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SUGAR INFORMATION SYSTEM: A PRO-FARMER INITIATIVE IN UTTAR PRADESH

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Absract

Traditionally, in India, farmers have followed subsistence farming practices. This has made agriculture less attractive to the younger generations of farming community. However, in the past few years, with the advent of information technology and modern farming practices the productivity, revenue generation and employability from cultivation has seen a northward trend. These new agricultural practices have translated into interactive and collaborative ways to assist the farmers as well as the industry towards a holistic growth trajectory. Sugar Information System (SIS), the outcome of the diligence of the Sugarcane Department of Uttar Pradesh, is one such step in this direction.

SIS has provided farmers with real time access to all information related to sugarcane and sugar industry through web based technologies. This research is an attempt to study the benefits as well as cost incurred by farmers of Uttar Pradesh while opting for this information and communication technology (ICT) implementation. During the research, which covered 70 farmers of Amroha district, it was analyzed that 70% of the farmers utilize these service and most of them were benefited from the feature of this initiative. Infact, the benefits to the farmer were manifold as in quality improvement, cost, time and effort reduction, reduced levels of intermediaries, ease in payment information and many more. The research concluded with suggestions from the farmers regarding additional features in the system and the view that ICT can be the fulcrum for taking Indian agriculture from meagre to plenty, from sustenance to profusion and from profitability to wealth maximization.

Key words: Farmer services, Technology, Agriculture, Sugar Information System (SIS)

Introduction

Indian Sugar Industry is the second largest producer of sugar in the world after Brazil, with an annual production capacity of over 35 million metric tonnes. It is the second largest agro-based industry after cotton. This industry not only contributes largely to our economy but also generates employment for the rural youth. Infact, it provides livelihood to over 50 million farmers and their families as well as employment to over 5 lakh skilled and semi-skilled laborers in sugar mills and allied industries across the country.

Globally, sugar production has been showing an increasing trend. Consumption of sugar has also grown at an average annual rate of 2.7% over the past 50 years. This trend is mainly on account of rising incomes, population growth as well as changes in dietary patterns and preferences in the developing countries. (Sugar, 2014)

As on January 31, 2015, India had 703 sugar mills (including two standalone refineries) with major concentration in rural areas. As can be seen from Table 1, about 46% of the sugar mills are promoted by sugarcane farmers in the form of co-operative societies and the remaining are companies.

Table 1: Sugar mills in India (segregated on the basis of ownership structure)

Sr. No.	Sector	No. of Units
1.	Private Limited Companies	335
2.	Co-operative Societies	325
3.	Public Limited Companies	43
	Total	703

(Source: Indian Sugarcane Industry- An Update – June 2015, CARE)

As regards state wise contribution to the sector, Maharashtra, Uttar Pradesh and Karnataka are the leading sugar producing states contributing 75% of total India's sugar production. Uttar Pradesh is the largest sugarcane cultivating state, accounting for nearly 39% of the total sugarcane crop followed by Maharashtra with 22% in 2013-14. However, average yield of sugarcane during the last 5 years in UP was 57-59 tonne/hectare as compared with Maharashtra, which has an average yield of 80-85 tonne/hectare. Furthermore, UP also had a low sugar recovery rate and consequently ranked second in sugar production after Maharashtra during the last 5 years. (Commodity Profile, 2015 and The Indian Sugar, 2015).

On the consumption front, domestic demand from bakeries, confectionaries, hotels, soft drink and ice-cream manufacturers supports higher intake levels. Stable political situation, rising incomes, a young population, relatively strong economic growth and changing buyer consumption patterns have also been seen as the key drivers encouraging higher sugar consumption.

Despite these positive features, the sugar industry has been reeling from the influence of high sugarcane prices and low sales volume of sugar leading to losses being incurred by sugar mills. The sugarcane farmers of Uttar Pradesh have been grappling with a large number of issues. These included getting their sugarcane fields surveyed, correct and timely measurement of sugarcane, selling their produce, loss/theft of supply tickets, delay in receipt of payments, distance between the farmer and mill/society offices. This lack of transparency at each level has made it difficult for the farmers to sell their produce. Millers also suffered due to these bottlenecks leading to a decline in production of sugarcane as many farmers sold their produce to the local jaggery or 'khandsari' units itself.

In such a scenario, intervention from the government's end is necessary to revive the industry. The Sugar Information system (SIS) launched by the Sugarcane Department of Uttar Pradesh (U.P.) was seen as one such initiative. It was one of the largest rural IT initiatives which is financially-viable, technologically accessible, socially acceptable and user-friendly.

SIS is backed by a website, which has password protected accounts for all farmers. This development has equipped farmers with the facility of SMS and Interactive Voice Response System (IVRS), provided access to comprehensive information related to sugarcane and sugar industry through either visiting the website, sending SMS or making a call to the IVRS number. The website is updated on real time basis, 24×7 and SMS sent out to individual farmers as soon as any transaction is executed with them. This system acts as a rural information technology platform and has resulted in advancement of Indian Sugar Industry. (UP sugarcane, 2014)

Features of Sugar Information System:

1. **User convenience:** Choice of accessing information from a mobile, landline, or a computer.
2. **Delivery Centre:** Each Sugar Mill has an independent delivery system.
3. **Geographical coverage:** All Districts are covered.
4. **Cost to user:** Free service to all users is provided. Only technology literacy is essential.
5. **Services provided:** SIS offers all-inclusive information to farmers covering survey, calendar, supply tickets, sugarcane weighing, payment, developments, achievements etc.
6. **Query handling:** Feature to fulfill farmer's query.
7. **Promptness and accuracy:** The information is updated regularly and provided automatically after each transaction.
8. **Security:** The information for each farmer is password protected.

Literature Review

Information Technology has been a boon for all sectors of industry. Its benefits have percolated into all levels of business whether horizontal or vertical including agriculture. It has permeated into agro-based industries as well and its backward linkage with the suppliers of raw materials, the farmers.

During UN Millennium meet, held from 6-8 September, 2000, eight Millennium Development Goals (MDG's) were adopted and under the 8th MDG it was mentioned that in cooperation with private sector, benefits of new technology, especially information and communication should be made available to all concerned. This appeared to be another line of thought for corporate social responsibility (CSR).

Negligible information is available on linking IT with CSR, particularly in context of Indian agro-based industries. However, ITC's Agri Business Division's "e-choupal" initiatives are very relevant in context with its CSR initiatives into company's supply chain as per Dey and Sircar (2012). 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.

It appears that it was in this context that Sugarcane Information System (SIS) for cane growers of Uttar Pradesh was conceptualized by the government of Uttar Pradesh. As per Karman Rizvi (2016), India is a leading producer of sugar in the world and almost half the national production of sugarcane comes from Uttar Pradesh. The sugar mills purchase sugarcane worth Rs. 23,000 crore each year. Sluggish pace of the industry due to logistics and lack of information was causing financial loss both to the farmers and the sugar mills. It was felt that this problem could be resolved by a reliable, robust, quick and cost effective communication system between all the stakeholders.

According to S. Sharma & Dr. A.K. Tyagi (2016), there are several advantages of "SIS" to all the stakeholders such as transparency in marketing system and mutual trust developed between farmers and sugar mills, saving in time of farmers, reduction in settlement time of sugarcane between harvesting and

crushing, resulting into higher cane weight for farmers and increased sugar recovery for sugar mills. The Government was also able to eliminate sugarcane mafia, reduce layers of government, transform the attitude toward e-Governance and increase in use of ICT in rural areas.

This study attempts to focuses on the major contribution made by Sugarcane Department of U.P. for the development of sugar industry and access the impact of Sugar Information System (SIS) launched for farmers of Uttar Pradesh. It also tries to highlight the actual utilization of SIS and its benefits to farmers in term of interaction with mill owner and government, reduction in intermediaries, decline in loss/theft of supply tickets, availability of payment information amongst many others as well as the cost implication for the poor farmers.

Objectives

The main purpose for undertaking this study was to explore the ICT implementation in Indian sugar industry. The objectives set for the research were:

1. To analyze the features and impact of SIS on farmers.
2. To highlight the benefits & costs involved in implementation of SIS.
3. To providing suggestion for improvement of SIS.

Research Methodology

This study was conducted in district Amroha (Uttar Pradesh). Primary data was collected from the villages of the district using a sample size of 70 farmers. A descriptive research design was selected which was backed by survey method. Personal interview were conducted on the basis of simple random sampling. As there was time and money constraint, only 70 farmers were interviewed for the research.

Secondary data was collected from government reports, publication, research reports and books.

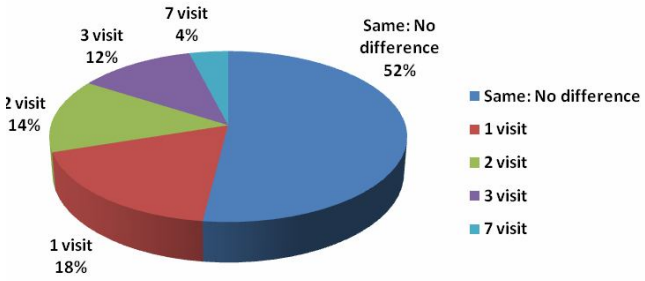
Outcome & Results

The data collected from the study was evaluated on various parameters. These included awareness level and utilization of SIS, preferred mode of operating the system, availability, user-friendliness and quality of the services, interaction with intermediaries and reduction in turnaround time (TAT) amongst others.

It was found that as regards the awareness level of the technology, 77 % of the farmers were aware and only 23 % were unaware of the sugar information system. These 23% small farmers still relied on the intermediaries to sell their produce and were unaware about the technology available in the market. According to them, the lack of literacy and small land holding made them depend on intermediaries and led to their inability to utilize technological advancements.

Table 1: Awareness about SIS

Awareness Level	Frequency	Percentage
Aware	54	77
Unaware	16	23
Total	70	100



Graph 1: Awareness about SIS

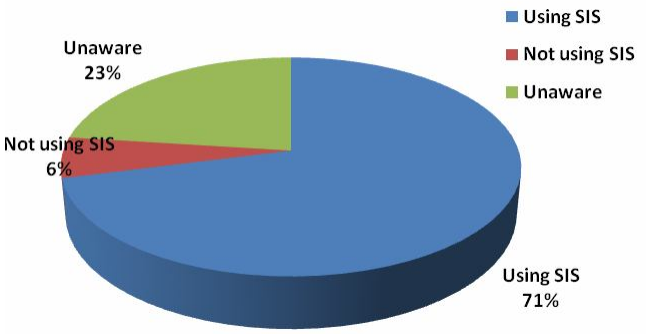
Therefore, there is a need to spread awareness and education among the rural community. This can be done with the intervention of governmental bodies, NGOs, and private industries.

On the service utilization front, 93% of the total aware farmers and 71% of the total sample size were using SIS. The remaining 7% of the aware farmers were not using the SIS due to illiteracy and fear of using technology-inability to operate mobile phones or utilize SMS facility. These farmers still relied on collecting supply ticket from

the collection centre and tracking the payments manually. The farmers aware of SIS consider the technology as a boom for them because earlier every task was done manually and they were unable to track the information related to cane supply, payments, weight, etc. but after the introduction of SIS they are able to track updated information within fraction of seconds.

Table 2: Service utilization

Service Utilization	Frequency	Percentage
Using SIS	50	71
Not using SIS	4	6
Total Aware	54	77
Unaware	16	23
Total	70	100

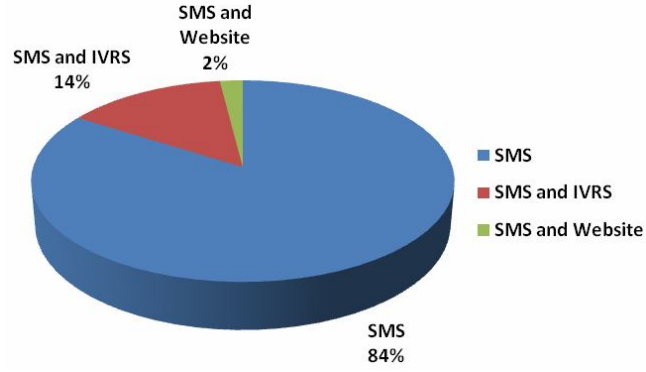


Graph 2: Service utilization

As regards mode of usage, farmer's perception about SMS was most favorable as compared to IVRS and website. About 84 % of the farmers utilize the service of SMS because most of the farmers were equipped with their own mobile phones. They were also of the view that getting the service message on their mobile phones was the most convenient way of communicating any information.

Table 3: Usage Mode Preference

Mode of SIS	Frequency	Percent
SMS	42	84
SMS and IVRS	7	14
SMS and Website	1	2
Total	50	100



Graph 3: Usage Mode Preference

SMS facility has made the system more transparent as the chances of supply ticket being misplaced at the collection center or absence of information about the operation of the mill has become almost negligible. Nowadays, farmers have the information about the generation of the supply ticket, the weight of the produce supplied to the mill, the payment details, etc. at their fingertips in form of SMS, IVRS, or website. If any supply ticket was misplaced, these tickets could be tracked by the reference ID provided by the system.

Regarding availability of services, there have always been question about how efficient ICT is in rural areas. According to the study, 58 % people observed that the service is available sometime or delivered after 2-3 days of generation of the supply ticket or not delivered at all. 42 % of the farmers aware of the SIS were satisfied with it and were able to avail full benefit of the service.

Table 4: Service Availability

Service Availability	Frequency	Percent
All times	21	42
Sometimes	29	58
Total	50	100

SIS enabled mill owners in better inventory management and reduced the wastage percent in form of lesser weight loss. The farmer also accordingly harvested his produce. The system also reduced intermediaries leading to better cost to farmer and reduced number of visits to banks for payment information.

Table 5: User-friendliness

User-Friendly	Frequency	Percent
Yes	48	96
No	2	4
Total	50	100

In context of user-friendly approach, about 96 per cent of the aware farmers concurred to it and were able to avail benefit of the services. Only 4 percent of the farmer aware about SIS did not find it user-friendly, that too because they are illiterate and unable to read the same. They are also not able to use IVRS as they are unable to connect to IVRS as lines are busy or there are many options which are confusing for them.

In the rural areas the main issue is illiteracy and people not able to use the technology available. Government, keeping in view the above problem, is

contemplating designing model more user-friendly for all and make it available in different local languages.

Further, according to the study, 90 percent of the farmers aware of SIS observed the reduction in the role of intermediaries. Their profit margins increased as they are able to sell the produce directly to the mill and not pay commission to intermediaries.

Table 6: Role of Intermediaries

User-Friendly	Frequency	Percent
Yes	45	90
No	5	10
Total	50	100

The sugarcane industry's biggest hurdle was intermediaries. The farmers were not able to sell their produce directly to the mill which led to low farm gate price, inability to sell the produce on time or not get the supply ticket as intermediaries would gather all the tickets and force the farmers to take the tickets from them. Small farmers used to sell their produce at much lower prices as they were not given the tickets by the intermediaries and forced to sell to intermediaries at lower prices.

SIS enables every farmer to track their supply ticket; weights supplied, and track their payment. This resulted in reduction of intermediaries to great extent but not abolished completely. Small farmers still sell their produce through intermediaries but the system is transparent as they know the exact price and the commission percent are fixed. They still sell to intermediaries because transporting small quantities of the sugarcane costs them a lot as against paying commission.

During the survey, it was interpreted that 90% of the farmers realized improvement in the quality of the sugarcane in term of juice content. SIS service provides them accurate information for the time of delivery and the total demand, this helps them in decision making and reducing their losses.

Table 7: Cane Quality

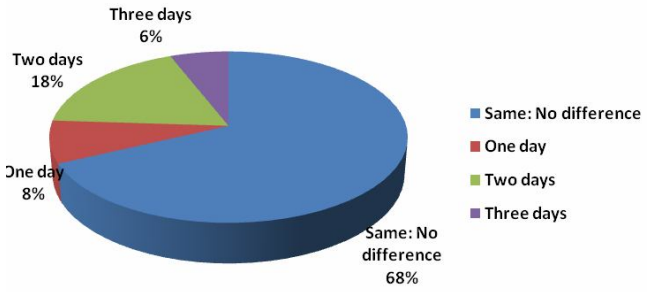
Cane quality	Frequency	Percent
Yes	45	90
No	5	10
Total	50	100

It was found that farmers before the SIS system did not have the accurate information of the supply ticket therefore they harvested their crops much before the required time. This harvested sugarcane used to be stored in the open field leading to moisture loss and therefore monetary loss to farmers. Also there was poor inventory management at the mills, as they were not able to communicate accurate demand to the farmers and had to dump the excess sugarcane. Hence, the sugarcane quality deteriorated at the mill, leading to huge monetary losses.

Majority of the farmers realized no difference in reduction of turnaround time (TAT) because they still had to travel to the collection centre and collect their physical supply ticket. Another reason stated was, delay in delivery of message through SMS and forces them to visit collection centre, inquiring for their supply ticket.

Table 8: Supply ticket: Reduced TAT

Reduced turnaround time	Frequency	Percentage
Same: No Difference	35	68
One day	4	8
Two days	9	18
Three days	3	6
Total	50	100



Graph 4: Supply ticket: Reduced TAT

A major problem faced by the farmers was the generation of the supply ticket and getting the ticket on time. Usually ticket would get generated but would not reach the farmers at all because it would get misplaced or was delivered late which led to high volume of wastage of the sugarcane. Also this uneven supply and demand practice made mill owners suffer huge losses as the raw material was not delivered to them on time.

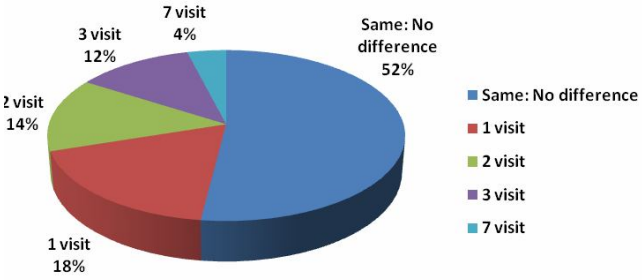
The IT sector intervention in agriculture though SIS supported the farmers but only to a certain extend. This provided farmers the information about the supply ticket generation information and its reference number through SMS, IVRS or website. Thus, farmers were able to get accurate information about the ticket generation and reducing monetary loss. This system can further be improvised by completely abolishing the mechanism of physical ticket collection.

SIS plays a vital role in saving the time of the farmers, as prior to SIS farmer had to visit the collection centre number of times to get the information about their supply ticket. After SIS the number of visit to the mills or collection should have been reduced to a great extent.

According to the study the 52 percent of the farmers observed that the number of the visits to the mill remain the same as they need to visit the collection centre for collection of supply ticket, track their supply ticket generation or visit the collection centre to find their supply ticket as the ticket generation SMS is delivered to the farmer just after the generation of ticket but the ticket are actually delivered to the collection centre after weeks. But on the other hand, 44% of the farmers believe that visits to mills have been reduced maximum upto 3 times. This is possible because after the SIS, farmers are able bout the dispatch of payment but in records of the bank the payment still needs to be updated. So 40 % of the farmers view is that there is no reduction in number of visits to the bank and 48 % of the farmers have been benefited by the SIS as they are provided with the accurate information about payment deposit and think that their visit to bank have reduced to maximum 3 times. This is possible because after the SIS, farmers are able to receive the information through SMS or IVRS.

Table 9: Reduction: Mill visits

Reduction : Mill visits	Frequency	Percentage
Same: No Difference	26	52
1 Visit	9	18
2 Visits	7	14
3 Visits	6	12
7 Visits	2	4
Total	50	100

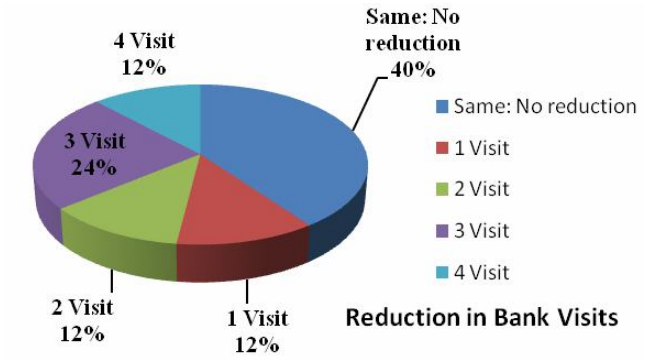


Graph 5: Reduction: Mill visits

SIS has reduced the number of visits to bank to a certain extend but not completely because sometimes the message is delivered to the farmers about the dispatch of payment but in records of the bank the payment still needs to be updated. So 40 % of the farmers view is that there is no reduction in number of visits to the bank and 48 % of the farmers have been benefited by the SIS as they are provided with the accurate information about payment deposit and think that their visit to bank have reduced to maximum 3 times.

Table 10: Reduction in bank visits

Reduction : Mill visits	Frequency	Percentage
Same: No Difference	20	40
1 Visit	6	12
2 Visits	6	12
3 Visits	12	24
4 Visits	6	12



Graph 6: Reduction in bank visits

Farmers in rural areas still rely on traditional practices and lack trust towards technological advancements. They believe in getting confirmation of payments in physical forms. Therefore, some people still visit to banks to get payment information. IT developments have started transforming the mind sets of the rural community and will gradually gain the trust the people, benefiting them in much better way.

Recommendations by farmers

According to the survey, it was analyzed that almost 70 percent of the farmers think that they are benefited by the features of SIS. The features like calendar and weight of sugarcane do not play a major role in helping the farmers because this information was available to farmers prior to SIS also. Services like supply ticket information, payment information, timely updates of mill operation, and query handling played a vital role in saving the time, monetary losses and wastage of sugarcane. There is need to educate the farmers and spread awareness of SIS among the community. Also, there is need to improve the delivery mechanism of the service, so that the farmers are able to utilize the service with no hurdles.

There were some suggestions by the farmers for addition of features to SIS. These additions will help in improvement of the ICT infrastructure of Sugarcane industry thereby benefiting the mills and farmers.

Some of the suggestions made were for the provision of the following information:

1. Weather information

2. Fertilizer/ Pesticides/ Seed arrival at store/dealer and their price.
3. Abolish the system of physical supply of ticket and provide only SMS service. This will save time of the farmers and also cost of travelling.
4. Updating Farmers on various achievements and technological upgradations in field of sugar industry.
5. Field Surveys
6. Information on Auto Parts and service centers

Future Prospects

There is need for investment in agricultural information system because of various factors:

1. About 70 % of the production cost resides in the raw produce and ultimately depends on the agriculture operation mechanism. Therefore, it is necessary to reduce the cost of production and take accurate decision making to maximize profit.
2. Agriculture is the source for raw products and determines the scale of all downstream activities.
3. Agriculture sector is inherently variable and there is a need for high management control with latest technology to achieve economies of scale.
4. ICT is in the nascent stage in agriculture industry and will lead to large benefits after it evolves and is adopted at large.

Conclusion

SIS resulted to be a boom for sugarcane cultivators and millers. It provided complete transparency in the sugarcane industry benefiting farmers, sugar mills and the society at large. The manual system of previous functionalities was replaced by technological interventions thereby resulting in improved efficacy and higher profits.

High level of cooperation is also required between farmers, harvest contractors, transport contractors and mill managers to ensure that the mill receives a steady stream of fresh cane. As small farmer constitute majority of grower base, the industry should take initiative for sharing of high cost farm equipment and harvesting by grower owned co-operatives. Last but not the least the continuous upgradation of human resource skills through training and other programmes inclusive of motivation and reward should be the focus of strategy aimed to enrich manpower and knowledge skills critical for holistic development of the sugar industry. These training programmes have already been initiated by organizations like National Skill Development Corporation; this will definitely support in educating the rural community and gaining their trust over information technology and upgrade the agriculture sector in India.

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