

Enabling Business of Agriculture via New Financing Technologies

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ABSTRACT

Agriculture business in the coming years will pave a way to fulfill the food requirement of all as by 2050 world's population will reach to around 9 billion. To feed such a large population our farmers must get the real benefits like of Financial, Technological, Machinery, on time credit, Vibrant supply chain, Schemes as per the changing trend of market. Currently around 800 million people go to bed hungry every day to overcome such drastic and inhumane conditions in near future which is supposed to be crueler to mankind, our farmers must produce a lot, increasing per hectare yield will be the main challenge and which can only be achieved by using latest technological tools, high quality fortified seeds. For this all our farmers institutions, Fintech sectors, govt. institutions, Machinery sector needs to come together to address this situation. To enable the agribusiness govt should develop user friendly regulations and schemes and at the same time they should be monitored continuously, this agribusiness supporting practices needs to incorporate farmers, firms, food industry, producers, vendors to facilitate selling and purchasing of goods and services.

Estimate suggest that demand for food will increase by around 68% by 2050. Today, growth of agricultural finance is constrained by major factors such as: i) Ineffective and not so accessible policies ii) Lack of backward integration towards farm gate and include a high cost iii) Low level of productivity due to fragmentation and iv) Lack of financial expertise and institutions which can provide a lot of agricultural loan portfolios. Time has come to give our agriculture community the respect and price they deserve to raise their living standard to bring them out of poverty. Government must develop financial cooperatives / Institutions which can strategically provide access to financial support like access to timely credit, insurance with the use of latest technological tools and keep a proper tab afterwards to properly recover those debts. To show case some of the best financial investment made by government we considered e-NAM and Kisan Call Center (KCC) in our thesis study and we will be looking upon the impact they are having on daily lives of a farmer all over India.

INTRODUCTION

Agribusiness: overview

Business of agriculture helps the major population of world as a source of their income and improving this agribusiness will help that community in many ways like – to bring them out of poverty, improving food security. Ever increasing population will demand a high food requirement which can only be dealt with high productivity (Must improve upon per hectare yield) for this to happen, we should provide our farm community every possible help they require like of – financial help, technical help, logistical help, mechanical help etc. For this kind of services, we need to have better rules & regulations with a back strong policy, which should be monitored on a regular interval to make dynamic changes as per current trends.

Major components for improving the business of agriculture is i) implementation of rules and regulation with a proper

framework of policies and making sure they are at par with farming and food sector community, ii) proper connectivity with our farm i.e. we need to have a strong backward integration, iii) Better use of technological services for the farm and firm like of e-NAM, govt portal distributing real time information about weather, soil health card, technical collaboration with world banks, FAO, and other countries which can provide a keen insight to implement such complex system with ease, iv) access to financial services like access to credit, better insurance to cover the loss, one stop platform to get all the details about govt. schemes, farmers and food industry should be made aware about any subsidized schemes, v) Well designed regulations supported by authorized institutions and efficient administrative procedures are must to improve our agriculture sector and its business.

In this thesis, I have covered a significant portion of these areas to find out the major advantages we can have by properly implementing above mentioned components and what are the constrained right now for a successful implementation of above components.

Financing technologies: overview

Financial tools and services will play a crucial role in enabling business of agriculture and improving the living standards of farming community which will lead to better living standards of farming community, creation of the jobs, economic growth of the country. To provide better financial tool and services first we need to understand the farmers and food sector to give them desired beneficial services. The areas need to be focused for providing such Fintech services are:

- i) Insurance cover for the small/marginal holder farmers, SME's,
- ii) Digital Fintech services as they are fast, convenient and hassle free, crediting, debiting the amount without visiting the bank branch,
- iii) Understanding the demand and needs of the farming and food industry and iv) Empowering the women financially who are mainly involved in the agriculture sector.

Gol with private sector need to find a route for appropriate approaches to assess or reduce the main risks and costs that inhibit access to financial services in the agriculture sector.

This thesis will look upon all these above mentioned concerned areas wherein lies the maximum opportunity and what hindrance we can have while going with these approaches, overall it will consider some of the successful stories around the world which we hope if copied in India at larger scale can give the same amount of output.

How we can enable business of agriculture via financing technology?

India, where suicide of farmers is quite common because of drought in their area, lack of empathy from govt. end, lack of access of credit to get their hands on good quality seeds, machinery, lack of insurance, lack of access to market, industry, cold chain, logistics ultimately leads our farmers towards the act of suicide and because of all mentioned constraints majority of Indian farmers are still living below poverty line, not getting proper medical and educational access.

Gol initiatives such as e-NAM, e-Delhi kisan mandi, ITC e-choupal and various schemes such as Soil health card, Opening up of Mega Food Parks, promoting contract farming, Digital banking, linking Aadhaar with their bank account, Gram Swaraj Abhiyaan, Opening up of Agricultural education portal, kisan Kalyan Karyashala (which taught farmers the ways they can double their income by 2022 using different govt services) and many more are finally giving a way to our farmers to enable their agribusiness. Other than that govt. also must open its boundaries so that farmers can sell outside players using FDI tools, regions like North-east can improve their economic stature multifold if govt allows north-east farmers to trade with countries like Bangladesh, Myanmar etc.

There are some success stories available on SFAC website under which they have showed how establishing e-Delhi kisan mandi helped farmers in getting more price for their produce. SFAC also providing Equity grant and Credit Guarantee Scheme (SGCGF) under this scheme they are sanctioning capital assistance to agricultural producer company. Ultimately, leading to enabling the business of agriculture in the country.

Statistics available

India is a big country with a 1.3 billion population, to feed such large rapidly increasing population continuous efforts in the improvement of food and agriculture sector is quite necessary. Here I will be showcasing the facts and figures which are available online on the government website and reports they have published. Gol is making such huge efforts in distributing real time information to all sectors using different sources of communication like- Internet, email, Social media, Tele communication, Radio, Awareness campaigns, Training camps like of skill India, Weather reports etc. This all kind of platforms are helping rural community and food sector to get their hands on the information. The statistics I am going to present will showcase the importance of New financing technologies for enabling the business of agriculture.

e-NAM (National Agriculture Market)

Govt has invested a lot for establishing e-NAM. The basic aim of e-NAM is that farmers can get the best price available for their produce, removing the intermediaries and farmers can sell their produce via online bidding through e-NAM portal all over the India. Buyer can also get the quality wise information of the lot he/she going to get (Figure 1).

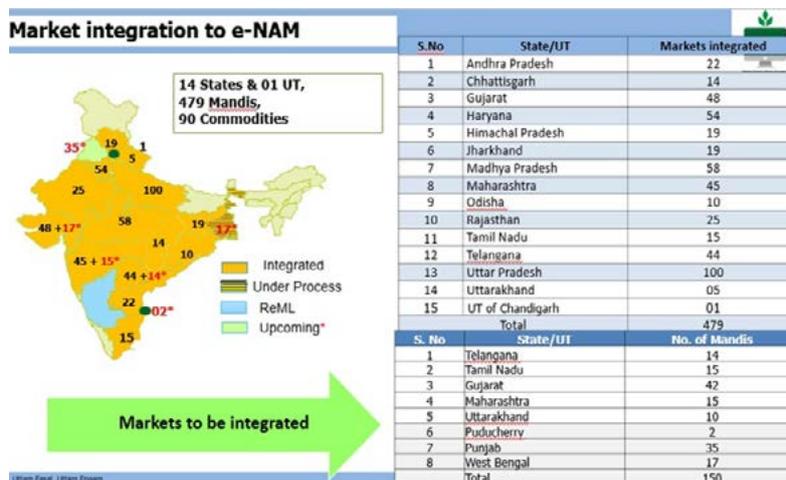


Figure 1. Showing present status of e-NAM status all over India.



Figure 2. Showing the e-NAM process flow from farmer registration to farmer getting money in the end.

Figure 2 above shows the complete process of e-NAM, online bidding take place daily from 10:00 am to 2:00 pm and if farmer thinks they are not getting enough amount via e- NAM and a bidder in front of them present physically offering sufficient amount then they can sell their crop to them too, giving the farmers a edge and flexibility to ultimately sell their produce at a higher price.

The funding opportunities

When we stress upon, that there needs to be intensive financing from govt., corporate, PSB's and cooperatives & other institutions to farmers and food sector. For this to happen we should understand what we can finance to those community and how to get it back in the period, it should be based on proper analysis. Below we are showing certain study finding showing where the funding opportunity lies, to whom we can fund and what we can finance under what circumstances we can finance (Figure 3).

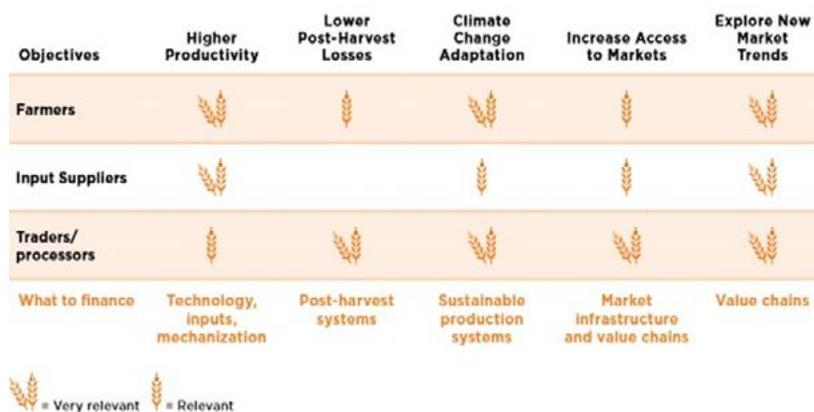


Figure 3. Showing funding opportunity, whom to finance and what to finance.

Improving agriculture productivity and farmers living standard via “Digital Services”

Today the Gol is promoting Digital India and Go cashless initiatives for this they have launched many e-wallets and UPI based applications which allow user to transfer and receive the money directly in their savings account. When farmers are selling their produce on e-NAM they are being paid digitally so that they can get the money right away. These kinds of services are certainly going to help farming community a lot but a challenge lies ahead how we can educate our rural population when they have access to mobile but don't know how to use the internet or such services. For that govt should run many countless awareness campaigns in every single block of each village. Below we have listed down some major action which can enable digital payments and other digital services in the Agricultural sector.

- i) Government, especially Ministry of Food Processing industries.
- ii) Payment service providers and e-wallet operators.
- iii) Establishing NGO's and govt. institutes in the rural area to deliver the campaigns for making the farmers more aware about different kinds of govt. scheme, digital services being offered and how to take advantages of that (Figure 4).



Figure 4. Comment made by FAO Director General, Mr. Jose Graziano during his Interview with Xinhua “Along the sidelines of the 34th FAO’s Regional conference for Asia and the Pacific in Fiji”.

Comments from such a remarkable person, heading the FAO making a point about digital services for sustainable development of agriculture sector by using digital technologies. This show an importance of digital services are going to play to be competitive and for the overall growth of agriculture sector to meet out the demand of food for the whole world.

Kisan Call Center (KCC)

Ministry of Agriculture, launched this scheme on 21st January 2004 to harness the use of Information and Communication Technology for the benefit of the farmers. Their aim was to sort out the farmers queries in their own regional language. Eleven-digit toll free number is “1800-180-1551” and KCC is covering all Indian state and UTs. So, basically farmers are now having access to something which can guide them.

Weather related queries are being answered by KCC agents using the weather report obtained on daily basis from “Ministry of Earth Sciences” (Figure 5).



Figure 5. Weather related forecast data being provided by “Ministry of Earth Sciences” which KCC agents use to answer farmers queries in that region.

Current work

This thesis report will be looking upon the two main government schemes, already in function and contributing a lot for the growth of farming community. Also, we will be looking upon some of the usage of government website who are there with lot of information if can be utilized properly can give the farmers an extra advantage for their overall growth. We have considered e-NAM and Kisan Call Center as primary focus of study and got the data of Sonapat, Haryana mandi as it is nearby to NIFTEM and travel is easy to get the accurate data.

Towards the end of this thesis, you will be able to recognize the benefits of e-NAM, because of that farmers are getting more money for their crops and vegetables also if they were not able to sell the produce via online bidding they can always sell their produce physically if they think they are getting sufficient money right away.

Kisan Call Center (KCC) is getting on an average 15-19 calls per day from the farmers and most of the time, they used to inquire about weather, cultural practices, bio-pesticides, government schemes, Crop insurance etc. and KCC guys able to deliver the answer satisfactorily. Also, government able to implement KCC in 22 languages, so that a farmer can get the information in which they feel comfortable at the same time government providing them message services, audio services, video services to let them understand fully.

LITERATURE REVIEW

An overview

This section forms the basic structure of all the work done to make this thesis. This chapter comprises Literature Review of previous work done by Gol, World Bank, FAO, Private entities, NGO's, Cooperatives, Individuals and many more. Under this section we will try to look upon research, studies, surveys and data gathered from around the world which tell us how it is becoming more relevant to incorporate the financing technologies for enabling the business of agriculture. A major study I have done under this project is on e-NAM and how it is generating more money via direct payment using internet banking or e-wallet in savings account of farmers while reducing intermediaries.

Review on business of agriculture via new financing technologies

Business of agriculture means inclusion of business practices which affects agriculture sector directly or indirectly and, in the end, can improve farmers living standard, can meet out food demand, improving the level of food security. All of this can only be achieved by financing carefully under the right circumstances backed with technical, scientific study of the region where you are going to invest. We have to invest in Machinery, Value chain, Technology, Digital mobile banking system, e-wallets, Market infrastructure, Post-harvest system, In Exploring new market trends etc.

He mentioned in his research paper that, there is an ever increasing need to invest in agriculture due to a drastic rise in global population and changing dietary preferences of the growing middle class in emerging markets towards higher value agricultural products. Estimates suggest that demand for food will increase by 70% by 2050 and at least \$80 billion annual investments will be needed to meet this demand, most of which needs to come from the private sector. On the other side, the growth and deepening of agriculture finance markets is constrained by a variety of factors which include:

- i) inadequate or investive policies,
- ii) high transaction costs to reach remote rural populations,
- iii) covariance of production, market, and price risks, and
- iv) absence of adequate instruments to manage risks,
- v) low levels of demand due to fragmentation and incipient development of value chains, and
- vi) lack of expertise of financial institutions in managing agricultural loan portfolios.

A greater inclusion of youth and women in the sector, and advancements in technology (both in terms of mechanizing the agricultural processes and leveraging mobile phones and electronic payment platforms to enhance access and reduce transaction costs). An important challenge is to address systemic risks through insurance and other risk management mechanisms and lower operating costs in dealing with smallholder farmers ^[1].

Reviewed agriculture credit in India in his paper and also emphasized upon innovative approaches to improve agricultural credit flow from the secondary sources and analyzed using compound annual growth rate and descriptive analytical tools. The share of private moneylenders has decreased with the institutional agencies making inroads into the rural scene. The SHG-bank linkage program, Kisan Credit Card, Farmers Clubs, Joint Liability Groups and Interest Subvention Scheme have been promoted to supplement rural credit delivery effectively and have also shown a significantly increasing growth rates over the years. The other innovations in agricultural credit markets are the inventory/warehouse receipt financing, supply/ value chain financing, leasing, contract farming and producer companies. The study has revealed that informal credit has certainly declined as a percentage

of total debt and simultaneously the institutional credit flow to agriculture has increased over the years with the institutional agencies venturing into the rural areas, nationalization of major commercial banks, and setting up of regional rural banks with initiatives of the Reserve Bank of India [2].

Researcher found out under his study that, the bank credit in India to agriculture sector has been increased in its quantum during the study period. The credit provided by the bank has increased its advances. But an effort must be taken by bank to reduce its outstanding, so that the recovered bank credit should be pumped in to agriculture sector further for its growth [3].

Wrote in his research that, since 2004, there has been a spurt in agricultural credit due to Govt. of India initiatives such as Doubling of Agriculture Credit in 2004-06, Debt Waiver Scheme and Strengthening of Cooperative. Thus, agricultural credit scenario has been good in past years but the average agriculture GDP growth declined to around 2 percent. Although agricultural credit flow data is impressive but the small and marginal farmers are unable to get credit easily. Therefore, more innovative models are needed to reach small and marginal farmers in rural areas for the success of financial inclusion program and ultimately, he found out that, it is now an established fact that without access to formal finance at an affordable cost, inclusive growth is not possible. To provide credit to the productive sector, which has the potential for employment generation, government should adopt multi-channel credit policy involving SHGs and Micro-Finance institution [4].

Their research is based on the identification of the role and importance that products and banking services have in developing a modern and efficient agriculture. A well-organized IT system is important for the agricultural holdings to access e-banking products. This type of IT system in agriculture can enable companies to select agricultural data and information useful for business opportunities and selection of e-banking products. The new banking products for modern agriculture offer several competitive advantages for both agricultural customers activating on global markets and for banks as well. The analysis of the online banking products like Internet banking, Home Banking and Mobile Banking, and global banking products as, for example, credit cards, existing in the portfolio of Romanian commercial banks, led to the delineation of their role and importance for agricultural customers as well [5].

RESEARCH METHODOLOGY

Selection of thesis topic

There are so many things I have consider like research paper and reports which were being published especially from World Bank and FAO as studies. Their main objective was to make the world aware about rising food security issue as world is producing enough to meet to food demand of every single person on the earth and yet there are so many countries where food hunger is there, some developing countries where some are getting food but not the proper nutritional contents. Farmers who are the backbone of this whole system are not getting enough money and they lack the resources to reach out to the market, lack of information at their end, lack of credit, distribution of subsidies, proper cold chain and supply chain are some of the main factors which act as a constraint in the development of the farmers in terms of their living standard.

So, I reached a conclusion with my guide that we can pursue a topic which can address food security issue and which can show some ways by which we can try to improve upon business of agriculture which will lead to better financial gains to farming community and in what ways we can provide financial assistance to farmers of rural India to make them more confident and self-reliant.

Gol, has invested a lot on e-NAM like they are providing software assistance to APMC mandi which wish to come under online bidding process also e-NAM is providing quality parameters testing which will help buyer to get the idea about the quality of produce they are going to get and payment is also done to farmer immediately via using Internet of digital banking tools.

Also, we will be looking upon Kisan call center assistance and try to get the idea about what kind of query farmers used to ask and is this kind of tele-communication service able to help out larger section of farming community.

For this topic, we have covered Sonapat mandi which is having e-NAM service as it is easy to reach out and nearby to our college. I will be comparing the minimum price, maximum price and modal price of e-NAM vs. Physical mandi and by which medium farmers are getting more money and how immediately for this I will be covering two crops: i) paddy (Dhan) and ii) Lady Finger (Bhindi). By the end of this comparison we got to know farmers are getting more amount in Bhindi so we will from next time can advise farmers via Kisan call center that they should go for Bhindi or govt can look into this and can formulate a proper regulation which will allow farmers to grow lady finger more and Paddy in rational amount and it should be on rotation basis. Also, we compared the price of paddy and Lady Finger too individually (e-Nam price vs Physical price) which clearly showed that farmers who are selling via e-NAM were getting more money than the ones who were selling via physically [6-10].

Scope of the study

In India, farmers are still facing some major challenges like:

- i) How to sell their produce for a better market price,
- ii) Effective value chain,

- iii) Proper facility of cold storage nearby to their location,
- iv) financial assistance and how to avail govt scheme and many more.

This study largely focuses on one of the GoI “e-NAM” scheme and “kisan Call center” scheme. Former scheme is helping the farmers in getting them connected whole over India, so that they are able to get the better price of their produce and at the same time getting the payment immediately via digital or internet banking, while the later scheme helping the farmers in getting the knowledge about their farming practices, what to produce, when to produce, what fertilizers to be used and in what quantity for specific crops, also KCC is helping them in making aware about govt scheme and assistance and how to avail them.

Objective of the present study

As per some research we have gone through in Literature review, here in this thesis I would like to cover some comparison using secondary data available from government sources (data.gov.in) and will try to find out below mentioned things:

- i) How e-NAM is able to help farmers financially? Bar chart showing the increase in their income when they were selling produce via e-NAM by comparing minimum price, maximum price and modal price of Paddy (Dhan) first and then Lady Finger (Bhindi).
- ii) I have compared two crops sold via e-NAM in 2018 (taking 1-month data in account) and compared for what crop, farmers are getting more price via this we can promote our farming practices to get the most out of agriculture output via kisan call center.
- iii) I have also looked upon Kisan call center service and compared is there any improvement in no. of calls they are getting by taking into consideration 2 months data.
- iv) Bar chart showing what kind of queries were asked mostly in Kisan call center?

Data collection method

The thesis objective requires data of e-NAM at the mandi level, for the easiness of getting the data we have selected Sonapat mandi as our geographical location as its near to NIFTEM and frequent visit can be made Sonapat mandi e-NAM data is also available month wise on “data.gov.in” that e-NAM data I have taken from there and for physical data we went to mandi got the minimum, maximum and modal price data from the farmers itself who were there at the time of visit. We have considered only 1-month data of Jan 2018 of Paddy (Dhan) and Lady Finger (Bhindi).

Maximum Price – Maximum Price at which lot is being sold both via e-NAM and Physical means on that day.

Minimum Price – Minimum Price at which lot is being sold both via e-NAM and Physical means on that day.

Modal Price – It is the price at which maximum no. of lot was being sold at that day.

I also went to SFAC office at Hauz Khas who is the parent body and played a crucial role in implementing e-NAM at the country level and providing software assistance to the each mandi who wish to have e-NAM. They are also helping mandis in organizing awareness campaigns.

One of the objective is to learn about the importance of “Kisan call center” for that I have got the secondary data from “data.gov.in” for the month of February and March 2018 and analyzed data to showcase the importance of it and how it can help in future to make our farmers more responsive and educative about the latest trends and what kind of things help their agricultural productivity.

Analysis and data interpretation

To fulfill the objective of our thesis, we wanted to show the data which can be understood and can help anybody in showing the progress and achievement of the schemes which took a lot of financial investment in implementing those, GoI have launched and how they are helping farming community for better financial gains for their farm produce.

We have done study of our data using MS Excel and represented that collected data in the form of Charts and tables in the meaning full manner.

Significance of the study

This study will help us in understanding what more is required from government and corporate sector to increase the level of rural population living standard and how we can for ourselves have better farm produce by sharing the information using latest technological tools to increase the productivity i.e. per hectare crop yield and at the same time better in quality.

Schemes like e-NAM and KCC is helping farmers in getting better price and advise about their crops, govt schemes, fertilizers, bio-pesticides etc.

Limitation of the study

Research is a continuous process and human being will always try to pursue the perspective he/she believes can bring lot of

goods in the society, here I have tried to cover only two aspects of the Indian govt scheme i.e. “e-NAM” & Kisan call center-(KCC)” and in what ways they are helping farming community in getting better price removing the intermediaries for their farm produce and payment is also done immediately at the same time KCC is helping curious farmers and distributing the answer for their queries be it of any kind like – crop related, weather related, bio-pesticide related, govt scheme related, cultural practices related.

Like “Robo bank” tied up with Andhra Pradesh cooperatives society to deliver the financial assistance and developing solutions for the farmers of that region, how to reach farmers and provide them financial assistance and how to get it back too in proper way.

There is e-Delhi kisan mandi where Farmers producer organization who are associated with them selling online some of fruits and vegetables, in the absence of e-Delhi kisan mandi farmers were used to sell their produce at Azadpur mandi and Delhi kisan mandi has shown on their website under success stories how farmers producer organization are now getting more money using their online platform.

So, there will always be many things to consider in a research but as of now our sole focus is on e-Nam and KCC [11-15].

RESULTS AND DISCUSSION

Data interpretation and analysis of “e-NAM”

e-NAM (Electronic National Agriculture Market) is a trading platform for traders, buyers and commissioning agents which provides a single window platform for APMC related information. e-NAM provides a transparent sale and prices are set by the trader i.e., either farmers or agents without their physical presence at the mandi. Bidding process takes place daily from 10:00 am to 2:00 pm if the lot is not sold via e-NAM then trader can sell it physically too or they can choose to remain in e-NAM for next day bidding process. Payment is done immediately when you are going with e-NAM system. M/s. Nagarjuna Fertilizers and Chemicals Ltd. is the Strategic Partner (SP) who is responsible for development, operation and maintenance of the platform.

Here we have 2 different crop i) Paddy (Dhan) & ii) Lady Finger (Bhindi) and we have collected data of these 2 crops e-NAM data and physical mandi data of Sonapat mandi.

In mandi we use three different terms:

- i) Minimum Price – The minimum price of the lot for any day.
- ii) Maximum price – The maximum price of the lot for each day.
- iii) Modal Price – The price at which maximum number of lot is being sold for each day.

Crops Considered

- i) Paddy (Dhan)
- ii) Lady Finger (Bhindi)

Price data of above two crops collected for the month of January 2018 (Tables 1,2 and Figures 6,7)

Table 1. Showing the e-NAM price record and physical mandi price record of Paddy (Dhan) for the January 2018.

State - Haryana, District - Sonapat Market - Ganaur							
Commodity - Paddy (Dhan)							
Jan 2018 Data							
S.No.	e-NAM (Paddy)			V/s	Physical		
	Min price	Max price	Modal price(Paddy)		Min price	Max price	Modal price(Paddy)
1	2971	3331	3251		2849	3240	2985
2	3251	3421	3311		2764	3172	3048
3	3051	3401	3251		2915	3124	3049
4	3101	3401	3251		2872	3190	3012
5	3251	3401	3321		3182	3364	3243
6	3251	3421	3311		2900	3128	3150
7	3401	3481	3421		3290	3318	3270
8	3341	3401	3381		3008	3264	3081
9	3341	3421	3381		3158	3370	3181
10	3401	3501	3421		3219	3410	3346
11	3401	3521	3451		3257	3458	3310
12	3421	3521	3481		3246	3362	3280
13	3601	3771	3711		3346	3418	3390
14	3501	3701	3651		3315	3560	3415
15	3601	3751	3711		3276	3476	3350

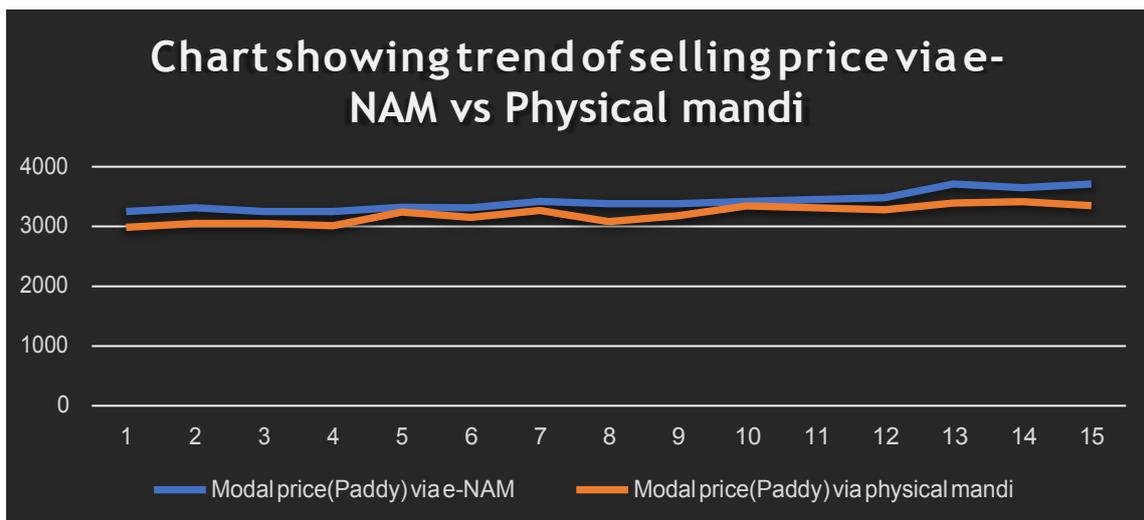


Figure 6. From above Table 1, here we can see that traders/agents are getting more amount when they are selling via e-NAM online bidding process and getting the payment immediately without ever going to mandi.

Table 2. Showing the e-NAM price record and physical mandi price record of Lady Finger (Bhindi) for the January 2018.

District - Sonapat and Market Sonapat mandi						
Commodity - Bhindi (Lady Finger)						
Jan 2018 Data						
e-NAM (Lady Finger)			V/s	Physical		
Min price	Max price	Modal price (Lady Finger)		Min price	Max price	Modal price (Lady Finger)
5000	6000	5000		4500	5600	4700
5000	6000	5000		4800	5800	4800
5000	6000	5000		5000	5700	5000
5000	6000	5000		4600	5830	4800
5000	6000	5000		4800	5790	4850
5000	5500	5000		4900	5300	4900
5000	6000	5000		4700	5900	4750
5500	6000	5500		5250	5800	5300
5200	5800	5200		5000	5550	5000
5500	6000	5500		5300	5800	5350
5000	6000	5000		4800	5900	4800
5000	6000	5000		4700	5700	4800
5000	6000	5000		4800	5850	4900
3000	3500	3000		2900	3300	3000
5000	5500	5000		4750	5350	4800

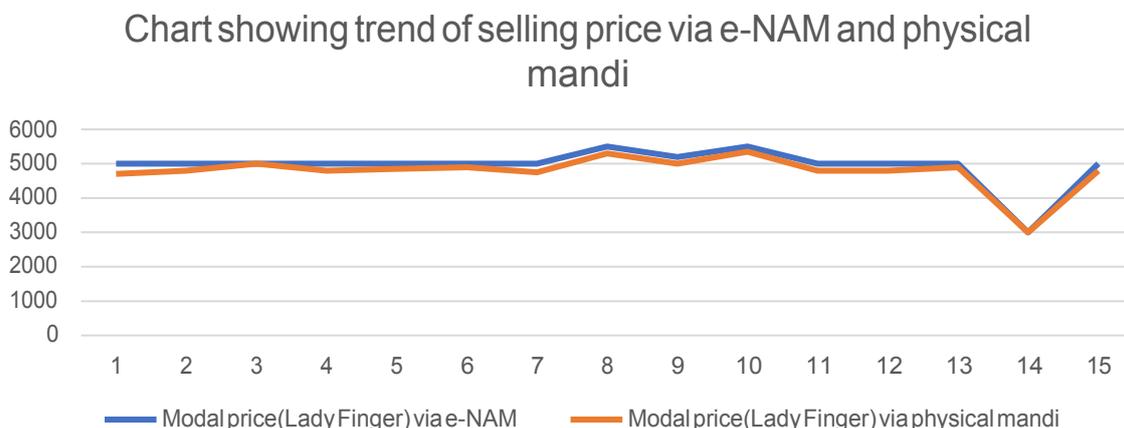


Figure 7. From above Table 2, here we can see that traders/agents are getting more amount when they are selling via e-NAM online bidding process and getting the payment immediately without ever going to mandi.

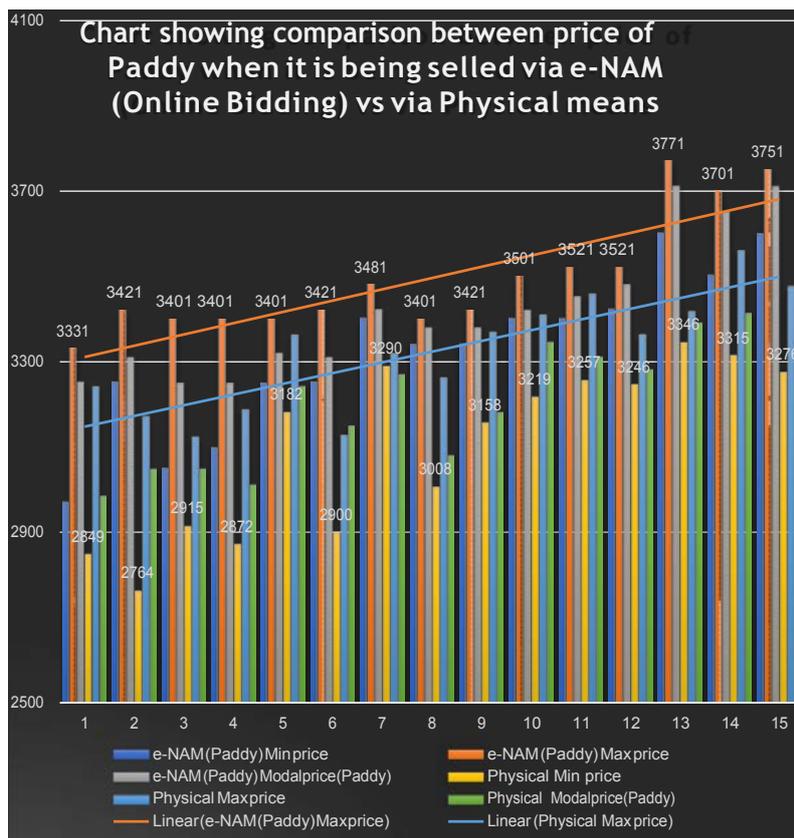


Figure 8. Chart showing comparison between price of Paddy when it is being sold via e-NAM (Online Bidding) vs via Physical means.

Figure 8 clearly depicts the benefits of e-NAM which our farmers are now getting. Linear line of Maximum price of Paddy one is of e-NAM and second is of physical means, depicts the clear image that via e-NAM farmers are getting more amount for the same crop, also for this bidding process they need not go to mandi every time and most of the time buyer at its own expense get the lot from the mandi, thereby saving the transportation cost of delivery too for the farmer.

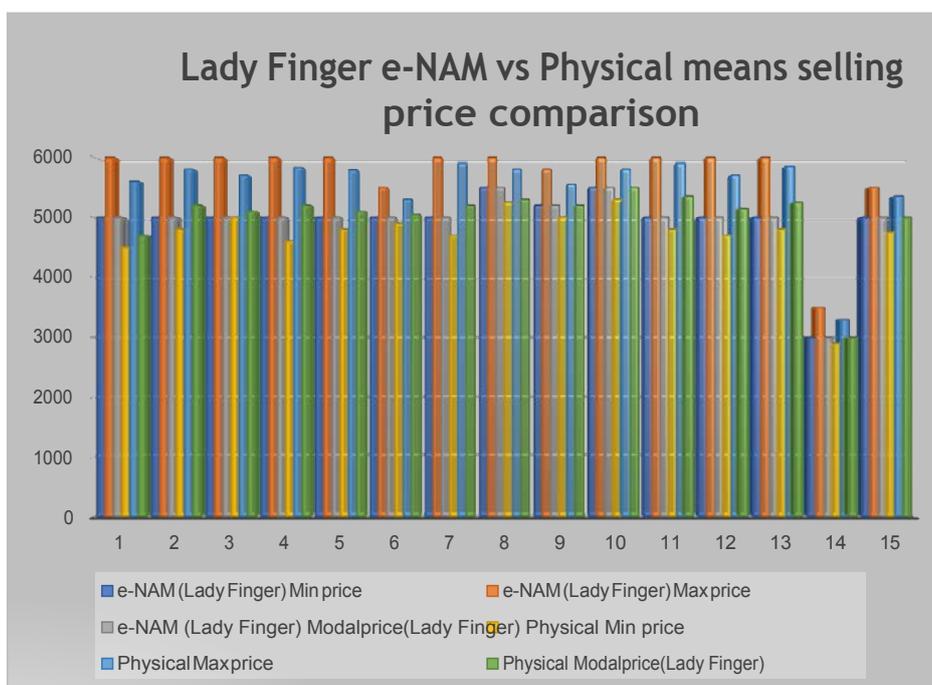


Figure 9. Lady Finger e-NAM vs Physical means selling price comparison.

Figure 9, using bar chart we can see farmers are getting more price for their lot in all category be it minimum price, maximum price or modal price.

This shows the viability of e-NAM and why it should be implemented across India. SFAC with its partner company who manages the software of e-NAM can certainly do more like they can provide the option of Individual buying, so that any one from all over India can get the crops, vegetables of their desired wish and at optimum price available.

Right now, Indian families of 4 people used to buy Wheat grains yearly around 400 kg and they get it from some agents who got that lot from the mandi, so we get that produce at a much higher rate, now if we allow such option to get the lot from e-NAM directly it will benefit farmers and us too, farmer will get the price they desired as per current market rate and we too will have the lot on a reasonable amount.

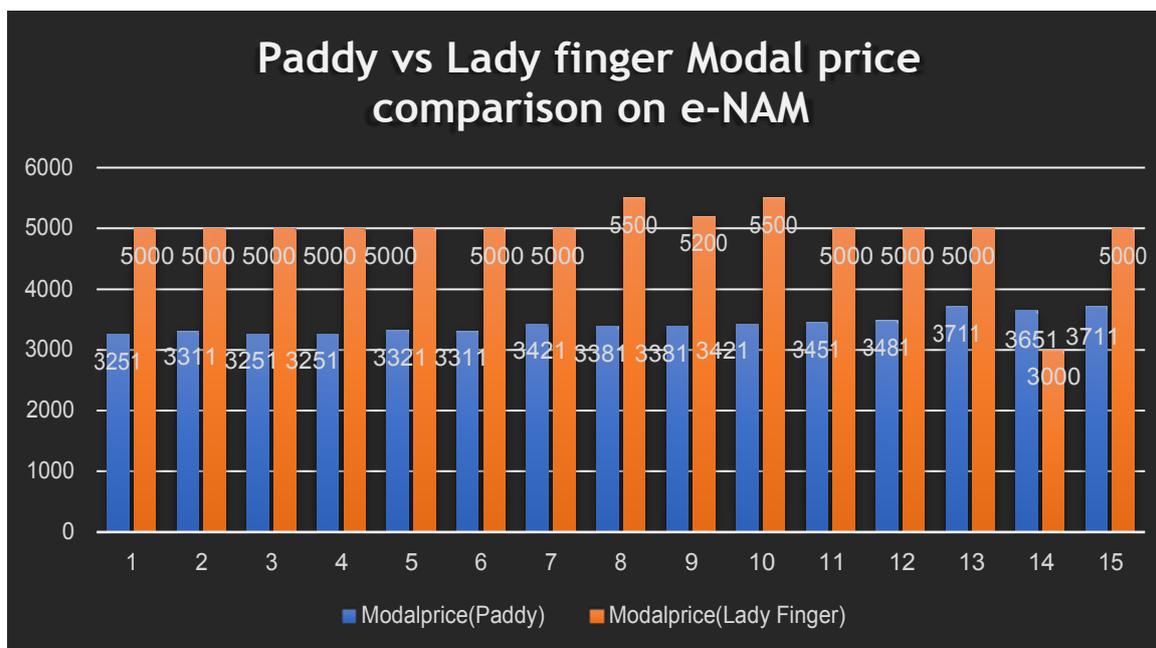


Figure 10. Paddy vs Lady Finger Modal price comparison on e-NAM.

Figure 10 shows farmers who are selling Lady Finger via e-NAM are getting much more price in comparison to those farmers who are selling Paddy via e-NAM. So, basically those who are selling Lady Finger can utilize the current market condition in a better way, maybe they were having good information about this in prior. Now, it is government duty to make farmers make more aware about the current market scenario so they can produce the crops on rotation basis because we have also observed that farmers who are growing paddy will continue to grow paddy because they feel safe with that, they don't want to take any risks which also gradually decreases their land productivity level if they have proper knowledge about crop rotation they could have got the benefit too.

Data interpretation and analysis of Kisan Call Center (KCC)

Kisan Call Center (KCC) is being maintained by "Farmers Knowledge Management System". They provide farmers all kind of help to support them, farmers can either call them on "1551 or on 1800-180-1551" or they can register themselves on their website "farmer.gov.in" and then login on that portal.

Aim of Farmers' portal is "It is envisaged to make available relevant information and services to the farming community and private sector using information and communication technologies, to supplement the existing delivery channels provided for by the department. Farmers' Portal is an endeavor in this direction to create one stop shop for meeting all informational needs relating to Agriculture, Animal Husbandry and Fisheries sectors production, sale/storage of an Indian farmer. With this Indian Farmer will not be required to sift through maze of websites created for specific purposes. Once in the Farmers' Portal, a farmer will be able to get all relevant information on specific subjects around his village/block /district or state. This information will be delivered in the form of text, SMS, email and audio/video in the language he or she understands. These levels can be easily reached through the Map of India placed on the Home page. Farmers will also be able to ask specific queries as well as give valuable feedback through the Feedback module specially developed for the purpose" [16-19].

We have taken into consideration Sonepat mandi KCC data for the month of February and March 2018 and did some analysis to get the idea how it is helping farmers and making an impact on their lives (Tables 3 and 4).

Table 3. Showing information about kind of query and about what crop KCC received most calls from farmers during February 2018.

On an Average number of calls received per day in February 2018 - 15 calls				
Query Type	No. of query	Questions based on major crop	No.	of Queries
Field Preparation	10	Barseem		7
Plant Protection	13	Bhindi		4
Agriculture Mechanization	3	Bottle gourd		4
Bio-Pesticides and Bio-Fertilizers	26	Onion		5
Cultural Practices	13	Tomato		5
Fertilizer Use and Availability	12	Wheat		144
Government Schemes	7	Others (Weather, Govt scheme, Biofertilizers)		222
Market Information	4	Total		391
Nutrient Management	4			
Weather	305			
Weed Management	8			
Total	405			

Table 4. Showing information about kind of query and about what crop KCC received most calls from farmers during March 2018.

On an Average number of calls received per day in March 2018 - 19 calls				
Query Type	No. of query	Questions based on major crop	No.	of Queries
Field Preparation	6	Bhindi(Okra/Ladysfinger)		4
Plant Protection	58	Bottle Gourd		13
Agriculture Mechanization	2	Bovine (Cow, Buffalo)		5
Bio-Pesticides and Bio-Fertilizers	37	Chillies		8
Cultural Practices	11	Jamun		4
Fertilizer Use and Availability	14	Mango		11
Government Schemes	11	Onion		14
Soil Health Card and Soil Testing	4	Mustard		4
Training and Exposure Visits	6	Sugarcane		5
Weather	254	Tomato		5
Weed Management	2	Wheat		92
Total	405	Others (Weather, Govt scheme, Bio fertilizers)		210
		Total		375

Comparison of KCC During the Month of February and March 2018

Based on query type asked during February and March 2018 (Table 5 and Figure 11)

Table 5. Month wise comparison of query type asked.

Query Type	Sum of No. of query (Feb)	Sum of No. of query (March)
Field Preparation	6	10
Plant Protection	58	13
Agriculture Mechanization	2	3
Bio-Pesticides and Bio-Fertilizers	37	26
Cultural Practices	11	13
Fertilizer Use and Availability	14	12
Government Schemes	11	7
Soil Health Card and Soil Testing		
Testing	4	4
Training and Exposure Visits	6	4
Weather	254	305
Weed Management	2	8
Grand Total	405	405

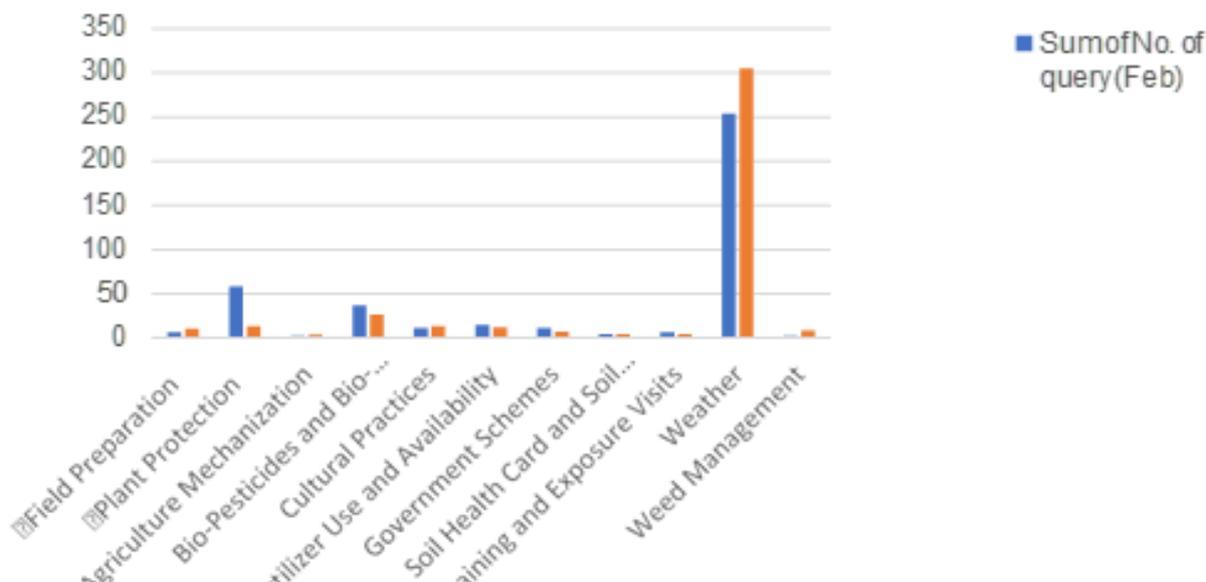


Figure 11. Bar representation of number of query type asked during February and March 2018.

SUGGESTIONS

We certainly can't deny the fact that government is trying to do a lot for our farmers but due to large population and education barrier, the awareness and acceptance pace is quite slow. We need to have a system where we can address the farmers at a large scale making them aware about future plan of action to increase their level of income.

Here, we have targeted two government schemes in which they have invested a lot financially to make them viable at the ground level. Below is some suggestion for the improvement of existing e-NAM and KCC. These are my own views and I thought if implemented can make system more effective and beneficial for farmers.

Suggestions for e-NAM

1. Government should try to bring food companies in e-NAM domain, which are engaged in contract farming or who procure from APMC mandis. So, that farmers can get more chances to trade their produce at a competitive level.
2. e-NAM should be open for all individuals of India, so that a common family who needs some grains or cereals or any other requirement during time of wedding can procure the lot from e-NAM directly.
3. Intensive awareness program should be conducted at block, village level and in every food companies too.
4. Payment should be done via only internet banking NEFT/RTGS, UPI, BHIM as because during our interaction we learned that many a times buyer was giving them a cheque which usually take a week time to get the money in the account.
5. Government should try to make Interstate trading more flexible and should provide transportation services at a cheaper cost.

Suggestions for Kisan Call Center (KCC)

1. Kisan Call Center (KCC) is an Intelligent move from government and it clearly shows how we can use Information and communication technology for the benefits of the farmers.
2. KCC agents are just providing the information about their queries, instead they should also advise them about current trends and from which crop they can get more money.
3. On an average KCC is getting 15 to 19 calls per day, so they should utilize this opportunity and make the farmers aware about the importance and use of e-NAM.
4. KCC is been a definite success but now it should try to expand its operation boundary and try to inform something beneficial to farmers like schemes available in that state/UT or subsidies, insurance they can have.

CONCLUSION

We have done a proper analysis on both e-NAM and KCC and from there we can get the proper idea about how and why these kinds of initiatives are required from time to time to continuously improve the living standard of farmers in India.

Comparison of e-NAM vs physical selling data of Paddy and lady Finger shows that farmers who are selling via e-NAM online bidding process are getting more amount for the same crop in comparison to their counterpart who are selling via physical means.

Also, a comparison between paddy and lady finger e-NAM selling price shows us that farmers who were selling lady finger were getting more amount (Rs/quintal), so we can get the idea that farmers who were selling paddy didn't know about the trend of the market or maybe they didn't know about the importance of crop rotation.

KCC is the best government initiatives and is very successful among the farmers as it can fulfill the queries of farmers and also, they are getting answer in their own dialect which make the feel more comfortable to understand the things.

Both e-NAM and Kisan Call Center (KCC) when implemented successfully at a larger scale all over India, helped farmers in their agriculture management practices for example: Farmers are now a bit more aware about what kind of crop they can grow in their field with maximum yield and at the same time can fetch more price from the market with a proper information about the weather forecasting. E-NAM is arranging time to time awareness campaigns at block level in each village where e-NAM mandi is there. They are giving them digital literacy short courses which is making them aware about how to use digital banking services.

Government of India with some private sector like banking institutions and farming institutions trying to bring some new products in the form of micro/ mini or in sachets form which will be covering farmers interest at a larger domain. While we still face some major challenges like breaking the rigid old mind set of the farmers who is getting just on an around Rs. 5000/month in India on an average that yes you can double your income if you try to adopt certain changes in your agriculture management practices, for this a long road needs to be cover which will include proper guidance to them on regular intervals with some concrete example to show them, that yes if you adopt such thing you will get the desired outcome. Using these two platforms government also promoting "Crop Rotation" and developing infrastructure like cold storage near the farm field and providing them logistics services by messaging the contact details of nearby transportation company contact details where they can negotiate at their own level.

Overall both initiatives are having a solid future and will help the farming community more in nearby future. e-NAM will probably take some more time to get established properly all over India in all APMC mandis and lot of continuous improvement needs to be done in e- NAM which can only be learnt from the barriers we are facing in e-NAM right now and if farmers are having query and trouble in using e-NAM than it should be addressed right away.

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