar industry has emerged as second largest agro- industry in India. In 1930 total production of sugar from twenty nine sugar mills in India was 120 thousand tonnes which is now about 25 million tonnes from about 500 sugar mills resulting into about 200 times increase in sugar production. About five million at national level and about three million in U.P. alone are sugarcane growers (Anonymous 2011, ISMA report) [1]. These three million farmers spread over in 44 districts of U.P. were facing lot of problems in marketing their sugarcane to sugar mills. Development and introduction of sugarcane information system has solved several of their problems (Rizvi, Retrieved on 02/06/16) [6]. The SIS was implemented from August 2010 and has won the prestigious Gold Medal of the National award for e-governance in 2011-12. The SIS has also won the overall Gold Medal in 2012 CAPAM International Awards for innovative use of technology in the public service and prestigious, Prime Minister Award 2012 for Excellence in Public Administration.

4. Research Methodology

To have deep insight into different components of sugarcane information system (SIS) a comprehensive review of literature available from published reports, newspapers, website, etc. was done and a case study was undertaken to understand adoption patterns and limitations in adoption of SIS.

To study the extent of adoption of SIS and identify constraints in its adoption by sugarcane growers, staff of sugar mills and sugarcane development department a detailed survey was conducted on problems being faced by different stakeholders prior to introduction of this system and advantages of SIS in sugar industry was also collected.

To get the first hand and most reliable information on this newly introduced system, discussions with managerial staff of four sugar mills i.e. SakhotiTanda, Daurala, Mawana and Kinauni of Meerut district of U.P. was held. Information on adoption pattern, constraints, advantages, etc. of SIS to the main stakeholder i.e. farmers was collected after interviewing 200 farmers from 8 villages of above mentioned sugar mill's area. Information collected from primary and secondary data on this "Innovative use of information technology in sugar industry of U.P." has been presented in this paper.

5. Findings

During the course of several visits in crushing season of 2014-15 and 2015-16, to four selected sugar mills viz; SakhotiTanda, Daurala, Mawana and Kinauni of District Meerut (U.P.) and discussion held with managerial staff of sugar mills, officers of sugarcane development department and 200 farmers in 8 villages of these sugar mills, very interesting information on several aspects of sugarcane information system was collected and has been presented here for the benefit of those who are interested to know more about the use of "e-governance" or Information Communication Technology (ICT) to bring transparency in marketing system of sugarcane and similar other commodities, which involves millions of farmers spread over a large geographical area with different levels of literacy rate. Detail information on problems faced by sugar industry in sugarcane marketing, prior to introduction of SIS, adoption pattern and constraints in its adoption was gathered and discussed as below.

5.1 Problems faced by farmers, sugar mills and sugarcane department prior to SIS

Before introduction of SIS all the steps involved in sugarcane marketing viz; measurement of sugarcane area, estimation of sugarcane production, intimation regarding supply schedule of sugarcane, weighing of cane and payment of cane price to the farmers were being undertaken manually and there remained chances of human error and delay in communication of information to end user (particularly to the cane growers).

Before introducing SIS mobile numbers of all the sugarcane growers were gathered by the respective sugar mill staff and made available to respective sugar mills for interaction with the farmers and vice-versa. With the introduction of SIS sugarcane area of each of the registered sugarcane grower is being measured with the help of GPS, intimation regarding cane supply is being sent through SMS, weighing of sugarcane has been computerized with the help of HHC and intimation regarding sugarcane price, balance payment, etc. is being sent through SMS to the farmers. The entire system is covered under e-governance, with highest degree of accuracy and speed.

5.1.1 Problems faced by farmers

- (i) Wasteful expenditure on travel.
- (ii) Reduced weight due to staleness in sugarcane.

5.1.2 Problems faced by sugar mills

- (i) Loss of income due to arrival of stale sugarcane.
- (ii) Lower utilization of installed capacity
- (iii) Unnecessary data entry

5.1.3 Problems faced by Sugarcane Department

- (i) Presence of middlemen and mafia.
- (ii) Long delivery time of interaction intimation

All these situations were causing financial loss both to the farmers and the sugar mills and there was a sense of anger and resentment towards the sugarcane department.

5.2 Sugarcane Information System (SIS)

In U.P. Sugarcane information system (SIS) was launched in crushing season 2010-11. The central objective was to provide complete transparency to all the transactions/ interactions between the sugarcane farmers and the sugar mills so that the middlemen could be eliminated. SIS offers almost real time access to information generating at each step of

sugarcane procurement process. SIS consists of the following six components which have been implemented by the sugar mills:

- Website
- Short Messaging System (SMS)
- Query Short Messaging System (QSMS)
- Internet/ Interactive Voice Response System (IVRS)
- Hand Held Computer (HHC)
- Global Positioning System (GPS)

SIS is an e-governance platform that serves three million sugarcane growers in U.P. who supply their produce to 119 sugar mills. The process architecture is designed to capture all transactions of the agri marketing chain in real time, uploads it on website, triggers an instant SMS and could be retrieved by IVRS. The use of SIS ensures that users of varying literacy levels are catered for. Presently, 7000 handheld computers and 2000 GPS devices are being used for data acquisition.

5.2.1 Websites: To provide cane development & marketing related information to cane growers of the state websites with full accuracy & transparency, 116 sugar mills of the state have developed their websites. These enable all the cane growers, to have full access of all the information regarding cane survey, supply ticket issuance, weighment, payment and cane development, and thereby saving time and expenditure.

5.2.2 SMS: This is the biggest rural messaging system of the rural India. Under this system, the farmers having mobile numbers registered with their sugar mills regularly get information regarding survey, issue of supply tickets, weighment, payment and other developmental activities.

5.2.3 Query SMS: This is a high-speed, bilateral and modernized question-answer service facility. Under this facility, any farmer while sitting at his home may get answers of his questions regarding cane survey, satta, supply tickets issuance, weighment and payment by sending SMS on query SMS number of the concerned sugar mill.

5.2.4 IVRS: By dialing the IVRS number given by sugar mills under this system, a farmer can get the information regarding cane survey, issuance of supply tickets, calendar, weighment and cane price payment etc. In U.P. 116 sugar mills are running this system successfully.

5.2.5 HHC: Through this system, purchase centres of sugar mills have been connected with main computer system of sugar mill. With the help of this system, the sugarcane farmers get computerized weighment slip (mill purcha) in place of hand written weighment slip. This system allows the main server of a sugar mill to register online details of Sugarcane purchased at out centers. HHC system is also being used in sugar cane survey of the farmer field.

5.2.6 GPS: The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defence.

GPS system for cane survey: Under this system field survey by manual means, is proposed to be replaced by GPS system. This system will ensure saving of time and money in cane survey and will further increase its accuracy and transparency.

Method for measuring sugarcane area by GPS system: This system includes two methods-

- With the help of satellite, coordinates are received by pressing buttons on GPS device, by moving clockwise or anti-clockwise at all corners of the field.
- Standing at a corner of the field the start button is pressed and moving onwards round the field, end button is pressed and thus with the help of satellite measurement is recorded automatically.

5.3 Adoption of SIS components in different Sugar mills

Extent of adoption of SIS in four sugar mills during crushing season of 2014-15 and 2015-16 was studied. According to information gathered during the course of study it was heartening to note that SakhotiTanda sugar mill, though smaller in size than rest of the other three sugar mills under study, has covered its all the sugarcane suppliers in terms of having their mobile numbers for sending SMS as well as with regard to coverage in terms of measurement of area (use of GPS) and weighment of sugarcane (use of HHC) closely followed by Daurala sugar mill as given in Table-1.

Table-1 Extent of adoption of SIS components in selected sugar mills.(Upto June 2016) [4], [5]

Name of SIS Component	Sugar mills and extent of adoption of SIS components			
	SakhotiTanda	Daurala	Mawana	Kinauni
GPS	100%	100%	Introduced and Proposed to cover 100% in 2016-17	Introduced and Proposed to cover 100% in 2016-17
HHC	100%	100%	100%	50%
SMS	836591	8136263	4886171	2575726

Table-2 Details of number and percentage of cane growers registered with mills

Particulars	Sugar Mills			
	SakhotiTanda (Retrieved on June 2016)	Daurala (Retrieved on July 2016)	Mawana (Retrieved on June 2016)	Kinauni (Retrieved on June 2016)
Number of Farmers	9044	39324	38466	40755
Mobile numbers registered	9044	38941	37835	39204
%	100	99.03	98.36	96.19

Data presented in Table-2 further reveals that 96.19 to 100 percent sugarcane growers have registered their mobile numbers with concerned sugar mills, which indicates the interest shown by them in SIS. Information made available by managerial staff and sugarcane growers from other three sugar mills also revealed that they all were very enthusiastic to introduce the system in letter and spirit and farmers were eager to adopt it, because of several benefits accruing from this system.

Rizvi (Retrieved on 02/06/16) reported that almost all the sugar mills in U.P. have adopted Sugarcane Information System. Our detail study conducted in selected four sugar mills confirmed that system has been introduced by all the sugar mills under study. However, due to certain constraints, extent of its adoption is varying in terms of use of different components of SIS.

5.4 Advantages of SIS to sugar industry

5.4.1 Advantages of SIS to farmers, sugar mills and sugarcane department

- Benefits to farmers: The key benefits to the farmers are transparency, elimination of middlemen, saving in unnecessary travel, increased supply of sugarcane to the mills, increase in area under sugarcane and higher weight of sugarcane supply.
- Benefits to sugar mills- Availability of comparatively fresh cane due to reduction in stalemant period of cane, higher sugar recovery, accuracy in cane area and cane supply resulting into proper utilization of crushing, capacity/ crushing time schedule, and reduction in paper work.
- Benefits to the Government- Elimination of sugarcane mafia, reduction in layers of government, transformation in the attitude toward e-Governance, and increase in use of ICT in rural areas.

5.4.2 Long Term Significance

- Low literacy rate no barrier to e-Governance
- Sustainability
- Penetration of IT in rural areas
- Reduction in layers of government and middlemen

5.4.3 Altered the expectations of stakeholder

- Information to the farmers at their doorstep
- Real time pre and post operation informations
- Free of cost to the farmers
- Paperless and to provide upto date information

5.4.4 Public Private Partnership: Collaboration between society, mill & department

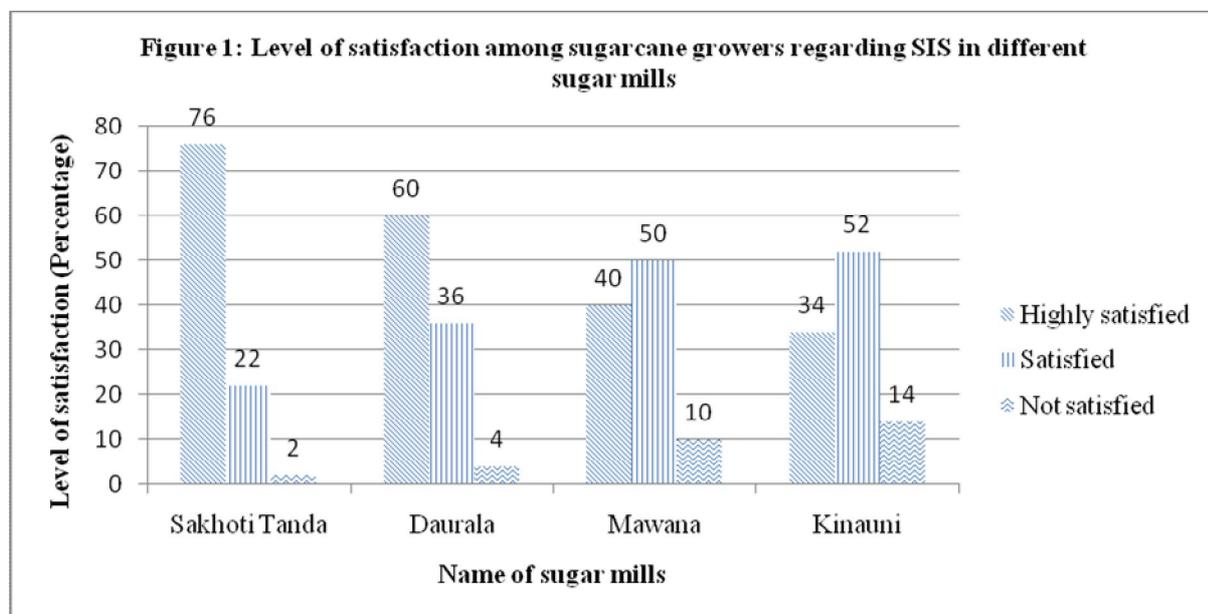
SIS is the outcome of unique collaboration where the project was conceptualized by the department and private enterprises were responsible for implementation and farmers were to benefit from it. As the planning was centralized and implementation was decentralized, SIS is not funded by the government and each sugar mills have to pay for it. The core of the SIS was defined by the government and each sugar mill has adopted SIS according to their needs with additional features. At the central level it needs only continuous supervision and leadership.

5.5 Level of satisfaction among sugarcane growers regarding SIS in different sugar mills

Fifty sugarcane growers from each of the four sugar mills were interviewed to get feedback with regard to their level of satisfaction about use of SIS, keeping in view the overall advantages/ benefits of this system to them. A summary of data is presented in Table-3 and Figure-1.

Table-3: Level of satisfaction among sugarcane growers regarding SIS in different sugar mills (2015-16)

Name of sugar mills	Level of satisfaction (percentage)		
	Highly satisfied	Satisfied	Not satisfied
SakhotiTanda	76	22	2
Daurala	60	36	4
Mawana	40	50	10
Kinauni	34	52	14



Data in Table-3 and Figure-1 indicate that 76 percent sugarcane growers of SakhotiTanda sugar mills reported to be highly satisfied and 22 percent reported to be satisfied with regard to use of SIS. As reported earlier all the components of SIS are being used and all the sugarcane growers have registered their mobile numbers also with SakhotiTanda sugar mill for all kinds of communication. Among sugarcane growers of Daurala sugar mill level of high satisfaction and satisfaction was 60 and 36 percent respectively, which was close to that of SakhotiTanda sugar mill. Sugarcane growers of Mawana and Kinauni were having comparatively lower level of satisfaction compared to other two sugar mills because of lower level of adoption of different components of SIS, which is likely to improve in near future, as reported by managerial staff.

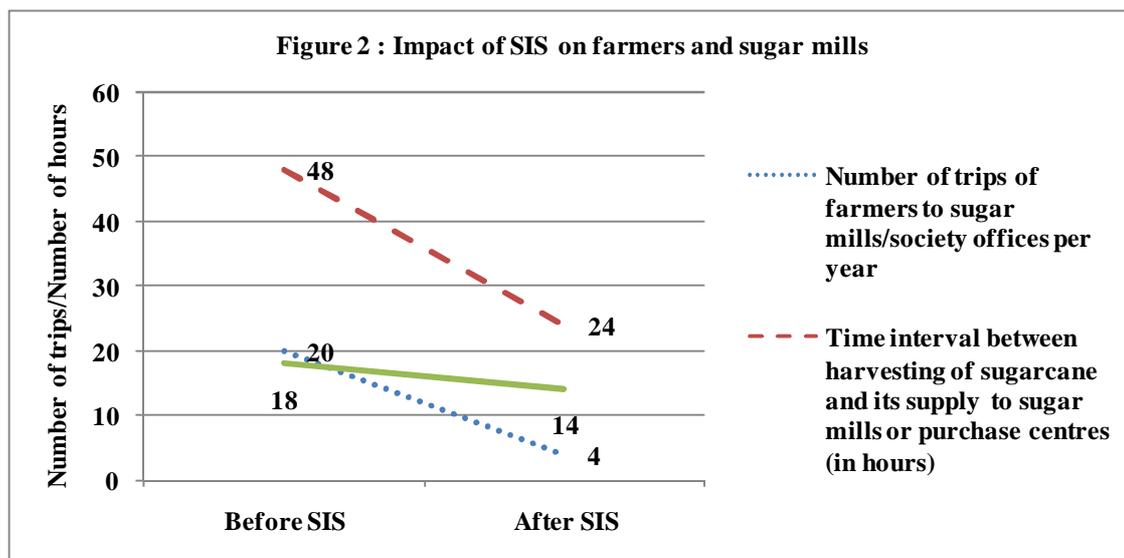
This clearly shows that success of SIS is highly dependent on extent of adoption of various components of this system and interest shown by the managerial staff.

5.6 Impact of SIS on sugar industry

During the course of study it was revealed, that besides several benefits as described under section 5.4 of this paper, the most striking impact of SIS on farmers was reduction in number of trips from 20 to 4 by each farmer to their respective sugar mills/society to get different types of information due to introduction of SMS under this system (Table-4 and Figure-2).

Table-4 Impact of SIS on farmers and sugar mills

S.No.	Component	Before SIS	After SIS
1.	Number of trips of farmers to sugar mills/society offices per year	20	4
2.	Time interval between harvesting of sugarcane and its supply to sugar mills or purchase centres (in hours)	48	24 (Ranging from 36 to 24)
3.	Time interval between arrival of sugarcane at purchase centre and its supply to the factory (in hours)	18	14



The second impact noted was reduction in statement period from sugarcane harvesting and its supply to sugar mills or purchase centre, as the case may be, and from the purchase centre to the sugar mill for crushing. This has its impact in two ways- first in getting higher return to the farmers due to less dries owing to reduction in time interval between harvesting of cane and its supply to purchase centre/mill by farmers. The second was on sugar mills due to increase in sugar recovery owing to reduction in time interval between harvesting of cane and supply to sugar mill for crushing.

This clearly shows that saving of time and increase in farmer’s income as well as increased sugar recovery and higher income to sugar mills can be considered very important impact of the use of this innovative “e-governance” system in sugarcane marketing.

5.7 Limitations/Constraints in adoption of SIS

Poor infrastructures, lack of trained manpower, co-ordination with various departments, work culture, lack of connectivity are important constraints in adoption of SIS to run this innovative programme successfully. Sugarcane department and sugar mills- on public private partnership mode have to remove all these constraints.

6. SuggestionsInformation technology/ e-governance, on the pattern of SIS can be used in all the business organizations and Govt. departments that interact with large number of people spread over a wide range of geographical area. Its application and use can help to a very great extent in monitoring and execution of CSR and welfare programmes with twin objectives of transparency and speed into the system. Keeping these facts into consideration and feedback received during the course of this study following suggestions are being made for the benefit of all concerned.

1. In case of industrial crops like cotton, potato, oilseed, etc. concerned agro-based industries can develop their own information system on the pattern of SIS for getting reliable information of area, production, raw material supply and other marketing aspects. Latest recommendations on high-tech production technology of concerned commodity for the benefit of farmers for sustainable production as well as to ensure good quality and required quantity of raw material to concerned agro-based industry should be included in information system.

2. All the business organizations can take advantage of e-governance in operating their business as well as their CSR activities. Since Company Act 2013 for CSR (Section 135) has been passed. Therefore proper monitoring of its execution and use of funds allotted for this purpose is becoming important.
3. Proper monitoring of utilization of welfare funds and its delivery to end users/ beneficiaries has become very important. A comprehensive system can be developed with the help of IT.
4. ICT can be used to improve the quality of primary education department.
5. Transparency in land records and speedy transactions in revenue.
6. Transparency in use of huge amount of funds being spent in rural development programmes, including MGNREGA etc. is very important. Use of ICT for its monitoring at different levels can go a long way in solving problems and bring transparency to these programmes.

These are some suggestions, there can be many more for proper monitoring, speedy transactions of message and transparency in business as well as in public dealings for proper utilization of public and private funds for the betterment of the society as a whole.

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