

**UTILISATION BEHAVIOUR OF REGISTERED FARMERS OF SELECTED  
AGRICULTURAL PRODUCE MARKET COMMITTEES (APMCs) OF  
TELANGANA STATE ON e-NAM PORTAL**

**By**

**MALLIBOINA MAHESH YADAV**

**(2018-11-127)**



**DEPARTMENT OF AGRICULTURAL EXTENSION  
COLLEGE OF AGRICULTURE  
VELLANIKKARA, THRISSUR-680656  
KERALA, INDIA  
2021**

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**THESIS**

Submitted in partial fulfilment of the  
requirement for the degree of

***Master of Science in Agriculture***

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**DEPARTMENT OF AGRICULTURAL EXTENSION  
COLLEGE OF AGRICULTURE  
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KERALA, INDIA  
2021**

## DECLARATION

I, hereby declare that the thesis entitled **“Utilisation behaviour of registered farmers of selected Agricultural Produce Market Committees (APMCs) of Telangana State on e-NAM portal”** is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me any degree, diploma, associate ship, fellowship or other similar title, of any other University or Society.

Place: Vellanikkara

Date: 30/09/2021

  
**MALLIBOINA MAHESH YADAV**  
**(2018-11-127)**

## CERTIFICATE

Certified that this thesis entitled “**Utilisation behaviour of registered farmers of selected Agricultural Produce Market Committees (APMCs) of Telangana State on e-NAM portal**” is a record of research work done independently by **Mr. Malliboina Mahesh Yadav (2018-11-127)** under my guidance and supervision and it has not previously formed basis for the award of any degree, diploma, associateship or fellowship to him.

Place: Vellanikkara

Date: 30/09/2021



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(Chairperson, Advisory  
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## CERTIFICATE


We, the undersigned members of the advisory committee of **Mr. Malliboina Mahesh Yadav (2018-11-127)**, a candidate for the degree of **Master of Science in Agriculture** with major field in **Agricultural Extension**, agree that research work entitled “**Utilisation behaviour of registered farmers of selected Agricultural Produce Market Committees (APMCs) of Telangana State on e-NAM portal**” may be submitted by **Mr. Malliboina Mahesh Yadav (2018-11-127)** in partial fulfilment of the requirement for the degree.



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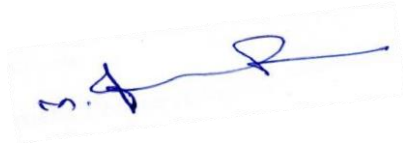
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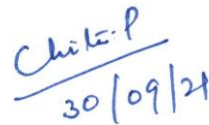
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**Malliboina Mahesh Yadav**

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# **INTRODUCTION**

## 1. Introduction

India is an agrarian country. It is believed that every culture is bound to fail tomorrow if agriculture fails today. An impressive and scientific application of service and technology can support Indian agriculture to face the serious challenges of poverty, food insecurity and malnutrition (Bachaspati, 2018). The agriculture and allied sectors continues to play vital role to the sustainable growth and development of the Indian economy. Agriculture not only meet the food and nutritional requirement, but also contributes significantly to the production, employment and demand through various backward and forward linkages. In India more than 50 per cent of population is engaged in agriculture and allied sectors (Tyngkan, 2018). Even though India is an agricultural country, its agricultural marketing has not been found that effective. The farmers are unable to get reasonable price for the products even after their hard work and are fully exploited by the middlemen due to the lack of market intelligence.

In order to encourage direct agricultural marketing infrastructure facilities in the country, the Government of India, introduced a model APMC Act in 2003, by setting up a committee under the chairmanship of Shri. K. M. Sahni, in consultation with the states for development and strengthening of agricultural marketing with better infrastructure, grading and standardisation. The states under the scheme were needed to amend their state specific Agricultural Produce Market Committee. The salient features of the model act are:

- Provide contract farming, allowing direct selling of the produce to contract farming sponsors
- Provide creation of marketing infrastructure from the revenue earned by the APMCs
- Permit private persons, farmers, and consumers to establish agricultural markets
- Provide a provision for setting up special markets for specified agricultural commodities
- Made the State Agricultural Marketing Board responsible for standardization and grading in the markets



- Provide single point levy of market fee on the sale of notified commodities
- Replace the licenses with registration of market agencies so that they can operate in more than one market

Under these laws, farmers have to sell their produce at state owned *mandis*. Over the years many issues have been highlighted in this system. For instance, APMC markets currently collect a market fee from farmers who wish to sell their produce in the *mandis*. This makes it more expensive for farmers to sell at APMC *mandis*. In addition, farmers have to arrange transportation of their produce to the nearest market from their farms, which brings in additional cost. Several intermediaries are involved in transporting the produce from farm to the market. A certain proportion of the price have to be paid to intermediaries as commission. Thus the market price received by the farmers for their produce becomes lower than the price at which the produce is sold to the retailer.

### **National Agricultural Market (e-NAM)**

The e-NAM is a pan-India electronic trading portal launched on 14<sup>th</sup> April 2016 by Government of India, and Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing e-NAM. The e-NAM connects the selected APMCs to build a unified national market for trading agricultural commodities across the country.

The e-NAM is a virtual market, but at the back end, there is a physical market. The e-trading platform assists all the APMC related information and services through a single window system. It includes commodity arrivals, prices and information about the minimum and maximum price of the available commodities. Online market reduces the transaction cost and information asymmetry ([www.enam.gov.in](http://www.enam.gov.in)). Among the various States of the country, Karnataka is famous for its High-tech hub for shopping and is a forerunner in market reforms. To improve agricultural markets and competitiveness, The Government of Karnataka launched the unified online agriculture market on 22<sup>nd</sup> February 2014. A total of 105 markets across 27 districts were brought under the Unified Market Platform (UMP) as of March 2016. The success of UMP in Karnataka got countrywide attention and some states like Andhra Pradesh, Telangana, Maharashtra and Gujarat have already started adopting the

Karnataka model. Impressed by the success of UMP in Karnataka, the Government of India took initiative to encourage other states to adopt e-trading platform for agricultural commodities (Chand, 2016).

### **Objectives of e-NAM**

- To integrate the markets first at the state level and later across the country through a common e-platform, to facilitate pan - India trade in agricultural commodities
- A national e-market platform for transparent sale transactions and price discovery in regulated markets and warehouses. Willing States are to enact the suitable provisions for e-trading in their APMC Act
- To provide unified license for a trader that valid across all markets in the State.
- Liberal licensing of buyers and commission agents by state authorities without any pre-condition of physical presence or premises in the market yard/ possession of shop
- To coordinate the quality standards of agricultural produce and provisions for quality testing (assaying) infrastructure in every market to enable informed bidding by buyers
- To provide marketing efficiency by transparency in auction process, prices proportionate with quality of produce and e-payment
- Imposing single point levy of market fees *i.e.* on the first wholesale purchase from the farmer

Electronic trading platform for National Agriculture Market (NAM) was launched with 21 APMCs across eight States on 14<sup>th</sup> April 2016. Government of India has now approved the proposal of 21 States/3 UTs for integration of 1000 APMCs with e-NAM.

States which are interested to integrate APMC with e-NAM, need to carry out the following pre-requisites,

- State APMC Act must have a specific provision for electronic trading/ e-auction as mode of price discovery

- Single point levy of market fee across the state
- Single trading license to be valid across the state

The e-NAM is created with an investment by the Government of India through the Ministry of Agriculture and Farmers' Welfare to offer special software developed for e-NAM made available to each APMC that agreed to join. Financial assistance are provided to States of selected APMCs / RMCs up to Rs.30 lakhs per market, for the purchase of hardware, internet connection and equipment for assaying and related infrastructure to make the market ready for integration with e-NAM.

The e-NAM is a e-platform for agricultural marketing in India introduced in 2016. A very limited number of studies have been taken up with respect to the arrival and trading of commodities in Telangana. However, no efforts have been undertaken in the State of Telangana to analyse the perception of the stakeholders especially the farmers and traders and the problems, if any faced by them with respect to utilisation of e-NAM.

In this backdrop, the present study was undertaken with the following specific objectives:

1. To understand the process and functioning of e-NAM facility under selected APMCs in Telangana State.
2. To study the perception of farmers about e-NAM and its utilisation.
3. To identify the constraints in availing e-NAM services.

### **Scope of the study**

The present study was attempted to find out the process and functioning of e-NAM facilities which would give a broader understanding of various opportunities available through the e-NAM platform. The outcome of the study on the perception and utilisation of e-NAM would help to bring more number of stakeholders in the e-portal for better utilisation. The constraints explored will be helpful for further building up of e-NAM services for better prospects of the farmers and traders.

**Limitations of the study**

The present study was conducted as part of master's degree programme of the student researcher. The study was restricted to Warangal and Hyderabad districts of Telangana State. The study was based on perceived opinions of the respondents and depended on their memory. Finally, there were constraints of time, money, resources and the covid-19 pandemic restrictions. However, care has been taken to make the study as objective as possible.

**Organization of the thesis**

This study is presented in five chapters. The first chapter deals with the introduction section, highlighting the objectives, scope, and limitations of the study. The Second chapter provides the review of literature that are relevant to the study. The methodology that was adopted for the study which includes locale of the study, selection of respondents, data collection and statistical tools used are described in the third chapter. The fourth chapter deals with the results and discussions of the study and the summary and conclusions of the study are given in the fifth chapter. References, appendices and abstract are given at the end.

# **REVIEW OF LITERATURE**

## 2. REVIEW OF LITERATURE

The review of literature helps to develop a proper understanding of research problem and it provides strong foundation for scientific investigation. Keeping the objectives in view, literature relevant to the present study was collected and is presented under the following sub headings:

- 2.1 Electronic trading in agriculture
- 2.2 Procedure of online marketing in agriculture
- 2.3 Personal profile characteristics of farmers
- 2.4 e-literacy of farmers
- 2.5 Perception of farmers and traders towards online marketing
- 2.6 Awareness about e-NAM
- 2.7 Utilisation of online marketing
- 2.8 Utilisation of e-NAM
- 2.9 Constraints in using electronic trading platform

### 2.1 Electronic trading in agriculture

Mueller (2000) stated that in US one in 25 farms had access to the internet in 2000 and e-commerce transactions were classified according to the partners involved *viz.*, consumers, business and government. The author also stated the impact of e-commerce in agriculture covers the vast fields, such as accessibility of e-commerce to the farmers, categories of agricultural e-commerce sites according to the economic purpose they serve (*e.g.* e-market intermediation, saving transaction cost, integrating e-commerce services, and providing e-commerce support).

Doluschitz *et al.* (2002) stated that the agricultural sector provided good opportunities for e-business because of its polypolistic structure, to the wide distances between operation sites and to diverse vertical as well as horizontal cooperative relations. It was therefore suggested that the internet would spread quickly and would become broadly established in the agricultural sector.

Fritza *et al.* (2004) analysed the developments in infrastructures in Agri-food sector between 2000 and 2002 and identified development strategies of successful platforms. Out of 85 platforms which existed in the year 2000, only 25 remained active in 2002.

Matani (2007) stated that IT must be used for keeping and maintaining the updated and enriched database of region-specific agricultural information to reach the farmers on time. Agricultural information regarding the agricultural products, their demand-supply status, and their current prices should be made available online to farmers for taking timely decisions on crop production and marketing.

Cofas (2009) conducted a study to understand the use of internet and marketing strategies adopted for electronic commerce implementation. The author concluded that electronic commerce allows more customer input which influenced agricultural marketing decisions.

Vaithianathan (2010) observed that numerous firms across the globe had adopted electronic commerce and hence benefited. In technologically developed countries like UK and US the firms which adopted electronic commerce gained advantage but agricultural firms in developing countries like India failed to follow the suit. The study examined the existing status of electronic commerce in India and identified opportunities for upcoming research.

Qaisar *et al.* (2011) discussed a number of innovative steps taken by ICT project in transferring information to farmers, focusing its analysis on mobile telephony, internet kiosks, like Tata Kisan Kedras, e-choupal, *etc.* The authors concluded that sustainable economic growth in rural India could be reached through public private partnership in the e-commerce field. Multi service public private kiosks would be the game changers in the rural market upliftment and ICT infrastructure would become the backbone.

Carpio *et al.* (2013) stated that market makers generated new marketing contacts, customers and higher sales through the e-commerce but active user's participation was critical for achieving these benefits.

Behera *et al.* (2015) described the importance of ICT to increase marketing activities of retail business in agricultural sectors which can boost Indian economy. The authors identified that number of IT users in agricultural retail field went on increasing prominently from 2011 to 2015 and they stated some success stories and prescribed some models for the justification of the importance of ICT in agriculture retail marketing.

Sally (2018) conducted a study on the new features of e-NAM. The six new features added that make e-NAM more user-friendly include MIS dashboard for better analysis, mobile payment facility by traders, BHIM payment facility and enhanced features on mobile app such as gate entry and mobile payments, e-Learning module in e-NAM website and integration of farmer's database.

## **2.2 Procedure of online marketing in agriculture**

Jairath and Agarwal (2005) observed that the commitment of specific markets like vegetables and fruits in total regulated markets is low. The states which representing about 20 per cent of vegetables and fruits production does not have regulated market per 100 sq.km. Some states have recently started a process of direct marketing by producers to consumers by starting the Rythu Bazar (Andhra Pradesh), Apni Mandi (Punjab, Haryana and Rajasthan), Uzahver Standies (Tamil Nadu), Krishi Bazar (Odisha) and Shetkari Bazars (Maharashtra).

Chengappa *et al.* (2012) stated that IT application as presentation of e-tender process helped in diminishing time for most of the stakeholders, but did not reduced the workload of the traders.



Marc and Kristi (2012) stated that it is basic to develop integrated electronic framework which process not only the trading but also the center office activities, such as trade confirmation, settlement and the risk management. The e-trading is expected to develop further and reflecting these market forces.

Tomar (2013) stated that the reform measures should be initiated by the government of India in agricultural marketing sector is expected to achieve national wide integration of markets to enhance the competitiveness of Indian agriculture in the global market through the effective implementation of marketing reforms.

Strzebicki (2015) described development of IT which is increasingly being used in agribusiness. The e-commerce had a tangible impact on the way business is led and structure of market. It is shown that development of e-commerce in polish agribusiness at an early stage of development and at the same time is a process of evolutionary changes.

Aggarwal *et al.* (2016) studied on transformations in agricultural markets in Karnataka district, to glean lessons from Karnataka's experience for India's e-NAM. The authors have explained the process of e-trading *i.e.*, operational mechanism of e-NAM, through a field study of ten mandis across the Karnataka State. It was found that Karnataka has been consistently pushing through with reforms, in the context of extremely entrenched relationships between farmers, traders and agents.

Deshmukh *et al.* (2018) stated that the formation of National Agriculture Market (NAM) is a landmark initiative, it would provide the farmers more options to sell their produce and it increases the accessibility of markets to farmers with unified marketing of e-NAM. In the era of globalisation and liberalisation these agricultural markets would help India to meet the challenges posed by the global markets.

Kulkarni (2018) stated that Karnataka had implemented e-auction system through a UMP in over 100 markets and a total of 105 markets had been brought under UMP across 27 districts as of march 2016. About 42 lakh lots with a total quantity of 1,863 lakh quintals and a total value of Rs 19,106 crore had been transacted on e-platform. The e-permit system, allowed the markets in the state to update their stock and generate e-permits from UMP.

Pattnaik (2018) revealed that the major constraints in availing e-NAM sakhigol RMC were lack of storage facilities, transportation facilities, distress sale and grading facilities. The author also stated that the farmers were happy with e-NAM platform as they were able to sell the entire produce on the same day and getting better prices for their produce.

### **2.3 Personal profile characteristics of e-NAM farmers**

#### **2.3.1 Age**

Chandana (2018) reported that majority of the farmers trading in e-NAM were 36-45 years of age group(52.50%) followed by 46-55 years age group (23.33%) and 14.16 per of farmers below 35 years of age.

Pattnaik (2018) observed that 57 per cent of the farmers were less than 50 years of age while 43 per cent of the farmers were more than 50 years of age.

Geethavani (2019) reported that majority (84%) of farmers were middle (36-55) aged while 16 per cent of farmers were young (up to 35 years) aged group.

Swarna (2019) observed that 58.33 per cent of farmers were middle (36-50 years) aged group while 21.57 per cent of farmers were young (up to 35 years) aged group and 20 per cent of farmers were old (above 50 years) aged group.

Singh *et al.* (2020) reported that majority (64.60%) of farmers were middle (35-54 years) aged group followed by 19.19 per cent of farmers were

old (above 55 years) aged group and 15.75 per cent of farmers were young (below 34 years) aged group.

### **2.3.2 Gender**

Bachaspati (2018) reported that 64.31 per cent of farmers were male while the female farmers were 35.69 per cent.

Thakur (2018) reported that majority (82%) of the farmers participating in e-NAM were males and the rest 18 per cent were females.

Tyngkhan (2018) reported that 52.54 per cent of farmers were males while 45.47 per cent of farmers were female.

### **2.3.3 Educational status**

Chandana (2018) revealed that 82.50 per cent of farmers were literate and 17.5 per cent were illiterate. Majority (37.50%) of the farmers were having primary level education.

Sekhar and Bhatt (2018) observed that 63 per cent of farmers had education level of high school and above, while 21 per cent of farmers had secondary education level, 11 per cent of farmers had primary education level and 5 per cent of farmers were illiterate.

Thakur (2018) revealed that majority (39%) of the farmers were with matric pass followed by graduate level (31%).

Tyngkan (2018) reported that majority (82.14%) of the farmers were literate the rest 17.86 per cent of the farmers were illiterate. Majority (30.40%) of the farmers with secondary education level while 27.15 per cent of farmers with primary education and 16.94 per cent of farmers with higher secondary education.

Geethavani (2019) observed that 80 per cent of the farmers were literate and rest 20 per cent were illiterate. Majority (48%) of the farmers were with

secondary education followed by 12 per cent of farmers having primary and graduation level education and 8 per cent of farmers had post-graduation education.

Swarna (2019) reported that 26.67 per cent of the farmers were illiterate while 73.34 per cent of the farmers were literate. Majority (21.67%) of the farmers had primary and secondary education level while 18.32 per cent of farmers had higher secondary education and 11.67 per cent of farmers had graduation level education.

Rao *et al.* (2020) observed that 57.30 per cent of the farmers had high school and above level of education while 22.40 per cent of the farmers had secondary education level, 10.40 per cent of farmers had primary education and 9.90 per cent of farmers were illiterate.

#### **2.3.4 Occupation**

Bachaspati (2018) observed that majority (96.22%) of the farmers had agriculture as main occupation and the other source of income were business (2.17%) and service (1.61%).

Sethi (2018) observed that 92 per cent of the farmers' main occupation was agriculture alone.

Tyngkan (2018) observed that majority of the farmers had agriculture (91.34%) as main occupation while 3.90 per cent of farmers had business along with agriculture.

Bandhavya (2020) observed that 66.60 per cent of the farmers had agriculture alone as their main occupation while 33.30 per cent of the farmers had agriculture and allied activities as their occupation.

#### **2.3.5 Family size**

Bachaspati (2018) reported that the farmers' average family size was 5.38 members per household.

Chandana (2018) reported that majority (54.16%) of the farmers had nuclear families while 45.83 per cent had joint families.

Geethavani (2019) reported that the average family size of the farmers was 4.48, 3.68 and 4.24 members in Kurnool, Guntur and Duggirala respectively.

Bandhavya (2020) reported that 46.70 per cent of the farmers had small sized family followed by 40 per cent of farmers with medium sized family and 13.30 per cent of farmers with large family.

### **2.3.6 Farming experience**

Thakur (2018) reported that majority (50%) of the farmers had more than 15 years of farming experience followed by 31 per cent respondents with 5-10 years of experience.

Swarna (2019) reported that majority (71.66%) of the farmers had low (up to 10 years) farming experience followed by 16.67 per cent of farmers with high (above 20 years) farming experience and 11.67 per cent of farmers with medium (11-20 years) experience.

### **2.3.7 Farm size**

Bachaspati (2018) reported that majority (38) of the farmers were small farm sized farmers and 26 per cent marginal farmers.

Pattnaik (2018) observed that majority (64%) of the farmers were marginal farmers followed by 29 per cent of farmers with small farm size and 7 per cent of farmers with large farm size.

Sekhar and Bhatt (2018) observed that 30 per cent of the farmers were having small sized farms while 27 per cent of farmers were medium and marginal farmers and 16 per cent of farmers were large farmers.

Geethavani (2019) observed that 36 per cent of the farmers were medium farmers while 32 per cent of farmers were small farmers, 28 per cent farmers were large farmers.

Swarna (2019) observed that 30 per cent of farmers were small farmers followed by 23.33 per cent of farmers were medium farmers and 20 per cent of farmers were landless.

Rao *et al.* (2020) reported that 28.60 per cent of farmers were marginal farmers while 26.8 per cent medium farmers, 24.90 per cent small farmers, 18.30 per cent large farmers and 1.40 per cent of farmers were landless.

### **2.3.8 Annual income**

Chandana (2108) revealed that the average annual income of the farmers from agriculture and other subsidiary occupations was Rs. 100000 – 150000.

Nitesh (2018) stated that majority of the farmers' annual income was Rs. 1.2 to 4.6 lakhs (67.39%) while 16.56 per cent of farmer's annual income was more than Rs. 4.6 lakhs and that of 11.04 per cent farmers was less than Rs. 1.2 lakhs.

Swarna (2019) stated that majority of the farmers had annual income of up to Rs. 1 lakh (76.67) while 23.33 per cent of farmers had Rs. 1-2 lakhs.

### **2.3.9 Social participation**

Lal (2014) reported that majority (54.38%) of the farmers had low level of social participation.

Deka *et al.* (2019) observed that 80 per cent of the rural women and 70 per cent of the men were members in organisation and 30 per cent men and 20 per cent women were office bearers of various organisations.

Bandhavya (2020) observed that majority (86.60%) of the farmers did not have membership in any organisation, while 13.40 per cent of farmers were members in one organisation.

### **2.3.10 Mass media exposure**

Lal (2014) reported that 48.75 per cent of the farmers were having medium level of mass media exposure and low level of extension contact.

Lal (2017) reported that most of the farmers were had medium (49.44%) level of mass media exposure.

Bandhavya (2020) observed that majority (70%) of the farmers had medium level of mass media exposure while 20 per cent of farmers had low level of mass media exposure.

## **2.4 e-literacy of respondents**

Verma *et al.* (2017) concluded that many farmers were still depending on traditional ways of mass communication like radio in rural areas. Awareness programme and schemes can make the farmers know about various e-platforms being provided by the government.

Pattnaik (2018) reported that 57 per cent of the farmers know about how to use the computer/internet while remaining 43 per cent of farmers were not using computer/internet.

Kumar *et al.* (2019) reported that 80 per cent of the farmers were using mobile internet for the purpose of social media like Facebook and Whatsapp.

Singh *et al.* (2020) reported that 66.90 per cent of the farmers were having access to smart phone while 33.10 per cent of the farmers had simple mobile phone.

## 2.5 Perception towards online marketing

Changchit (2006) elicited consumer perception of online shopping and reported the factors like risk, past experience, uncertainties and benefits of online shopping which were perceived differently between the consumers who prefer offline shopping and consumers who prefer online shopping.

Kolageri and Nararaj (2017) stated that e-marketing service was used by 93.33 per cent of middle-aged people, 91.00 per cent of graduates, 60 per cent of male, 65 per cent of middle-income group people and 54.17 per cent of employees in the study area.

Carpio *et al.* (2013) revealed that e-commerce offered the new venue of promoting and marketing the agriculture products that has benefit of reaching geographical populations and providing detailed information about product, so that the producers and consumers became more regular active users of the e-commerce platform.

Chahal *et al.* (2013) stated that introduction of online marketing in farm sector, exploitation of sellers and consumers is imperfect and the farmer's income enriched and prices of commodities get stabilized.

Asadihkoob and Ebrahimi (2014) stated that e-commerce can provide many advantages like profitability, agricultural production market development, and access to the national and international markets, increasing competition and improving quality of the agricultural products and eliminate intermediaries.

Kadrolkar (2014) stated that efficient agricultural marketing is necessary for development of the agriculture sector as it gives incentives and outlets for better production and contributed to the commercialisation of subsistence farmers. The author concluded that Tarikere APMC was working effectively and efficiently, helping numerous farmers, traders, and commission agents.



Zhao (2016) observed that the e-commerce had been broadly used in many fields as a kind of business model, the use of e-commerce could harvest a huge growth in food supply chain. With efficient and proper combination of food supply chain and e-commerce, food enterprises could guarantee the food safety better and deal with the increasingly aggressive market competition effectively and improves market competitiveness systematically

Acharya (2017) suggested the speeding up of third phase of agricultural marketing reforms and to outline the progress on move towards e-NAM.

Singh *et al.* (2016) reported that majority of the farmers were not satisfied with the practices followed by the traders under present marketing system. They feel that they were exploitative and the prices were not transparent. But they were satisfied with the weighing, auction process and payment system.

Yadav and Sharma (2017) stated that e-NAM would play key role and game changer for the Indian farming community and also provide the farmers more options for sale of their produce. The e-NAM would increase the accessibility of market to farmers and it has the potential to transform Indian agriculture from traditional to an entrepreneurial.

Yadav and Shalendra (2017) reported that around 89 per cent traders have shown their willingness towards migration to e-NAM and the likeliness of shifting platform also depends upon the knowledge level of traders, around 55 per cent of traders have stated electronic trading and around 83 per cent of traders are expecting that with the introduction of e-platform market will be wider for them.

Reddy (2018) revealed that electronic markets have a positive impact on both the prices and market arrivals for three commodities i.e. paddy, groundnut and copra. The author indicated that farmers are benefited from higher prices whereas commission agents and traders benefited from higher market arrivals.

Geethavani (2019) reported that the perception of farmers towards e-NAM trading was seen positive, as they were favourable towards e-NAM trading because reduced the wastage of produce, trading farmers able to sell entire produce at a time and preventing the middlemen entry into the supply chain.

## **2.6 Awareness about e-NAM**

Shruthi (2015) revealed that the source of awareness about e-purchasing considerable per cent of 39.17 and 38.33 per cent to consumers through friends and advertisement respectively.

Mohan (2017) stated that through implementation of e-NAM had some problems due to resistant changes in 70 years old commission agent-backed system. Many states were trying to overcome the situation by making farmers and traders aware of the benefits through online bidding. Uttarakhand and Himachal Pradesh had reduced market fees for online traders.

Nitesh (2018) reported that 30 per cent of farmers were aware of e-NAM while 70 per cent of the farmers were not aware about e-NAM.

Thakur (2018) stated that the majority (71%) of the farmers were not aware about e-NAM, and only 29 per cent of farmers were aware of e-NAM.

Roshini *et al.* (2018) observed that the farmers are not aware of e-NAM. Farmers should be well informed about the facilities available in e-NAM, for efficient work. Creating the awareness among the farmers through various communication channels could be done to increase the quality of e-NAM functioning.

Bara (2018) reported that the level of awareness about e-NAM system among the farmers, were 75 per cent and 25 per cent of farmers were not known about e-NAM system in Jharkhand.

Swarna (2019) stated that the farmers awareness about e-NAM system were only 23.37 per cent and 76.67 per cent of farmers were not aware of e-NAM trading.

## **2.7 Utilization of online marketing**

Murthy *et al.* (2001) stated that e-commerce in agriculture over the internet would open a new possibilities in agricultural business. The authors provided relevant strategies for the role of e-commerce in agricultural marketing.

Changchit (2006) reported that consumers, who had positive experiences with online shopping, found to be easier and perceived more benefits on online shopping. The consumers who had perceived a higher risk and higher uncertainty with online shopping, they preferred shopping at a physical store.

Gal (2012) concluded that though many people related to the agricultural sector and started purchasing Agri-products through online, but the share of it remained very less as compared to other sector. The author suggested that e-commerce is still relatively primitive but many companies were showing interest in the e-commerce to stay competitive.

Alavion *et al.* (2013) stated that nearly 68 per cent of the farmers had high tendency towards adoption of electronic marketing and more than 70 per cent of the respondent chose rural ICT offices for rice e-marketing. The study revealed that rural ICT offices had a role for fulfilment of buy and sell.

Jamaluddin (2013) suggested that in respect to the agriculture sector in India, the TAM is the basis of the research in IT diffusion. It will be more useful if it is integrated with the security aspects of technology on the customer side like infrastructure, perception and trust.

Kuboye and Ogunjobi (2013) studied the e-marketing for Nigerian agricultural products and pointed the utilisation of dealer to act as a middleman between the farmers and consumers for marketing and explore the use of web application to market farm products.

Amrutha *et al.* (2015) studied the use of ECTs in agricultural products marketing and the economic advantages by the use of ECTs to farmers and other stakeholders in agricultural marketing.

Ramesh *et al.* (2015) stated that regulatory marketing structure gives the physical facilities and institutional environment to traders, farmers, processors and other marketing functionaries to lead trading activities which is offering best price to farmers. The part of Agricultural Produce Marketing Committee (APMC) is playing a key role in promoting agricultural marketing.

Mante and Almadi (2016) suggested that if we aim to establish a long term and sustainable growth in the agricultural sector, then preference should be given for home grown products. E-marketing of those products could give the higher profits than the conventional marketing system.

Alavion *et al.* (2017) conducted a study on adoption of agricultural electronic marketing through the application of the TPB model. In this study, authors suggested that to accelerate the adoption of electronic marketing and its user-friendly characters and advantages would be demonstrated to users through workshop and A-V aids.

Seth and Ganguly (2017) stated that currently technologies that outfit to the optimal utilisation of resources and the effective market linkages for better service delivery and to discover the highest price possible has been observed in case of India through the e-NAM, a technology driven unified market platform which have a brighter future in India.

## **2.8 Utilisation of e-NAM**

Chand (2016) stated that full benefit from linking agriculture markets in the country and by putting them on electronic platform would become a single trading license valid across the country and then the farmers will get the option to sell her/his produce in any market throughout the country.

Bhusanar and Singh (2019) concluded that e-NAM provides an opportunity for local traders to access the national market and for big traders it provides an opportunity to directly participate in the local mandis and it reduces the intermediation cost. They also stated that it would happen only when e-NAM become fully operational throughout the country.

Bisen and Kumar (2018) stated that e-NAM is facing initial delay for successful implementation and lesser density of e-NAM across the existing regulated markets and there is tremendous scope for its further expansion. They also stated that the efforts must be taken towards the development and up gradation of scientific warehouses, refrigerated vans and cold storage for perishables commodities.

Reddy (2018) revealed that there was a positive impact in prices and market arrivals of rice, pigeon pea, and groundnut. The author suggested that there is a need for increasing the efficiency of e-NAM by eliminating the challenges faced by the markers.

## **2.9 Constraints in using electronic trading platform**

Kashyap and Raut (2006) studied various challenges typical of the rural environment such as channel management promotion and communication, physical distribution. To overcome these problems need to be equipped with technology based system like electronic marketing. The advantage of electronic marketing offers economy of transaction for trading, efficient price discovery and more transparent and competitive settings.

Mallikarjuna (2007) suggested that bidding of agricultural produce had been conducted by the officials in Bellary market was not free from unscrupulous activities like price rigging, taken away samples and overweighing. This should be stopped immediately and ensure to conduct of fair and systematic manner. Market committee should see that traders not gathered at the time of bidding.

Begum (2011) stated that agricultural marketing continued to be dazed by many market imperfections such as defective weighing, lack of scientific grading system and inadequate infrastructure. The objective of regulating the agriculture markets was to bring both farmers and trader closer with same level of advantage.

Mittal and Meher (2012) found that the process of adoption of mobile telephony information delivery system had been slow and many models were still at an early stage of development. The farmers indicated that they like more information delivered via mobile to them, but they were not pro-actively seeking it out. The barriers were applied more for small farmers than large farmers, as the large farmers are more able to leverage benefits of the communication and information they can access.

Asadihkoob and Ebrahimi (2014) stated that the use of e-commerce in Iran's agriculture had numerous challenges, of which the most important challenge was lack of infrastructure.

Dsouza and Joshi (2014) examined development of agricultural e-commerce framework of India. They identified the challenges and information gaps in the e-commerce application and gave suggestions to the prevailing e-commerce in agriculture.

Mookherjee (2016) reported that farmer's price realization problem is compounded by poor infrastructure at the *mandis* and the manual weighing, lack of modern grading and sorting, and single window systems processes creates long delays and measurement errors. These delay results in large post-harvest losses about 6 to 8 per cent for fruits, 4 to 6 per cent for cereals and pulses, 7 to 12 per cent for vegetables.

Shalendra and Jairath (2016) reported that e-NAM has potential to bring transparency, efficiency, competitiveness, and better participation of farmers by integrating the wide range of functionaries like farmers, traders,

commission agents, e-auction, clearing and settlement, payment gateway, warehousing, logistics, grading and assaying, and banking facilities.

Timberlake *et al.* (2016) studied the barriers for implementation of Electronic Benefit Transfer (EBT) in farmers markets of Wisconsin, USA. They found that the farmers markets had potential to reduce food insecurity through EBT redemption and understanding main barriers as well as effective strategies for the successful implementation of EBT in farmers markets was imperative to realize full potential of this program and difficulties from the market managers' perspectives was also important to inform the future policy initiatives to improve EBT system.

Gummula (2017) stated that in case of e-NAM farmers had to take their commodity to a designated location and with no guarantee that they would receive a best price for doing so. Farmers although can access information they could not exploit this advantage as e-NAM did not have any facility to transport produce from farmers field and transport it to the mandi where higher prices for that produce were prevailing.

Nirmal (2017) reported that the state agricultural departments had finding it difficult to convince all the stakeholders (farmers, traders and commission agents) to move to e-platform. Due to lack of technical expertise, state agricultural departments had also delayed setting up of the assaying/grading facilities in the e-platform markets.

Raju *et al.* (2017) revealed about some most important points that affecting the e-NAM like removal of entry barriers, standardized scientific grading and assaying, assist price discovery, electronic settlement of sales, warehouse based trading, improving market infrastructure and involvement of more stakeholders.

Bhosage (2018) stated that agricultural markets are characterized by poor competitiveness, presence of executive intermediaries, inefficiency, fragmentation, and frequent price manipulations, so that the electronic

marketing platform for agricultural products will solve many of the farmers' problems.

Biswal (2018) stated that major problems faced by farmers were at the stage of registration process, due to lack of awareness about e-NAM and the lower rate of e-literacy of farmers.

Chandana (2018) revealed that the major constraints faced by the farmer and traders identified were lack of grading and packing facilities, storage facilities, insufficient infrastructure facilities, malpractices in the market and the price fluctuations.

Majhi (2018) stated that major constraints faced by the farmers were lack of storage facilities, lower rate of e-literacy among the farmers and no fixed price by the government for their commodity.

Roshini *et al.* (2018) stated that since the transaction of the agricultural commodities had been started, the marketing of produce have been always a problem faced by farmers. Provision of transport services could be encouraged to reduce rural farmer problems.

Sethi (2018) concluded that major constraints faced by the e-NAM farmers were lack of assaying, internet problems, lack of awareness, and having no idea on market information. The author suggested that there should be a provision of price support system, incentive and the trading grants to attract the more number of farmers and traders towards e-NAM.

Tyngkan (2018) reported that the constraints faced by farmers through e-NAM trading were e-NAM trading is the lengthier process than the traditional system followed by lack of awareness about e-NAM trading and the grading inconsistent, these is due to the e-trading was newly introduced and farmers were not aware much about e-trading system.

Yadav (2018) stated that the major constraints faced by farmers in e-NAM system were inefficient information about market price and market charge



followed by lack of transportation, lack of cleaning and grading system and the quality certification were not there. The author also stated the constraints faced by the traders were delay in sale, farmers demanding for quick cash and internet problems.

# **RESEARCH METHODOLOGY**

### **3. RESEARCH METHODOLOGY**

Research methodology is a systematic way of finding solutions for a research problem. Research methodology is explanation and justification of various methods of conducting the research. In this chapter, the methodology followed for the study is discussed under the following subheadings:

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Selection of respondents
- 3.4 Selection of variables
- 3.5 Operationalisation and measurement of variables
- 3.6 Tools used for data collection
- 3.7 Statistical tools used for the study

#### **3.1 Research design**

The present study was conducted by using ex-post facto design because the researcher does not have scope to manipulate the independent variables. Ex-post facto research is a systematic inquiry in which the researcher does not have direct control over independent variables because their manifestations have already occurred or they are inherently not manipulated (Kerlinger, 1973).

#### **3.2 Locale of the study**

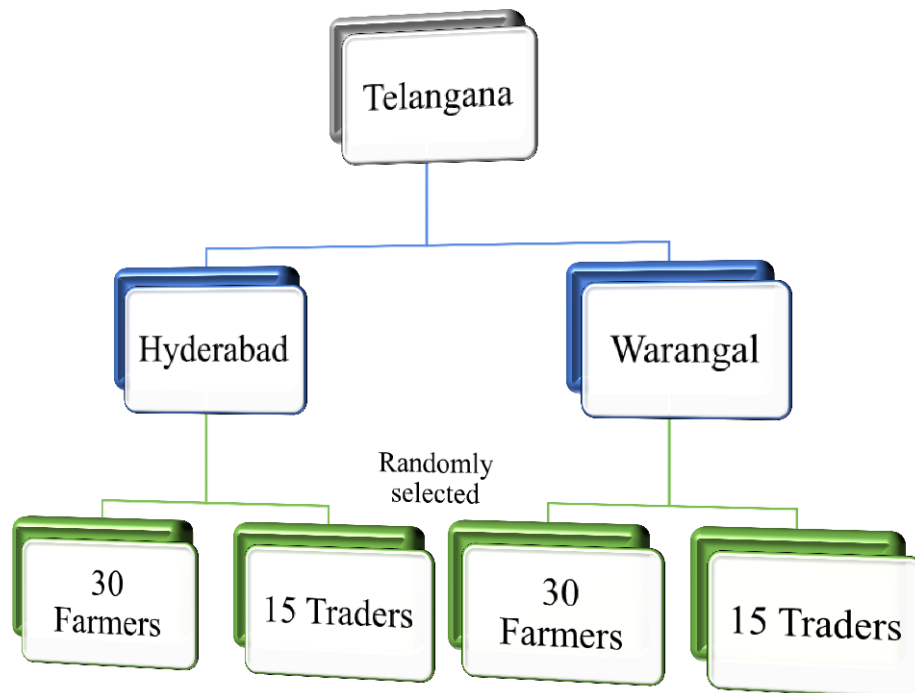
The locale of study was Telangana state. In Telangana, five markets from five districts (Nizamabad, Warangal, Hyderabad, Badepally, and Thirumalagiri) had been selected by Government of India for the pilot implementation of e-NAM. From these five districts, Hyderabad and Warangal districts was selected purposely, for this study.



Plate 1. Map showing the study area in Telangana

### 3.3 Selection of sample

The farmers and the traders, registered and trading under e-NAM portal constituted the sampling frame of the study. A total of 90 respondents (60 farmers and 30 traders) formed the sample of the study, for which 30 farmers and 15 traders were selected from each district, using random sampling procedure.



**Figure 1. Pictorial representation of selection of respondents**

### 3.4 Selection of variables

Selection of variables is the most important part of any research study. Based on the objectives of the study, review of literature and discussion with experts, a list of independent and dependent variables were identified for the study. The following variables were selected for the study.

### 3.5 Operationalisation and measurement of variables

#### 3.5.1 Age

Age is operationally defined as the number of chronological years completed by the farmers/traders at the time of investigation since birth as reported by the respondent. The farmers and traders were categorised into following groups as per the classification by Government of India followed for the census 2011, which is as follows:

<b>Category</b>	<b>Age (years)</b>	<b>Score</b>
Young	<35	1
Middle aged	35-55	2
Old	>55	3

### 3.5.2 Gender

Gender is defined as the state of being male, female. This indicates whether the farmer/trader belongs to male or female category. The farmers and traders were classified into two categories, as follows:

<b>Category</b>	<b>Code</b>
Male	1
Female	2

### 3.5.3 Educational status

Educational status was operationally defined as the number of years of formal schooling and their ability to read and write. The scoring procedure developed by Trivedi (1964) followed by Anupama (2014), Sasidharan (2015), Narayanan (2016), Krishnan (2017), and Athira (2017) was adopted with slight modifications. The farmers and traders were classified into different categories as follows:

<b>Educational status</b>	<b>Score</b>
Illiterate	1
Primary school	2
High school	3
Intermediate	4
Degree	5

Post-graduation	6
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### 3.5.4 Occupational status

Occupational status was operationalised as the main vocation and other additional vocations that the farmers/traders were engaged at the time of interview. The scoring procedure followed by Neshva (2015), and Athira (2017) was adopted with slight modifications for the study. The farmers and traders were categorised differently as follows:

The farmers were categorised as follows:

<b>Occupation category</b>	<b>Score</b>
Agriculture alone	1
Agriculture + Farm labour	2
Agriculture + Cattle	3
Agriculture + Government employment	4
Agriculture + Private employment	5
Agriculture + Business	6

The traders were categorised as follows:

<b>Occupation category</b>	<b>Score</b>
Trading alone	1
Trading + Agriculture	2
Trading + Government employment	3
Trading + Private employment	4

### 3.5.5 Family size:

Family size was operationally defined as the number of members in the family/household, sharing the same economic unit. The scoring procedure followed by Neshva (2015) was adopted for the study. The farmers and traders were categorised as follows:

Category	Size of family	Score
Small family	<5 members	1
Medium family	5-8 members	2
Large family	>8 members	3

### 3.5.6 Annual income

It is operationally defined as the total earnings of the farmers from both farm and non-farm sources in a year. It is taken after deducting the cost of cultivation incurred, expressed in terms of rupees. The farm sources included income from different agricultural and allied sector activities and non-farm sources included from employment, business and other sources. The scoring procedure followed by Krishnan (2017) was adopted for the study with slight modifications. The scoring procedure for farmers employed was as follows:

Annual Income (Rs.)	Score
Up to 50000	1
50000 – 100000	2
100000 – 200000	3
More than 200000	4

The annual income of traders was defined as total earnings from trading and non-trading sources in a year. The scoring procedure for traders employed was as follows:



<b>Annual Income (Lakhs)</b>	<b>Score</b>
Less than 2	1
2 – 5	2
5 – 8	3
More than 8	4

### 3.5.7 Farm size

Farm size refers to the actual area of land possessed by the farmers for agricultural and allied activities. It was expressed in acres. The scoring procedure followed by Shilpa (2019) was adopted for the study. The farmers were categorised as follows:

<b>Category</b>	<b>Farm size (acre)</b>	<b>Score</b>
Marginal	<2.5	1
Small	2.5 to 5.0	2
Large	>5.0	3

### 3.5.8 Experience

Experience was measured in terms of number of years the respondents (farmer/trader) have been involved in farming / trading activities. Scoring procedure followed by Priya (2011), and Anju (2016) was adopted for the study with slight modifications. The farmers and traders were categorised as follows:

<b>Category</b>	<b>Experience in farming</b>	<b>Score</b>
Low	Up to 5 years	1
Medium	6-10 years	2
High	11-20 years	3

Very high	More than 20 years	4
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### 3.5.9 Savings

Savings was operationalised as the amount of money which the family of the farmers/traders saved in the form of deposits with external agencies and are readily available if needed.

The following scoring procedure was used in the study for farmers.

Savings (Rupees)	Score
Less than 50000	1
50000 – 100000	2
100000 – 200000	3
More than 200000	4

The scoring procedure followed for traders was as follows:

Savings (Lakhs)	Score
Less than 1	1
1 – 2	2
2 – 3	3
More than 3	4

### 3.5.10 Indebtedness

Indebtedness was defined as the total loan in terms of cash farmer/trader respondents owes at the time of the investigation from various money lending sources such as cooperative bank, private banks, moneylenders and relatives/friends. For assessing the credit of farmers variables such as source of

credit, credit amount taken, rate of interest and time period of credit were evaluated. The scoring procedure followed for each variable was as follows:

### 3.5.10.1 Source of credit

The scoring procedure followed for farmers and traders was as follows:

Category	Score
Cooperative banks	1
Private banks	2
Money lenders	3
Friends/relatives	4

### 3.5.10.2 Credit amount

The scoring procedure followed for farmers and traders was as follows:

Respondents	Category	Score
<b>Farmers</b>	Up to 50000	1
	50000 – 100000	2
	100000 – 200000	3
	More than 200000	4
<b>Traders</b>	Up to 5 lakhs	1
	5 - 10 lakhs	2
	10 - 15 lakhs	3
	More than 15 lakhs	4

### 3.5.10.3 Rate of interest

The scoring procedure followed for farmers and traders was as follows:

Category (per cent)	Score
Up to 10	1
10 – 20	2
More than 20	3

### 3.5.10.4 Repayment period

The scoring procedure followed for farmers and traders was as follows:

Category (months)	Score
Up to 6	1
6 -12	2
12 - 24	3
More than 24	4

### 3.5.11 Social participation

It was the operationally defined as the degree of involvement of the farmers/traders in formal or informal social organisations either as member, office bearer and the frequency of participation in meetings and other organisational activities. The procedure followed by the Neshva (2015), Krishnan (2017), and Shilpa (2019) was adopted for the study. The scoring procedure employed for farmers and traders was as follows:

Social participation	Category	Score
	No membership	0

<b>Membership</b>	Membership in one organisation	1
	Membership in more than one organisation	2
	Office bearer in one organisation	3
	Office bearer in more than one organisation	4
<b>Frequency of attending meetings</b>	Never	0
	Rarely	1
	Sometimes	2
	Often	3
	Always	4

The respondents were categorised as follows low, medium and high based on mean and standard deviation as follows:

<b>Category</b>	<b>Range of scores</b>
Low	Below (Mean-SD)
Medium	Between (Mean $\pm$ SD)
High	Above (Mean+SD)

### 3.5.12 Information seeking behaviour

It was operationalised as the extent to which the respondents sought information from different communication sources. The scale developed by Deepa (1999), and followed by Parimaladevi (2004), and Shilpa (2019) was adopted for the study with slight modifications. The different information sources for obtaining agricultural technology were listed out mainly into three categories namely informal sources, formal sources and mass media. The scoring procedure employed was as follows:

<b>Frequency</b>	<b>Score</b>
Never	0
Rarely	1
Sometimes	2
Often	3
Always	4

The respondents were categorised as follows low, medium and high based on mean and standard deviation as done in social participation.

### **3.5.13 Decision making ability**

It was operationally defined as the ability of the farmers / traders to select the most efficient means from among the available alternatives for achieving maximum economic profit. The scale developed and used by Parimaladevi (2004) was adopted for the study. The scale consisted of six statements and the respondents were asked to give response in a five point scale. The scoring procedure for positive statements employed was as follows:

<b>Category</b>	<b>Score</b>
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The scoring for negative statements was reversed. The scores obtained were summed up. The scores of respondents were ranging from 6 to 30. The summated score of the respondents were divided into three categories such as low, medium and high by calculating the mean and standard deviation (SD).

Category	Range of scores
Low	Below (Mean-SD)
Medium	Between (Mean±SD)
High	Above (Mean+SD)

### 3.5.14 Innovativeness

It was operationally defined as the degree to which the farmers and traders were relatively early in adopting new technologies. The procedure developed by Singh and Choudhary (1977) and followed by Anju (2016) was adopted for the study. A question was asked to respondent as when the respondent would like to adopt an improved technology and based on the response, the following scoring procedure was employed.

Statement	Score
As soon as it is brought to my knowledge	3
After I had seen other people tried successfully	2
I prefer to wait and take my own time	1
I am not interested to adopt new technologies	0

### 3.5.15 Market orientation

Market orientation is operationally referred as the degree to which the farmer/trader respondents are oriented towards marketing to obtain reasonable gains from the produce. The scale developed by the Samantha (1977), followed by the Athira (2017) was adopted for the study with slight modifications. The scale consisted of six statements and the respondents were asked to give response in a five point scale. The scoring procedure employed was as follows:

Category	Score
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Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The scoring for negative statements was reversed. The scores obtained were summed up. The scores of respondents were ranging from 6 to 30. The summated score of the respondents were divided into three categories such as low, medium and high by calculating the mean and standard deviation as done in decision making ability.

### 3.5.16 Economic motivation

It was operationally defined as the extent to which the farmers/traders was orientated towards profit maximization and the relative value placed on monetary gains. The Scale developed by the Supe (1969), followed by the Shilpa (2013) was adopted for the study with slight modifications. The scale consisted of six statements and the respondents were asked to give response in a five point scale. The scoring procedure employed was as follows:

Category	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The scoring for negative statements was reversed. The scores obtained were summed up. The scores of respondent were ranging from 6 – 30. The



summated score of the respondents were divided into three categories such as low, medium and high by calculating the mean and standard deviation as done in decision making ability.

### 3.5.17 e-Literacy

e-Literacy was operationally defined as the ability of the respondents (farmer/trader) to efficiently portray and understand the messages using electronic gadgets such as computer and mobile phone. An arbitrary scale was developed for measuring the e-literacy of respondents on computer and mobile phone, separately. The scale consists of 10 statements. The scoring procedure employed was as follows:

Category	Score
Able	1
Not able	0

### 3.5.18 Perception

Perception is operationally defined as the way of respondents understood and interpreted the services offered by e-NAM. To measure this a scale developed with different statements with respect to the e-NAM trading and based on the literature. The respondents were asked to give their responses on a four point scale. The scoring produce employed was as follows:

Category	Score
Strongly agree	4
Agree	3
Disagree	2
Strongly disagree	1

### 3.5.19 Awareness

Awareness was operationally defined as the level of awareness on various facilities and services of e-NAM. The respondents (farmer/trader) were asked about the different facilities and services of e-NAM and whether they were aware or unaware of that facility. The scoring procedure employed was as follows:

<b>Category</b>	<b>Score</b>
Aware	1
Unaware	0

The data collected were analysed based on awareness index.

$$\text{Awareness index} = \frac{\text{Total score obtained}}{\text{Maximum possible score}} \times 100$$

### **3.5.20 Utilisation of e-NAM**

Utilisation of Electronic National Agricultural Market (e-NAM) was operationally defined as the frequency of use of the online marketing e-NAM for selling and buying of the produce by the farmers/traders. The scoring procedure followed by Kumari (2016) was adopted for the study with slight modifications. The scoring procedure employed was as follows:

<b>Category</b>	<b>Score</b>
Very high	5
High	4
Moderate	3
Low	2
Very low	1

The data collected were analysed based on utility index.

$$\text{Utilization index} = \frac{\text{Total score obtained}}{\text{Maximum possible score}} \times 100$$

Then, ranks were given to the statements based on the index score in the descending order.

### 3.5.21 Constraints

Constraints were operationally defined as the problems experienced by the farmers/traders with regard to the e-NAM trading. To measure this possible constraints were identified with respect to the e-NAM trading and based on the literature, list of constraints were finalised for farmers and traders separately. The constraints were categorised into four types, namely procedural constraints, physical constraints, technical constraints, and economical constraints. The scoring procedure employed was as follows:

Category	Scale
Very important	5
Important	4
Fairly important	3
Slightly important	2
Not important	1

Then for each constraint, the frequency of the responses under each category was multiplied with the respective scores and added to get the total score for that constraint. Then this was converted into index.

$$\text{Index} = \frac{\text{Total score obtained}}{\text{Maximum possible score}} \times 100$$

Then, the constraints were ranked based on the index score in the descending order of the importance.

### **3.6 Tools and techniques used for data collection**

Both primary and secondary data were collected and used for the study.

#### **3.6.1 Primary data:**

The primary data were collected from framers and traders through personal interview method by using a structured interview schedule.

#### **3.6.2 Secondary data:**

The study focuses on aspects of agriculture marketing through e-NAM. Hence, the facilities and services of e-NAM and other data required for the study were collected from the e-NAM website, the records of e-NAM office and discussed with e-NAM officials of the selected markets.

### **3.7 Statistical tools used for study**

#### **3.7.1 Percentage analysis**

Percentage analysis was done for making comparisons of the respondents. For calculating percentages, the frequency of each category was multiplied by 100 and divided by total number of respondents.

#### **3.7.2 Mean**

The mean score was used to represent group of an individual's value in simple manner.

#### **3.7.3 Standard Deviation (SD)**

Standard deviation was used to quantify amount of variation of a set of data value in study.

#### **3.7.4 t - test**

t test was used to find whether there was any significant difference between constraints faced by farmers as well as traders in both the markets.

### **3.7.5 Correlation coefficient**

Spearman correlation coefficient was used to test the significance relationship between independent and dependent variables. It ranges from -1 to +1. -1 indicates perfect negative relation between the variables whereas +1 indicates perfect positive relation between variables.

## **RESULTS AND DISCUSSION**

## 4. RESULTS AND DISCUSSION

This chapter deals with the results obtained in the present study and the discussions on the results. Keeping the objectives in view, findings of the study are presented under the following headings:

- 4.1 Present status of e-NAM
- 4.2 Status of basic facilities in selected markets
- 4.3 Operational mechanism of e-NAM
- 4.4 Socio economic profile of the respondents
- 4.5 e-literacy of farmers and traders
- 4.6 Perception of farmers and traders about e-NAM
- 4.7 Awareness about e-NAM facilities and services
- 4.8 Utilisation of e-NAM facilities and services
- 4.9 Constraints faced by farmers and traders

### 4.1. Present status of e-NAM

The e-NAM is a pan-India electronic trading portal launched with 21 APMCs across eight States on 14<sup>th</sup> April 2016. It connects the selected APMCs to build a unified national market for trading agricultural commodities across the country. The online trading platform provides all the APMC related information and services through a single window system.

#### 4.1.1. e-NAM markets in India

As on August 2020, the e-NAM connected 1000 markets (APMCs) in 18 states and three Union Territories. The markets covered under e-NAM are depicted in Table 1 and Plate 2.

**Table 1. List of e-NAM markets in India**

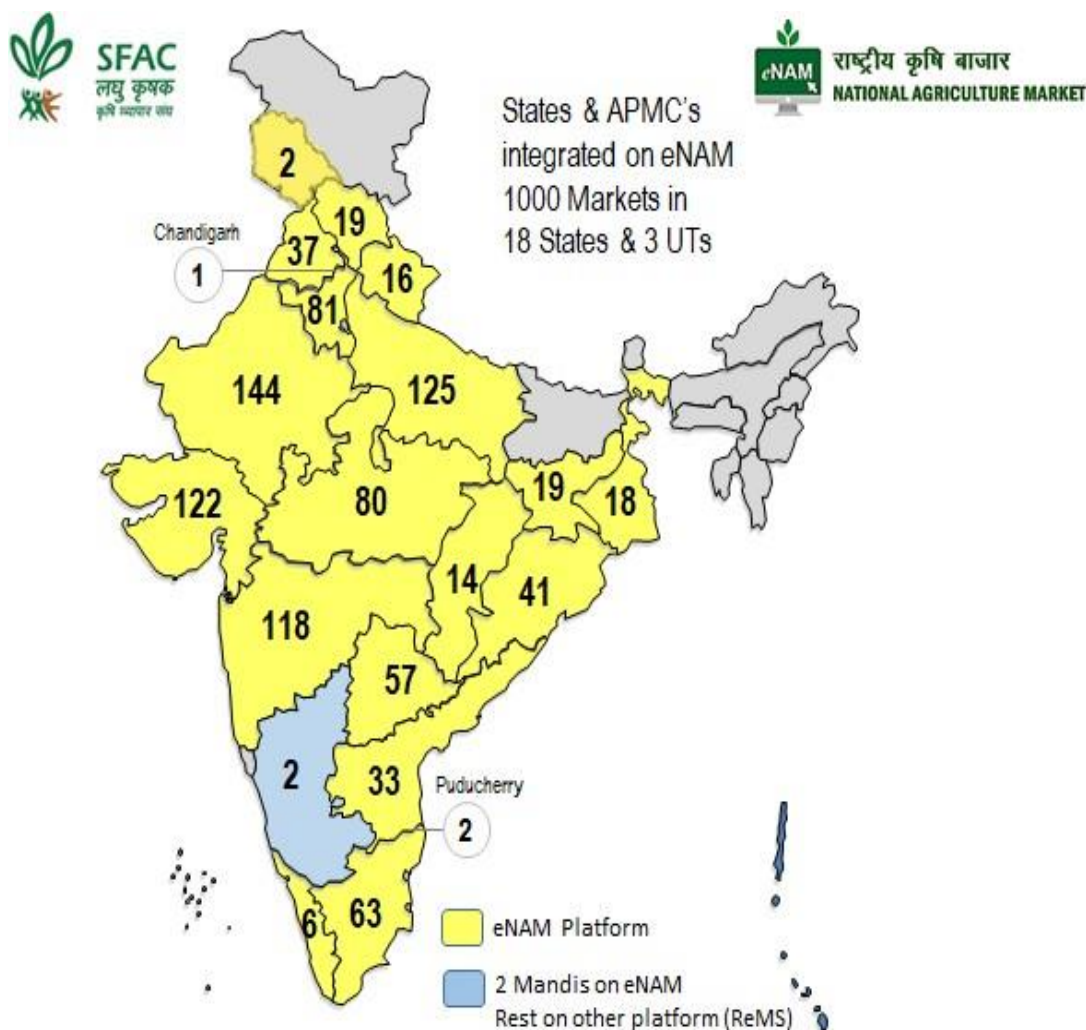
SI. No.	Name of State/UT	Markets registered with e-NAM
1	Andhra Pradesh	33
2	Chandigarh	1
3	Chhattisgarh	14

4	Gujarat	122
5	Haryana	81
6	Himachal Pradesh	19
7	Jammu and Kashmir	2
8	Jharkhand	19
9	Karnataka	2
10	Kerala	6
11	Madhya Pradesh	80
12	Maharashtra	118
13	Odisha	41
14	Puducherry	2
15	Punjab	37
16	Rajasthan	144
17	Tamil Nadu	63
18	Telangana	57
19	Uttar Pradesh	125
20	Uttarakhand	16
21	West Bengal	18
	<b>Total</b>	<b>1,000</b>

Source: e-NAM website as on 31<sup>st</sup> August 2020

Among the states and Union Territories of India, Rajasthan topped the list with 144 markets registered with e-NAM followed by Uttar Pradesh (125), Gujarat (122) and Maharashtra (118). In the study area of Telangana there were 57 markets registered with e-NAM as on 31<sup>st</sup> August 2020.





Source: e-NAM website as on 31<sup>st</sup> August 2020

### Plate 2. Coverage of e-NAM

#### 4.1.2. Commodities traded under e-NAM

There were 175 commodities including food grains, fruits, oil seeds, vegetables, spices *etc.*, listed in e-NAM trading platform as on August 2020. The details of commodities traded under e-NAM platform are shown in table 2.

**Table 2. List of commodities covered under e-NAM**

SI. No.	Commodity Category	No. of Commodities
1	Vegetables	50
2	Fruits	31

3	Food grains/ cereals	26
4	Spices	16
5	Oilseeds	14
6	Miscellaneous	38
	<b>Total</b>	<b>175</b>

Source: e-NAM website as on 31<sup>st</sup> August 2020

Table 2 reveals that majority of the commodities traded through e-NAM belongs to vegetables (50 number) followed by fruits (31 number) and food grains and cereals (26 number).

#### 4.1.3. e-NAM in Telangana

In Telangana State, the marketing and trading of agricultural produce are mostly carried out by APMCs. Telangana consists of 192 APMCs of which only 57 APMCs were integrated with e-NAM. In 2016, five markets were selected for pilot phase of e-NAM, and later in the first phase 39 markets and in the second phase 13 markets were integrated in e-NAM, thus totalling 57 e-NAMs in Telangana.

#### 4.1.4. Stakeholders in India and Telangana

Table 3 shows the stakeholder data of e-NAM in India and Telangana

**Table 3. Statistics of stakeholders in India and Telangana**

S. No.	Category of Stakeholders	No. of Stakeholders	
		India	Telangana (%)
1	Farmer	1,67,18,808	18,17,000 (10.87)
2	Trader	1,44,987	5,648 (3.89)
3	Commission Agent (CAs)	83,958	4,622 (5.50)
4	FPO	1,720	54 (3.14)

Source: e-NAM website as on 31<sup>st</sup> August 2020

As on 31<sup>st</sup> August 2020, 1000 e-NAM *mandis* had been registered in India. Of these, 57 belonged to Telangana State. In India, more than 167 lakhs farmers and nearly 1.45 lakh traders had registered with e-NAM. The corresponding numbers in Telangana were 18 lakhs (farmers) and 5648 (traders).

#### 4.2 Status of basic facilities in selected markets

Table 4 shows the availability of infrastructural facilities in the selected e-NAMs (Hyderabad and Warangal). It shows the basic facilities available in the markets such as auction hall, assaying lab, computers, printers, internet, drinking water, rest rooms, and the like, and the commodities traded and staff availability.

**Table 4. Availability of infrastructural facilities in selected market**

SI. No.	Particulars	Hyderabad	Warangal
1	Administrative building	Yes	Yes
2	Notified Commodities under e-NAM trading	Chilli	Red Gram, Cowpea (Black, Red, White), Sesame seed (Black, White), Green Gram, Maize, Sunhemp and Black Gram
3	Godown	No	Yes
4	Officers/staff (No.)	12	16
5	Computer (no.)	7	12
6	Printer (no.)	6	10
7	NAM Bidding Hall	Yes	Yes
8	E-Gate entry Facility	Yes	Yes
9	Data Entry Operator	Yes	Yes
10	Internet Connection	Yes	Yes

11	Electronic Weighing Machine/ Bridge	Yes	Yes
12	POS Machine	Yes	Yes
13	Projector/ LCD screen	Yes	Yes
14	Computer Operator	Yes	Yes
15	E-Agreement	Yes	Yes
16	Generation of Sale Receipt	Yes	Yes
17	Assaying Lab	No	Yes
18	Announcing Highest bid price to farmer by SMS	Yes	Yes
19	Integration of Weighing with e-NAM Portal	Yes	Yes
20	Exit Pass Generated	Yes	Yes
21	Drinking water facility	Yes	Yes
22	Farmer rest house availability	No	Yes
23	Adequate parking space	Limited	Yes
24	Building for lab	No	Yes
25	Lab Analyst		Yes
26	Lab Equipment availability (moisture Meter, weighing scale, computer, printer, sampling equipment, etc.)	No	Yes
27	Generator	Yes	Yes
28	Computer for users	Yes	Yes

e-NAM was introduced in 2016 in both Hyderabad and Warangal markets. From Table 4, it is observed that in Hyderabad market only one commodity (chilli)

was traded through e-NAM and in Warangal market the commodities such as red gram, cowpea, sesame seed, green gram, maize, sunhemp and black gram were traded through e-NAM portal. The Warangal market was having more number of staff, lab equipment, computers and printers as compared to the Hyderabad market, where only one commodity was being traded. The Warangal market was a bigger market having more space for storage of produce and parking space as compared to the Hyderabad market. The Hyderabad market was located at the heart of the Hyderabad city, and this might have constrained in providing space to the market as compared to the Warangal market.

### **4.3 Process and functioning of e-NAM**

The farmers were habituated with traditional methods of trading in agriculture from olden days but presently popularity of online marketing is increasing. e-NAM is an e-trading portal that provides a single platform for both farmers and traders for buying and selling of agricultural produce from anywhere across the country. It connects between all the markets existing in a country. A specially developed software is provided to each *mandi* which agrees to join for e-NAM trading.

#### **4.3.1 Registration process of e-NAM**

The registration process of e-NAM stakeholders will be differed from each stakeholder. The farmer and trader / commission agent registration process is depicted below

##### **4.3.1.1 Registration process for farmers**

The step by step registration process for farmers is depicted below

- User can register by Clicking <http://www.enam.gov.in/web>
- Select registration type as farmer and select the desired APMC
- Provide correct email ID to receive login ID and password
- Successfully registered farmers receive a temporary login ID and password in the email provided
- Login to the dashboard and click on „register with APMC“
- It will redirect you to registration page for filling/updating details

- It will be submitted to selected APMC for approval after KYC is completed
- After successful submission user will receive an email confirming the status of application as it is submitted/in progress/approved/rejected
- Once approved by APMC, the user will receive e-NAM farmer permanent login ID and password

#### **4.3.1.2 Trader/CA registration process**

The step-by-step registration process for farmers is depicted below

- User will have to Register by Clicking <http://www.enam.gov.in/web>
- Select registration type as trader/CA and select the suitable APMC
- Provide passport size photograph and correct email ID to receive login ID and password
- After successful registration, the trader will receive a temporary login ID and password to email
- Login to the dashboard and click on „register with APMC“
- It will redirect to registration page for filling/updating details
- It will be submitted to selected APMC or SAMB for approval (In case of Unified License)
- After successful login to dashboard, the trader will be able to see the arrivals and trade activities happening in APMC for commodities notified in e-NAM
- After submitting the trader/CA license and KYC, all those details will be forwarded to selected APMC for approval
- After successful submission, the user will receive an email confirming the status of the application as it is submitted/in progress/approved/rejected
- To get permanent login ID and password and for verification of license number, the traders have to visit respective APMC
- After successful approval by APMC, e-NAM trader/CA will receive permanent login IDs and password through email
- Trader/CA can participate in e-NAM trade by using the given login ID & password

### **4.3.2 The e-NAM auction process**

Once the farmer brings the product to market e-auction takes place through e-NAM portal. So the process for the auction involves a series of steps right from gate entry of the product till its gate exit and the process is depicted in Figure 2.



**Figure 2.e-NAM auction process**

- **Gate entry:** The process starts from gate entry. Once the farmer entered into market with commodity, then all the particulars of the commodity have to be entered and a unique lot ID number is generated through the system. Entry slip consists of lot ID number, farmer's name, and contact details of the farmer, name of the commission agent and company, type of commodity, bag type, number of bags and government ID.
- **Unloading of the lot:** Concerned commission agents unload the lot in their premises. This automatically updates inventory position of the goods with commission agent.



- **Display of the lot:** The lot is displayed for inspection by buyers. Such display is a typical requirement when lot is not sampled and tested.
- **Assaying:** The assaying lab technician from the APMC will visit the lot and collects the sample of the commodity for assaying. After drawing the sample, the assaying report is uploaded to e-NAM website for the next process. If the assaying machinery is not available for some commodities, then quality checking is done on the basis of a physical examination by commission agents/ trader.
- **Generate e-bidding:** Based on the assaying report, mandi officials generate auctioning of the produce through the e-platform and fix maximum bidding time.
- Then the traders will quote their prices electronically for their interested lot IDs and the same will be displayed on the display board.
- **Acceptance by the farmer:** Once the bidding time is over, then the SMS is sent to the farmers with the details of winning bid. The farmer can also view winning bid lot number wise displayed on the e-display board at APMC. The farmer is given the opportunity to accept or reject the bid. Once farmer accepted, complete the sale process and winner details to be communicated to all the market participants through SMS and display mechanism.
- **Weighment of sold commodity:** Weighing of sold lots is done after successful completion of auction process to determine the total sale consideration.
- **Generation of sale agreement:** System based documents (sale bill, invoice,) to be given to the farmer, traders and commission agents. Sale bill contains trader name and license number, commission agent name and license number, farmers name agreement number, commodity details, weight of bag, packing type, no. of bags, commodity price, farmer's price, mandi fee and commission agent fee.
- **Payment to farmers and others:** Once the sale bill is generated, trader sends money through NEFT/RTGS/cash deposit through bank challan but the

farmers demanding for immediate cash after sale, hence traders pays cash to farmers directly.

- **Gate exit pass:** After successful payment to the farmers, commodity is handed over to trader and mandi officials generates gate exit pass which contains gate exit number, exit type, APMC details, vehicle number, trader name, lot code, commodity type, bag type, number of bags and total weight of commodity.
- **Generate e-permit for secondary trade:** If the buyer is interested to resale the commodity within the state in any e-NAM mandi after primary sale, then e-permit is prerequisite for exemption of mandi fee from secondary sale.

#### 4.4 Socio economic profile of the respondents

The socio-economic profile characteristics of the respondents (farmer/trader) selected for the study *viz.*, age, gender, educational status, occupational status, family size, farming/trading experience, farm size (only for farmers), annual income, savings, indebtedness, innovativeness, information seeking behaviour, social participation, decision making ability, market orientation and economic motivation are discussed here under separate headings.

##### 4.4.1 Socio economic profile of the farmers

###### 4.4.1.1 Age

The age wise categorisation of the farmers is presented in Table 5.

**Table 5. Distribution of farmers based on their age (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Young aged	13	21.67
2	Middle aged	30	50.00
3	Old aged	17	28.33
	<b>Total</b>	<b>60</b>	<b>100.00</b>

Table 5 indicates that 50 per cent of farmers were middle aged group (35 - 55 years), 28.33 per cent of farmers were old aged group (more than 55 years) and 21.67 per cent of the farmers were young aged group (below 35 years). Thus, the Table clearly indicates that majority (50%) of the farmers participating in e-NAM were middle aged farmers. This may be due to now a days young people are interested in studies and doing jobs, so farming is not preferred by many of the youth. The results are in conformity with the findings of Geethavani (2019) and Swarna (2019).

#### 4.4.1.2 Gender

The categorisation of farmer respondents according to their gender and the results are presented in Table 6.

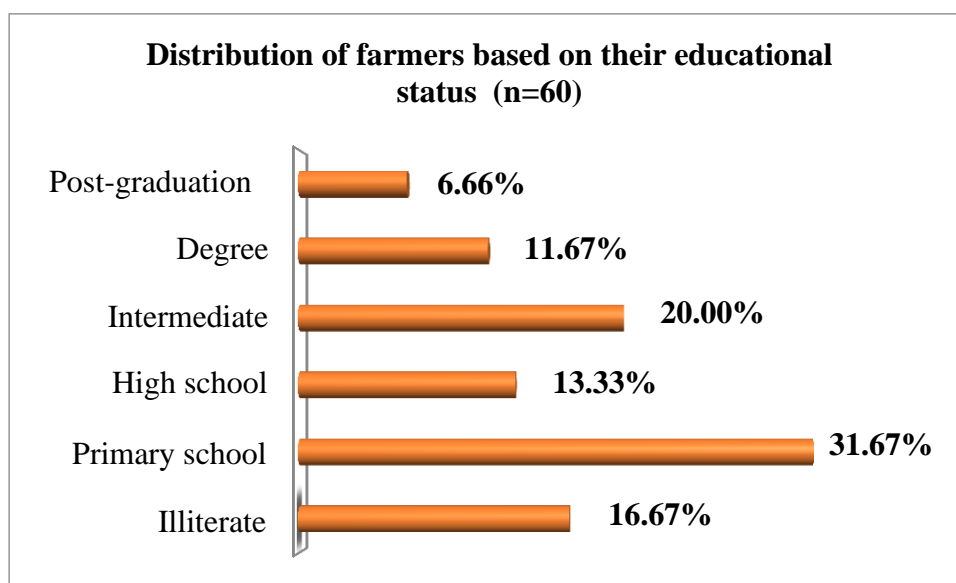
**Table 6. Distribution of farmers based on their gender (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Male	53	88.33
2	Female	7	11.67
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 6, it is seen that 88.33 per cent of the farmers were males and only 11.67 per cent of farmers were females. It is observed that in the study area, most of the agriculture and finance related works were taken care by male members and household duties were taken care by females, and this may be the reason for the overwhelming share of the males participating in e-NAM. The results are in conformity with the findings of Thakur (2018).

#### 4.4.1.3 Educational status

The categorisation of farmers based on their educational status is presented in Figure 3.



**Figure 3. Distribution of farmers based on their educational status (n=60)**

It is observed that slightly less than one third of farmers (31.67%) were having the primary school level education. Twenty per cent of the farmers were having intermediate level of education followed by 13.33 per cent of farmers having high school level education and 11.67 per cent of farmers having degree level and 6.67 per cent farmers having post- graduation level of education. Altogether it can be seen that majority (83.33) of the farmers were literates. The results are in conformity with the findings of Chandana (2018).

#### 4.4.1.4 Occupational status

The farmers were categorised according to their occupation and the results are presented in Table 7.

**Table 7. Distribution of farmers based on their occupational status (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Agriculture alone	40	66.37
2	Agriculture + Farm labour	14	21.24
3	Agriculture + Cattle rearing	6	12.39

	<b>Total</b>	<b>60</b>	<b>100.00</b>
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From Table 7, it is seen that 66.37 per cent of the farmers had agriculture alone as their occupation followed by 21.24 per cent of farmers with agriculture along with farm labour and 12.39 per cent of farmers with agriculture with cattle farming as their occupation. There was no farmer doing agriculture along with government job / private job / business. It clearly indicates that majority of the farmers are depending on farming alone. The result is in conformity with that of Tyngkan (2018) and Bandhavya (2020)

#### 4.4.1.5 Family size

The categorisation of farmer respondents according to their family size is presented in Table 8.

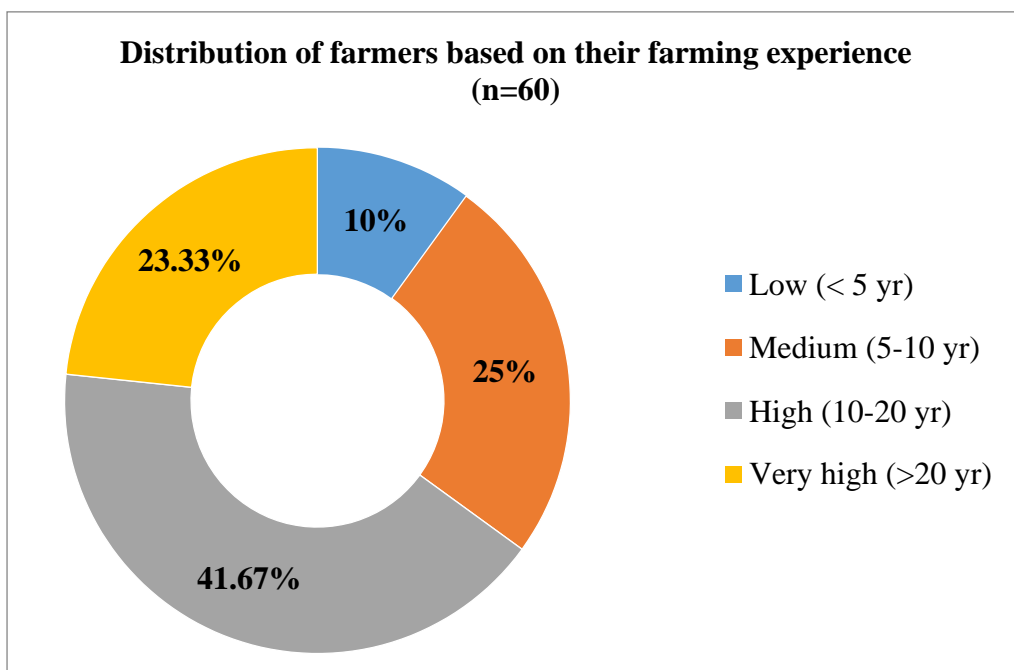
**Table 8. Distribution of farmers based on their family size (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Small (<5 members)	33	55.00
2	Medium (5 to 8 members)	27	45.00
3	Large (> 8 members)	0	0.00
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 8, it can be observed that 55 per cent of the farmers had a small family with less than five members in their family followed by 45 per cent of the farmers having medium family with five to eight members. The results are in tandem with the family size of Telangana State (<https://www.telangana.gov.in>) and is in conformity with the results of Chandana (2018). It shows that now the large families are rarely seen in the State and most of the farmers are living with nuclear families.

#### 4.4.1.6 Farming experience

The farmer respondents were categorised according to their farming experience and the results are presented in Figure 4.



**Figure 4. Distribution of farmers based on their farming experience (n=60)**

From Figure 4, it is observed that, 41.67 per cent of farmers were with high farming experience (10 - 20 years) followed by 25 per cent of farmers with medium farming experience (more than 5 - 10 years) and 23.33 per cent of the farmers with very high farming experience (more than 20 years). Only 10 per cent of the farmers were with low experience (less than five years). Thus it is inferred that the farmers were having good farming experience as evidenced by 65 per cent of farmers having high to very high farming experience. The results reveal that majority (65%) of the farmers were having more than 10 years of farming experience. The results are in conformity with that of Thakur (2018).

#### 4.4.1.7 Farm size

The categorisation of farmers based on their farm size is presented in Table 9.

**Table 9. Distribution of farmers based on their farm size (n=60)**

Sl. No.	Category	Farmers	
		No.	%

1	Marginal (<2.5 acre)	13	21.67
2	Small (2.5 to 5 acre)	24	40.00
3	Large (> 5 acre)	23	38.33
	<b>Total</b>	<b>60</b>	<b>100.00</b>

As can be seen from Table 9, majority (40%) of the farmers were small farmers closely followed by 38.33 per cent of large farmers. Marginal farmers were comparatively less in number (21.67 %). The result is in conformity with that of Bachaspati (2018).

#### 4.4.1.8 Annual income

The farmers were categorised according to their annual income and the results are presented in Table 10.

**Table 10. Distribution of farmers based on their annual income (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Less than ₹50,000	3	5.00
2	₹50,000 – ₹1,00,000	13	21.67
3	₹1,00,000 – ₹2,00,000	24	40.00
4	More than ₹2,00,000	20	33.33
	<b>Total</b>	<b>60</b>	<b>100.00</b>

Table 10 revealed that 40 per cent of the farmers had an annual income of ₹1lakh -₹2 lakhs followed by 33.33 per cent of the farmers with more than two lakhs of annual income, 21.67 per cent of the farmers had an annual income of ₹50,000 - ₹1,00,000 and only five per cent of the farmers had less than ₹50000 of annual income. The results reveal that majority of the farmers (73.33%) had an annual income of more than ₹1,00,000 per annum. This may be because, the farmers

(78.33%) were having small to large farm size. The result is in conformity with that of Chandana (2018).

#### 4.4.1.9 Savings

The farmer respondents were categorised according to their savings and the results are presented in Table 11.

**Table 11. Distribution of farmers based on their savings (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Less than ₹50,000	20	31.40
2	₹50,000 – ₹ 1,00,000	28	46.51
3	₹1,00,000 – ₹2,00,000	11	20.93
4	More than ₹2,00,000	1	1.16
	<b>Total</b>	<b>60</b>	<b>100.00</b>

Table 11, revealed that 46.51 per cent of the farmers with ₹50,000 - ₹1,00,000 of savings followed by 31.40 per cent of the farmers had less than ₹50,000 savings and 20.93 per cent of farmers with 1 lakh to 2 lakh savings.

It is inferred that, majority (77.91%) of the farmers had an average savings of less than 1 lakh whereas only 1.16 per cent of farmers had more than 2 lakh savings per annum.

#### 4.4.1.10 Indebtedness

Indebtedness of the farmers was analysed in terms of sources of credit, credit amount, rate of interest and repayment period, and the results are presented below.

##### 4.4.1.10.1 Source of credit

The categorisation of farmers based on their source of credit and the results are presented in Table 12.



**Table 12. Distribution of farmers based on their credit source (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Cooperative banks	31	51.66
2	Private banks	0	0.00
3	Moneylenders	22	36.67
4	Friends /relatives	7	11.67
5	Traders/commission agents	0	0.00
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 12, it is observed that majority (51.66%) of the farmers availed loans from cooperative banks while 36.67 per cent of farmers availed loans from moneylenders, and 11.67 per cent of farmers from their relatives/friends. No farmers had taken loans from private banks or traders/commission agents.

#### 4.4.1.10.2 Credit amount

The categorisation of farmer respondents based on the amount of credit availed is presented in Table 13.

**Table 13. Distribution of farmers based on the amount of credit availed (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Less than ₹50,000	6	10.00
2	₹50,000 – ₹1,00,000	17	28.33
3	₹1,00,000 – ₹2,00,000	22	36.67
4	More than ₹ 2,00,000	15	25.00
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 13, it is observed that 36.67 per cent of the farmers had taken ₹1 lakh to ₹2lakhs of credit, while 28.33 per cent of farmers had taken ₹50,000 to ₹1,00,000 of credit and 25 per cent of farmers had taken more than ₹2,00,000 of credit. Only 10 per cent of the farmers had taken less than ₹50,000 of credit.

#### 4.4.1.10.3 Rate of interest

The farmer respondents were also categorised based on the rate of interest they had to pay and the results are presented in Table 14.

**Table 14. Distribution of farmers based on the rate of interest (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Less than 10%	26	43.33
2	10 - 20%	5	8.34
3	More than 20%	29	48.33
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 14, it is observed that 48.33 per cent of farmers had borrowed for an interest rate of more than 20 per cent followed by 43.33 per cent of farmers for less than 10 per cent interest rate, while 8.34 per cent of the farmers for an interest rate of 10-20 per cent. The lower interest rate of less than 10 per cent was contributed by the cooperative banks, while the higher interest rate of more than 20 per cent was contributed by the money lenders.

#### 4.4.1.10.4 Repayment period

The categorisation of farmers according to the repayment period of loans availed/allowed is presented in Table 15.

**Table 15. Distribution of farmers based on their repayment period (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Up to 6 months	5	8.34

2	6 - 12 months	14	23.33
3	12 - 24 months	30	50.00
4	More than 24 months	11	18.33
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 15, it is observed that 50 per cent of the farmers had borrowed with a repayment period of 12 to 24 months. Whereas 23.33 per cent of the farmers had borrowed with a repayment period of 6 to 12 months and 18.33 per cent of farmers had borrowed with more than 24 months of repayment period. Only 8.34 per cent of farmers had borrowed with less than 6 months" repayment period.

#### 4.4.1.11 Innovativeness

The categorisation of farmer respondents based on their innovativeness is presented in Table 16.

**Table 16. Distribution of farmers based on their innovativeness(n=60)**

Sl. No.	Statement	Category	Farmers	
			No.	%
1	As soon as it is brought to the knowledge	Innovators	7	11.67
2	After seeing other people tried successfully	Imitators	32	53.33
3	Prefer to wait and take one"s own time	Fabians	18	30.00
4	Not interested to adopt new technologies	Drones	3	5.00
	<b>Total</b>		<b>60</b>	<b>100.00</b>

From Table 16, it is seen that 53.33 per cent of the farmers were imitators in case of adopting new technologies followed by 30 per cent of fabians and 11.67 per cent of innovators. Only 5 per cent of farmers were drones. Thus, the table clearly

indicates that majority (53.33%) of the farmers were imitators and the least (5%) were drones.

#### 4.4.1.12 Information seeking behaviour

The categorisation of farmers based on their information seeking behaviour is presented in Table 17.

**Table 17. Distribution of farmers based on their information seeking behaviour (n=60)**

Sl. No.	Category	Farmers	
		No.	%
1	Low	14	23.33
2	Medium	34	56.67
3	High	12	20.00
	<b>Total</b>	<b>60</b>	<b>100.00</b>
<b>Mean - 29.2222</b>		<b>SD - 3.5686</b>	

From Table 17, it is observed that majority (56.67%) of the farmers were having medium information seeking behaviour followed by 23.33 per cent of the farmers having low information seeking behaviour and 20 per cent of the farmers were having high information seeking behaviour. Thus, Table 19 clearly indicates that majority (56.67%) of farmers were having medium level of information seeking behaviour. The result is in conformity with Bandhavya (2020).

#### 4.4.1.13 Social participation

The categorisation of farmer respondents according to their social participation is presented in Table 18.

**Table 18. Distribution of farmers based on their membership in social organisation (n=60)**

Sl. No.	Category	Farmers	
		No.	%

1	No membership	38	63.33
2	Membership in one organisation	22	36.67
3	Membership in more than one organisation	0	0.00
4	Office bearer in one organization	0	0.00
5	Office bearer in more than one organisation	0	0.00
	<b>Total</b>	<b>60</b>	<b>100.00</b>

From Table 18, it is observed that 63.33 per cent of the farmers did not have a membership in any of the organisations. Only 36.67 per cent of farmers were members in one organisation and there were no farmers having membership in more than one organisation or office bearer in any of the organisation. The results are in conformity with that of Bandhavya (2020).

The categorisation of farmer respondents based on their frequency of social participation is presented in Table 19.

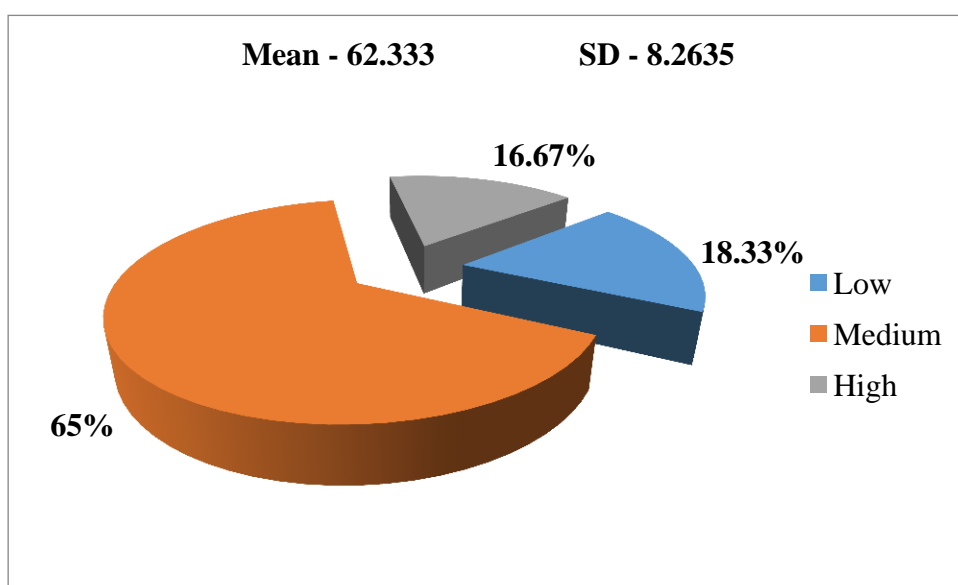
**Table 19. Distribution of farmers based on their frequency of social participation**  
(n=22)

Sl. No.	Category	Farmers	
		No.	%
2	Rarely	12	54.55
3	Sometimes	6	27.27
4	Often	4	18.18
5	Always	0	0.00
	<b>Total</b>	<b>22</b>	<b>100.00</b>

From Table 19, it is observed that majority of the farmers (54.55) rarely attended meetings of social organisations whereas 27.27 per cent of the farmers attended meetings sometimes and 18.18 per cent of farmers attended meetings often.

#### 4.4.1.15 Decision making ability

The categorisation of farmers based on their decision-making ability is presented in Figure 5.

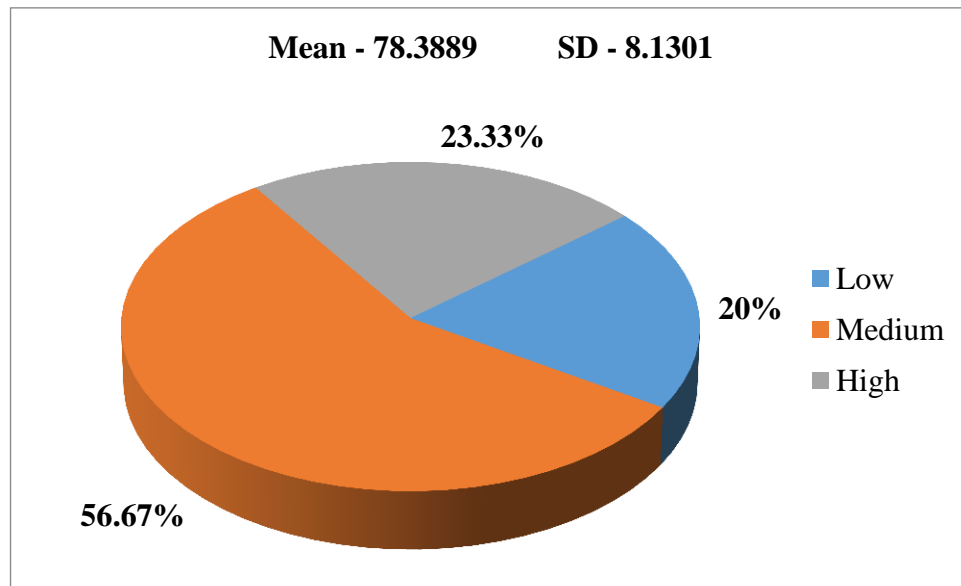


**Figure 5. Distribution of farmers based on their decision-making ability (n=60)**

From Figure 5, it is observed that 65 per cent of the farmers were having medium level of decision-making ability followed by 18.33 per cent of farmers with low level of decision-making ability. However, 16.67 per cent of farmers had high level of decision making ability. Thus Table 22 indicates that majority (65%) of the farmers were having medium level of decision making ability.

#### 4.4.1.16 Market orientation

The farmer respondents were also categorised based on their market orientation and the results are presented in Figure 6.

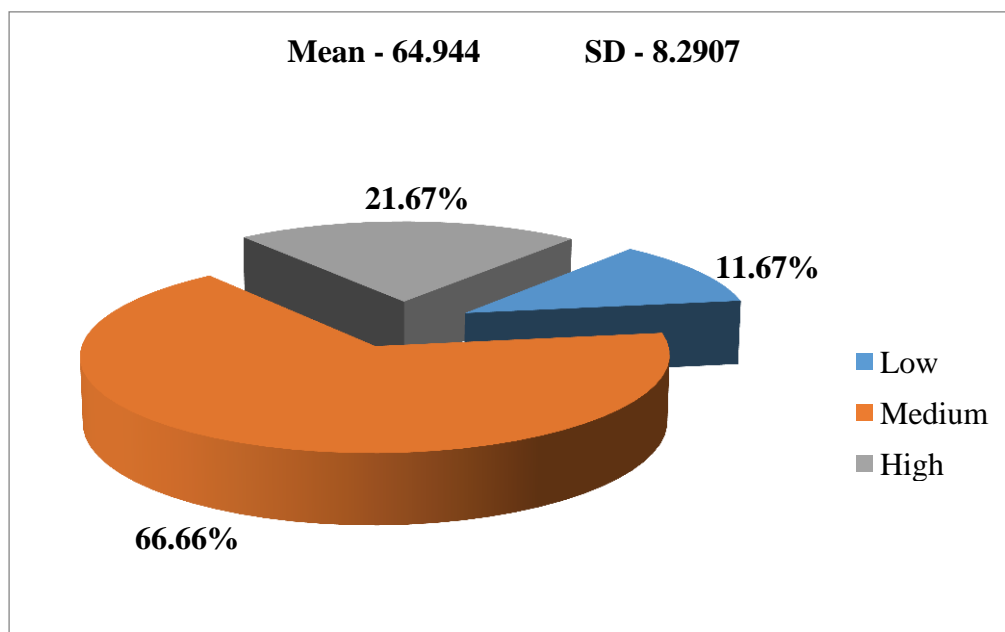


**Figure 6. Distribution of farmers based on their market orientation (n=60)**

From Figure 6, it is observed that 56.67 per cent of the farmers were having medium level of market orientation followed by 23.33 per cent of farmers were with high level of market orientation and 20 per cent of farmers with low level of market orientation. Thus Table 23 indicates that majority (56.67%) of the farmers were with medium level of market orientation.

#### **4.4.1.17 Economic motivation**

The categorisation of farmers according to their economic motivation is presented in Figure 7.



**Figure 7. Distribution of farmers based on their economic motivation (n=60)**

From Figure 7, it is observed that 66.66 per cent of farmers were having medium level of economic motivation followed by 21.67 per cent of the farmers with high level of economic motivation and 11.67 per cent of farmers with low level of economic motivation. It is clear that majority (66.66%) of the farmers were with medium level of economic motivation.

#### 4.4.2 Socio economic profile of the traders

##### 4.4.2.1 Age

The categorisation of trader respondents based on their age is presented in Table 20.

**Table 20. Distribution of traders based on their age (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Young aged	3	10.00
2	Middle aged	23	76.67
3	Old aged	4	13.33



	<b>Total</b>	<b>30</b>	<b>100.00</b>
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Table 20, indicates that 76.67 per cent of the traders were middle age group of 35 to 55 years followed by 13.33 per cent of traders were old age group of above 55 years and 10.00 per cent of traders were less than 35 years age group. Thus Table 25, indicates that majority (76.67) of the traders participating in e-NAM are middle age grouped traders.

#### 4.4.2.2 Gender

The gender wise categorisation of the trader respondents are presented in Table 21.

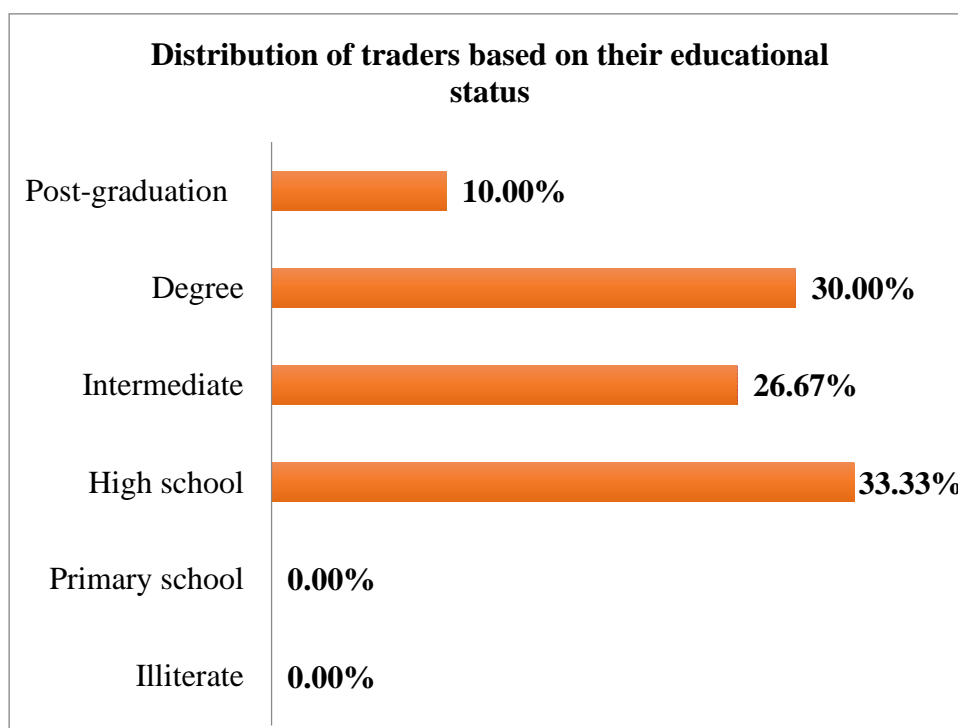
**Table 21. Distribution of traders based on their gender (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Male	30	100.00
2	Female	0	0.00
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 21, it is seen that 100 per cent of the traders were males and no female traders were seen in e-NAM trading. It clearly indicates that only male traders were participating in e-NAM.

#### 4.4.2.3 Educational status

The categorisation of traders based on their educational status and the results are presented in Figure 8.



**Figure 8. Distribution of traders based on their educational status (n=30)**

From Figure 8, it is observed that 33.33 per cent of the traders were having high school level of education followed by 30.00 per cent of traders having degree level and 26.67 per cent of traders having intermediate level of education. Ten per cent of the traders were having post- graduation level of education. Altogether it can be seen that 100 per cent of the traders were literate.

#### 4.4.2.4 Occupational status

The categorisation of trader respondents according to their occupational status is presented in Table 22.

**Table 22. Distribution of traders based on their occupational status (n=30)**

Sl. No.	Category	Traders	
		No.	%.
1	Trading alone	22	73.33

2	Trading + Agriculture	8	26.67
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 22, it can be observed that 73.33 per cent of the traders had trading alone as their occupation followed by 26.67 per cent of traders with trading along with agriculture as their occupation. There were no traders doing trading along with government job / private job. Thus, Table 28 indicates that majority (73.33%) of the traders are depending on trading alone.

#### 4.4.2.5 Family size

The trader respondents were categorised according to their family size and the results are presented in Table 23.

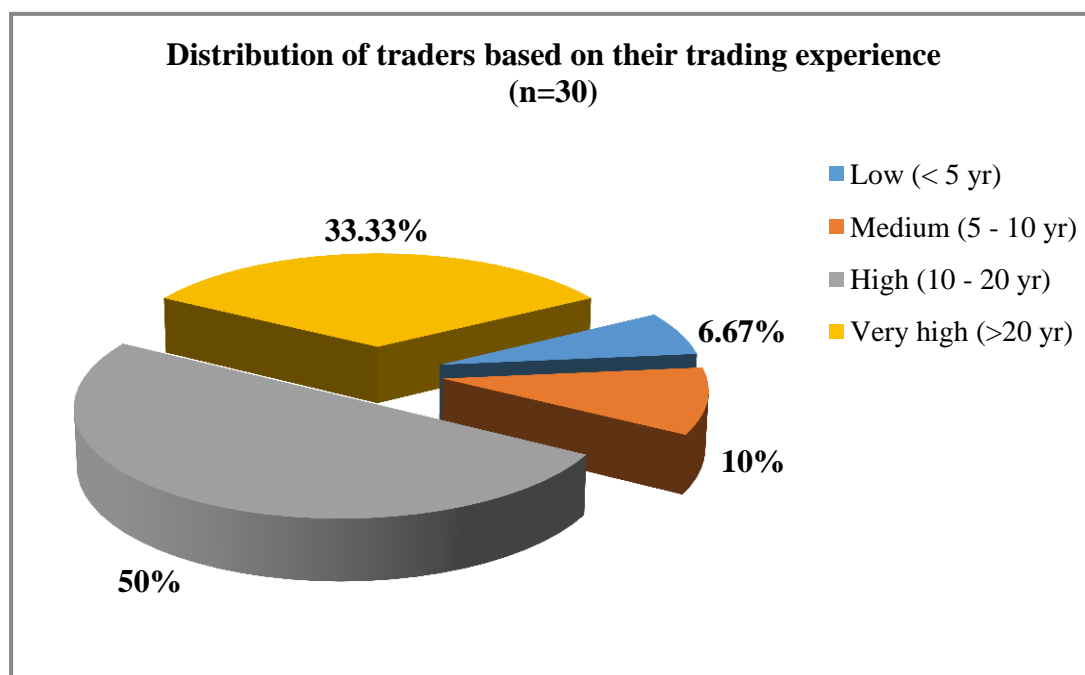
**Table 23. Distribution of traders based on their family size (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Small (<5 members)	9	30.00
2	Medium (5 to 8 members)	15	50.00
3	Large (> 8 members)	6	20.00
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 23, it is observed that 50 per cent of the traders were having medium family with five to eight members in their family followed by 30 per cent of the traders with small family with less than five members in their family and 20 per cent of the traders having large family with more than eight members. Thus Table 29 shows that majority (80%) of the traders were having small to medium sized family.

#### 4.4.2.6 Trading experience

The categorisation of traders based on their trading experience is presented in Figure 9.



**Figure 9. Distribution of traders based on their trading experience (n=30)**

From Figure 9, it is observed that 50 per cent of traders were with high trading experience (10 to 20 years) followed by 33.33 per cent of the traders with very high trading experience (>20 years). Whereas 10 per cent of the traders had medium trading experience (5 to 10 years). Only 6.67 per cent of the traders had low experience (< 5 years). Thus Table 30 indicates that majority (83.33%) of the traders were having more than 10 years of trading experience.

#### 4.4.2.7 Trading experience through e-NAM

The traders were categorised according to their e-NAM trading experience and the results are presented in Table 24.

**Table 24. Distribution of traders based on their e-NAM trading experience  
(n=30)**

Sl. No.	Category	Traders	
		No.	%
1	1 year	2	6.67

2	2 year	8	26.66
3	3 year	20	66.67
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 24, it can be seen that 66.67 per cent of the traders were with three years e-NAM trading experience followed by 26.66 per cent of traders with two years of e-NAM trading experience and 6.67 per cent of traders with one year experience with e-NAM portal. Thus it is inferred that the traders were having good trading experience through e-NAM as evidenced by 66.67 per cent of traders having three years e-NAM trading experience (e-NAM was introduced in 2016, around 4 years prior to the data collection for the study).

#### 4.4.2.8 Annual income

The categorisation of traders based on their annual income is presented in Table 25.

**Table 25. Distribution of traders based on their annual income (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Up to 2 lakhs	0	0
2	2 to 5 lakhs	19	63.34
3	5 to 8 lakhs	7	23.33
4	More than 8 lakhs	4	13.33
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 25, it is observed that 63.34 per cent of the traders were having 2 to 5 lakhs of annual income followed by 23.33 per cent of the traders with 5 to 8 lakhs of annual income and 13.33 per cent of the traders with more than 8 lakhs of annual income. Thus Table 32 reveals that majority of the traders (86.67%) had annual income of 2 to 8 lakhs per annum.

#### 4.4.2.9 Savings

The traders were categorised according to their savings and the results are presented in Table 26.

**Table 26. Distribution of traders based on their savings (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Up to 1 Lakh	5	16.67
2	1 to 2 Lakhs	18	60.00
3	2 to 3 Lakhs	5	16.67
4	More than 3 Lakhs	2	6.66
	<b>Total</b>	<b>30</b>	<b>100.00</b>

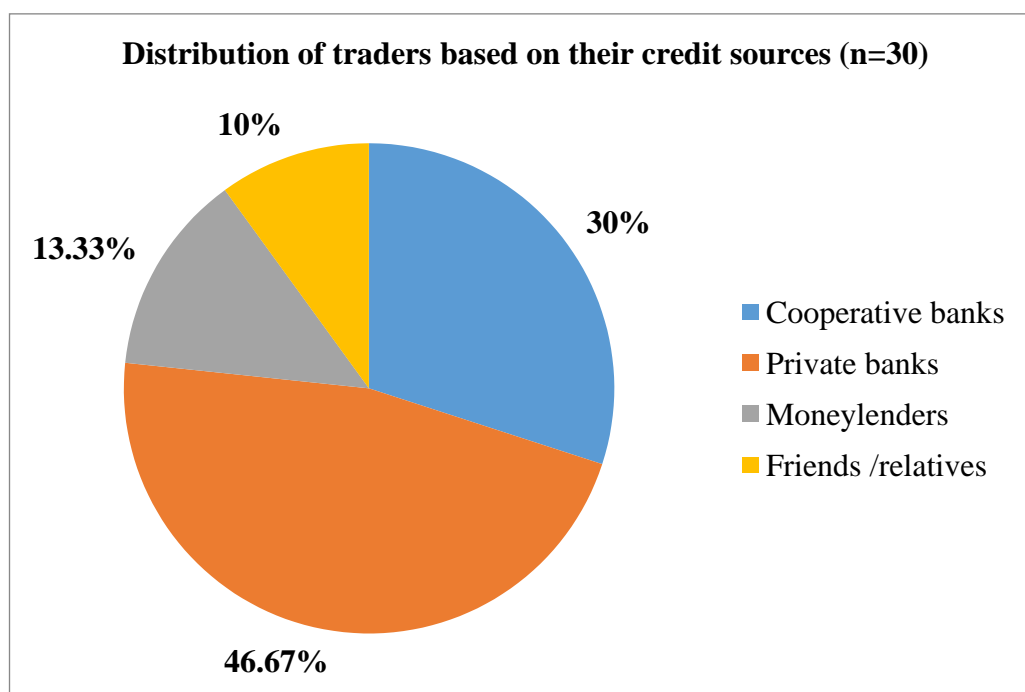
Table 26, revealed that 60 per cent of the traders were having 1 to 2 lakhs of savings followed by 16.67 per cent each of the traders having less than 1 lakh and 2 to 3 lakhs of savings per annum. Only 6.66 per cent of traders were having more than 3 lakh of savings per annum. Thus Table 33 indicates that majority (76.67%) of the traders were having 1 to 3 lakhs savings per annum.

#### 4.4.2.10 Indebtedness

Indebtedness of the trader respondents was analysed in terms of source of credit, credit amount, rate of interest and repayment period, and the results are depicted below.

##### 4.4.2.10.1 Source of Credit

The categorisation of traders according to their credit source is presented in Figure 10.



**Figure 10. Distribution of traders based on their credit source (n=30)**

From Figure 10, it can be observed that 46.67 per cent of traders availed loan from private banks followed by 30.00 per cent of traders who availed credit from cooperative banks, while 13.33 per cent of the traders availed loans from moneylenders and 10 per cent of traders from their friends/relatives. Thus it can be inferred from Table 34 that majority of the traders (76.67%) availed loans from private and cooperative banks. It may be noted here that majority of the traders availed loans from private banks, while none of the farmers availed loans from private banks, and instead farmers resorted to cooperative banks, or even money lenders.

#### 4.4.2.10.2 Credit amount

The categorisation of traders based on the amount of credit availed and the results are presented in Table 27.

**Table 27. Distribution of traders based on their amount of credit availed (n=30)**

Sl. No.	Category	Traders
---------	----------	---------

		<b>No.</b>	<b>%</b>
1	Up to 5 lakhs	6	20.00
2	5 to 10 lakhs	4	13.33
3	10 to 15 lakhs	9	30.00
4	More than 15 lakhs	11	36.67
	<b>Total</b>	<b>30</b>	<b>100.00</b>

Table 27, revealed that 36.67 per cent of the traders had taken more than 15 lakhs of credit followed by 30 per cent of traders who availed credit of 10 to 15 lakhs. Twenty per cent of the traders had taken less than five lakhs of credit. Only 13.33 per cent of the traders had taken 5 to 10 lakhs of credit. Thus it can be inferred that majority (66.67%) of the traders had availed loan of more than 10 lakhs.

#### 4.4.2.10.3 Rate of interest

The categorisation of traders according to the rate of interest they have to pay is presented in Table 28.

**Table 28. Distribution of traders based on their credit rate of interest (n=30)**

<b>Sl. No.</b>	<b>Category</b>	<b>Traders</b>	
		<b>No.</b>	<b>%</b>
1	Less than 10%	9	30.00
2	10 - 20%	14	46.67
3	More than 20%	7	23.33
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 28, it is observed that 46.67 per cent of the traders had borrowed with an interest rate of 10 to 20 per cent followed by 30 per cent of traders with less than 10 per cent interest rate and 23.33 per cent of traders with more than 20 per cent interest rate.



#### 4.4.2.10.4 Repayment period

The categorisation of trader respondents based on their repayment period is presented in Table 29.

**Table 29. Distribution of traders based on their repayment period (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Up to 6 months	0	0
2	6 - 12 months	0	0
3	12 - 24 months	6	20.00
4	More than 24 months	24	80.00
	<b>Total</b>	30	100.00

From Table 29, it is observed that 80 per cent of the traders had availed the credit with a repayment period of more than 24 months while 20 per cent of the traders had borrowed with a repayment period of 12 to 24 months.

#### 4.4.2.11 Innovativeness

The trader respondents were categorised based on their innovativeness and the results are presented in Table 30.

**Table 30. Distribution of traders based on their innovativeness (n=30)**

Sl. No.	Statement	Category	Traders	
			No.	%
1	As soon as it is brought to the knowledge	Innovators	11	36.67
2	After seeing other people tried successfully	Imitators	13	43.33
3	Prefer to wait and take one's own time	Fabians	4	13.33
4	Not interested to adopt new	Drones	2	6.67

	technologies			
	<b>Total</b>		<b>30</b>	<b>100.00</b>

From Table 30, it can be observed that 43.33 per cent of the traders were imitators in case of adopting new technologies followed by 36.67 per cent innovators and 13.33 per cent fabians. Only 6.67 per cent of traders were drones. Thus Table 30 reveals that the majority (43.33%) of the traders were imitators followed by innovators (36.67 %) and the least (6.67%) were drones.

#### 4.4.2.12 Information seeking behaviour

The categorisation of traders based on their information seeking behaviour is presented in Table 31.

**Table 31. Distribution of traders based on their information seeking behaviour**  
(n=30)

Sl. No.	Category	Traders	
		No.	%
1	Low	4	13.33
2	Medium	23	76.67
3	High	3	10.00
	<b>Total</b>	<b>30</b>	<b>100.00</b>
<b>Mean - 40.84</b>		<b>S D - 4.83</b>	

From Table 31, it is observed that 76.67 per cent of the traders were having medium level of information seeking behaviour followed by 13.33 per cent of the traders having low level of information seeking behaviour and 10 per cent of the traders were having high level of information seeking behaviour. Thus it can be inferred from Table 31 that majority of the traders (76.67%) were having medium level of information seeking behaviour.

#### 4.4.2.13 Social participation

The categorisation of traders based on their membership in social organisations is presented in Table 32.

**Table 32. Distribution of traders based on their membership in social participation (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	No membership	0	0.00
2	Membership in one organization	18	60.00
3	Membership in more than one organization	7	23.33
4	Office bearer in one organization	3	16.67
5	Office bearer in more than one organization	0	0.00
	<b>Total</b>	<b>30</b>	<b>100.00</b>

From Table 32, it is observed that 60 per cent of the traders had membership in one organisation followed by 23.33 per cent traders having membership in more than one organisation. Only 16.67 per cent of traders were office bearers in one organisation, while none of the traders were office bearers in more than one organisation. Thus Table 32 indicates that 100 per cent of the traders were having membership in any of the social organisations.

#### 4.4.2.14 Frequency of social participation

The categorisation of trader respondents based on their frequency of attending meetings is presented in Table 33.

**Table 33. Distribution of traders based on their frequency of social participation (n=30)**

Sl. No.	Category	Traders	
		No.	%
1	Rarely	7	23.33

2	Sometimes	7	23.33
3	Often	11	36.67
4	Always	5	16.67
	<b>Total</b>	<b>22</b>	<b>100.00</b>

Table 33 shows that 36.67 per cent of the trader respondents had attended meetings often followed by 23.33 per cent each of the traders attending meetings “rarely” and “sometimes”. Only 16.67 per cent of the traders attended meetings “always”. Thus it is inferred from Table 40 that majority of the traders (53.34%) used to attend meetings often.

#### 4.4.2.15 Decision-making ability

The categorisation of trader respondents according to their decision making ability is presented in Figure 11.

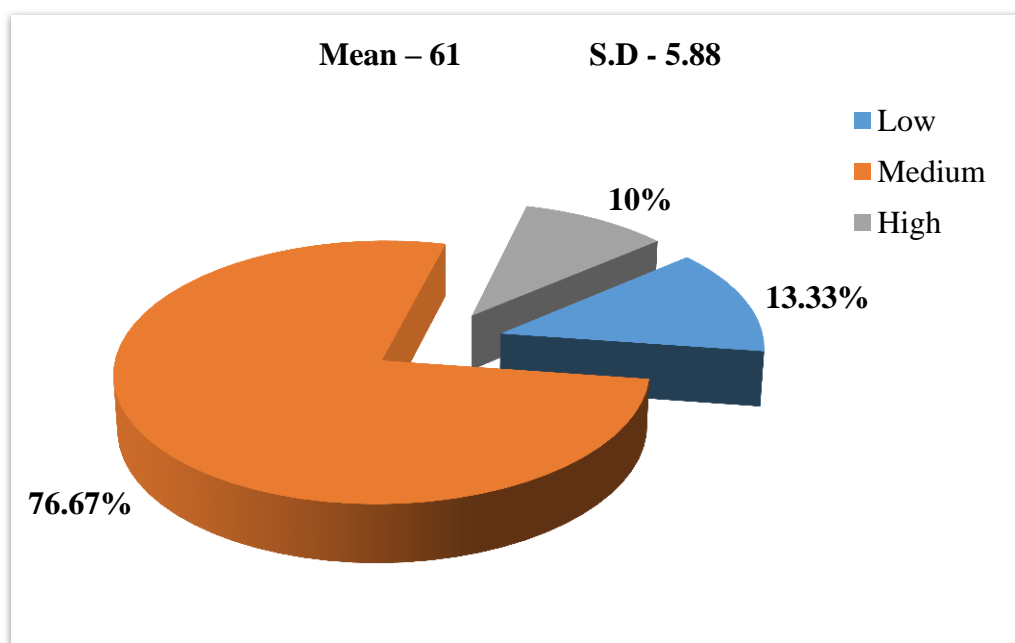
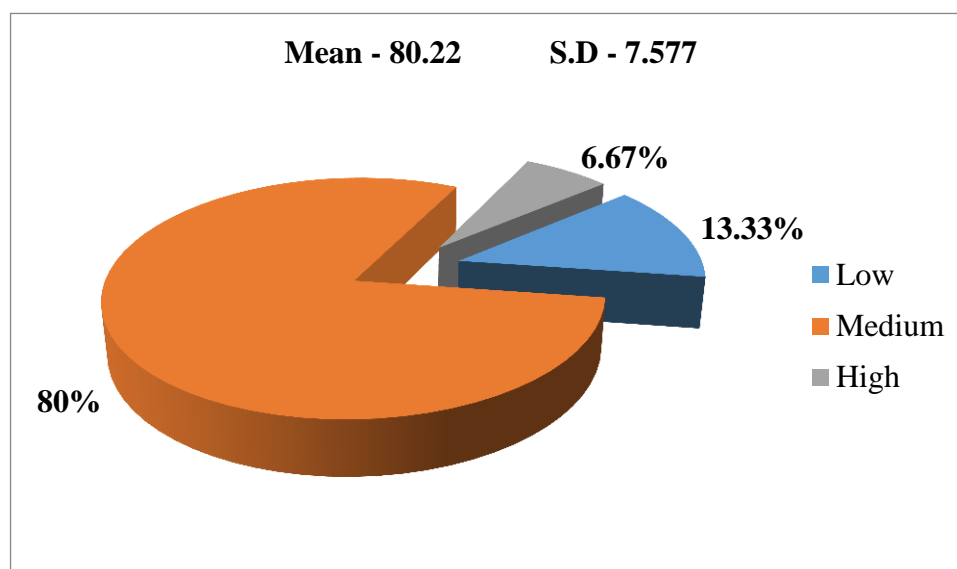


Figure 11. Distribution of traders based on their decision making ability (n=30)

From Figure 11, it can be observed that 76.67 per cent of the farmers were with medium level of decision making ability followed by 13.33 per cent of farmers with low level of decision making ability and 10 per cent of farmers had high level of decision making ability. Thus Figure 11 indicates that majority of the traders (76.67%) were having medium level of decision making ability.

#### 4.4.2.16 Market orientation

The traders were categorised based on their market orientation and the results are presented in Figure 12.

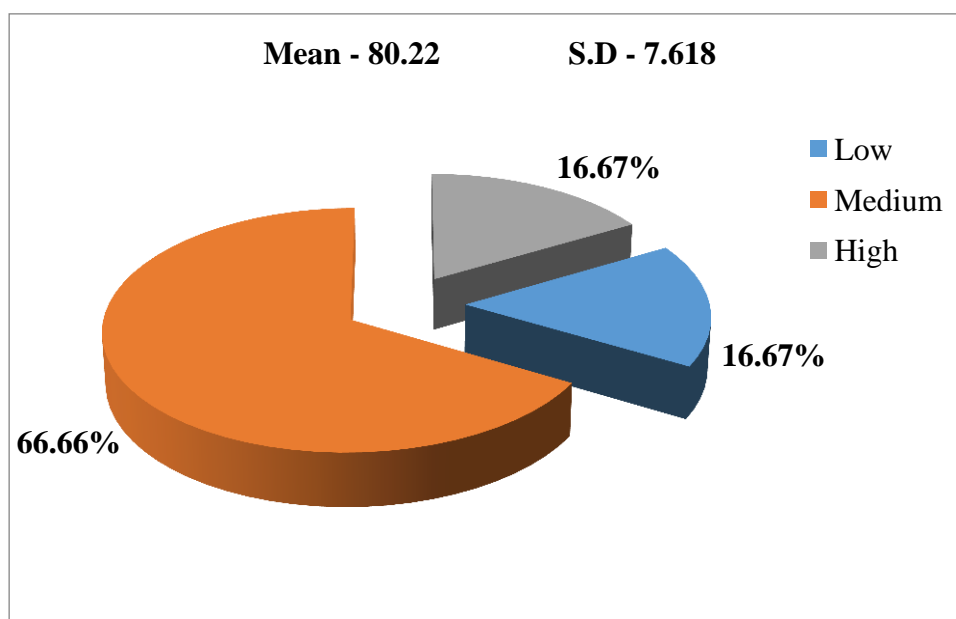


**Figure 12. Distribution of traders based on their market orientation (n=30)**

From Figure 12, it is observed that 80 per cent of the traders were having medium level of market orientation followed by 13.33 per cent of traders with low level of market orientation and 6.67 per cent of traders with high level of market orientation. Thus Figure 12 shows that majority (80%) of the traders were with medium level of market orientation.

#### 4.4.2.17 Economic motivation

The categorisation of trader respondents according to their economic motivation is presented in Figure 13.



**Figure 13. Distribution of traders based on their economic motivation (n=30)**

From Figure 13, it is observed that 66.66 per cent of the traders were having medium level of economic motivation followed by 16.67 per cent each of the traders with low and high level of economic motivation. Thus Figure 13 indicates that majority of the traders (66.66%) were with medium level of economic motivation.

#### **4.5 e- literacy of farmer and trader respondents**

e-literacy of farmers and traders was analysed in terms of their ability to use computer (computer literacy) and ability to use mobile phones (m-literacy).

##### **4.5.1 Farmers' ability to use computer (computer literacy)**

The categorisation of farmer respondents according to their ability to use computer was done and the results are presented in Table 34.

**Table 34. Distribution of farmers based on their ability to use computer (n=60)**

Sl. No.	Statements	Able to use		Unable to use	
		Frequency	%	Frequency	%
1	Switch on a computer	8	13.33	52	86.67
2	Shut down a computer	8	13.33	52	86.67

3	Use the computer mouse with ease	8	13.33	52	86.67
4	Open a file	8	13.33	52	86.67
5	Create a folder	5	8.33	55	91.67
6	Opening videos in computer	8	13.33	52	86.67
7	Create a word document	4	6.67	56	93.33
8	Browse internet	8	13.33	52	86.67
9	Using e-mails	6	10.00	54	90.00
10	Interaction through social media	8	13.33	52	86.67

From Table 34, it is observed that majority of the farmers (86.67%) were not computer literate. Only 13.33 per cent of farmers had computer literacy with the ability to use the basic functions of computer including switch on and shut down a computer, using computer mouse with ease, opening a file, opening videos in computer, browsing internet and interaction through social media using computer. While 10 per cent of the farmers were able to use e-mails, 8.33 per cent of farmers were able to create a new folder and only 6.67 per cent of farmers were able to create a word document. Thus it can be inferred that most of the farmers were computer illiterates. The results are quite opposite to Pattnaik (2018), reported that 57 per cent of the farmers able to use the computer.

#### 4.5.2 Traders' ability to use computer (computer literacy)

The categorisation of traders based on their ability to use computer is presented in Table 35.

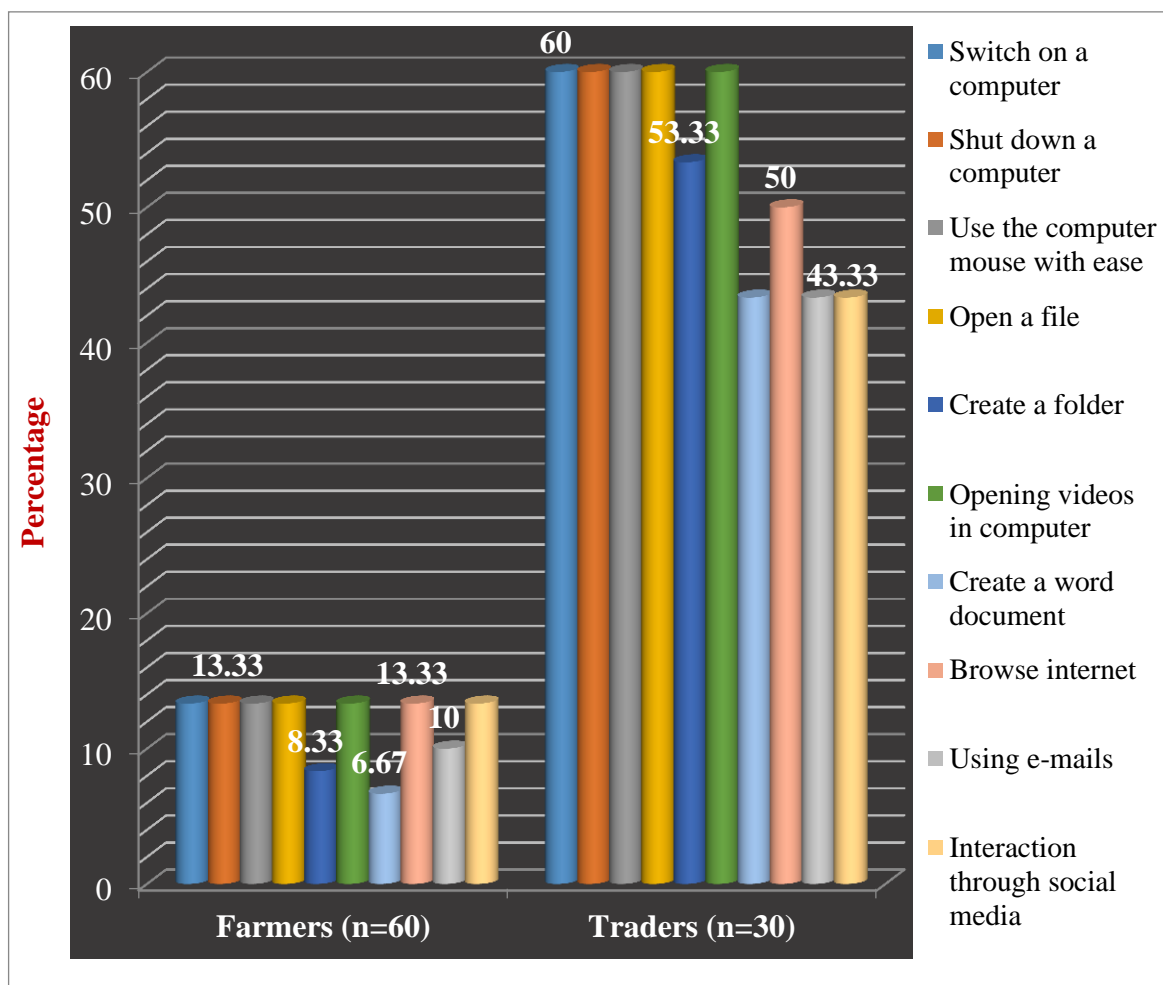
**Table 35. Distribution of traders based on their ability to use computer (n=30)**

Sl. No.	Statements	Able to use		Unable to use	
		Frequency	%	Frequency	%
1	Switch on a computer	18	60.00	12	40.00
2	Shut down a computer	18	60.00	12	40.00

3	Use the computer mouse with ease	18	60.00	12	40.00
4	Open a file	18	60.00	12	40.00
5	Create a folder	16	53.33	14	46.67
6	Opening videos in computer	18	60.00	12	40.00
7	Create a word document	13	43.33	17	56.67
8	Browse internet	15	50.00	15	50.00
9	Using e-mails	13	43.33	17	56.67
10	Interaction through social media	13	43.33	17	56.67

From Table 35, it is observed that 60 per cent of the traders were able to switch on and shut down a computer, use computer mouse with ease, open a file, open videos in computer while 53.33 per cent of traders were able to create a folder and 50 per cent of traders able to browse internet. Only 43.33 per cent of traders were able to create a word document, using e-mails and interaction through social media using computer. It can be inferred from Table 35 that most of the traders (60%) were computer literates.





**Figure 14. Ability of farmers and traders to use computer (computer literacy)**

#### 4.6.3 Farmers' ability to use mobile phone (m-literacy)

The farmer respondents were categorised according to their ability to use mobile phone and the results are presented in Table 36.

**Table 36. Distribution of farmers based on their ability to use mobile phone (n=60)**

Sl. No.	Statements	Able to use		Unable to use	
		Frequency	%	Frequency	%
1	Switch on mobile phone	60	100.00	0	0
2	Opening contacts	60	100.00	0	0
3	Making phone calls	60	100.00	0	0

4	Texting messages	17	28.33	43	71.67
5	Browse internet	14	23.33	46	76.67
6	Using e-mails	7	11.67	53	88.33
7	Installing apps	11	18.33	49	81.67
8	Taking photographs	39	65.00	21	35.00
9	Making video calls	27	45.00	33	55.00
10	Interaction through social media	31	51.67	29	48.33

From Table 36, it is observed that 100 per cent of the framers know to switch on and switch off mobile phone, opening contacts, making phone calls while 65 per cent of the farmers were able to take photographs, 51.67 per cent were able to interact through social media, 45 per cent of farmers were able to make video calls and 28.33 per cent farmers could do text messages and browse internet. However, only 18.33 per cent of farmers were able to install apps while only 11.67 per cent of farmers were able to use e-mails. Thus it can be inferred that though cent per cent of the farmers were m-literate with basic ability to use mobile phones, they were yet to gain competency in using many functions of the mobile. However, the m-literacy of the farmers was found higher as compared to the computer literacy. The study of Kumar *et al.* (2019), reported that 80 per cent of the farmers were using mobile internet for the purpose of social media.

#### 4.5.4 Traders' ability to use mobile phone (m-literacy)

The categorisation of traders based on their ability to use mobile phone is presented in Table 37.

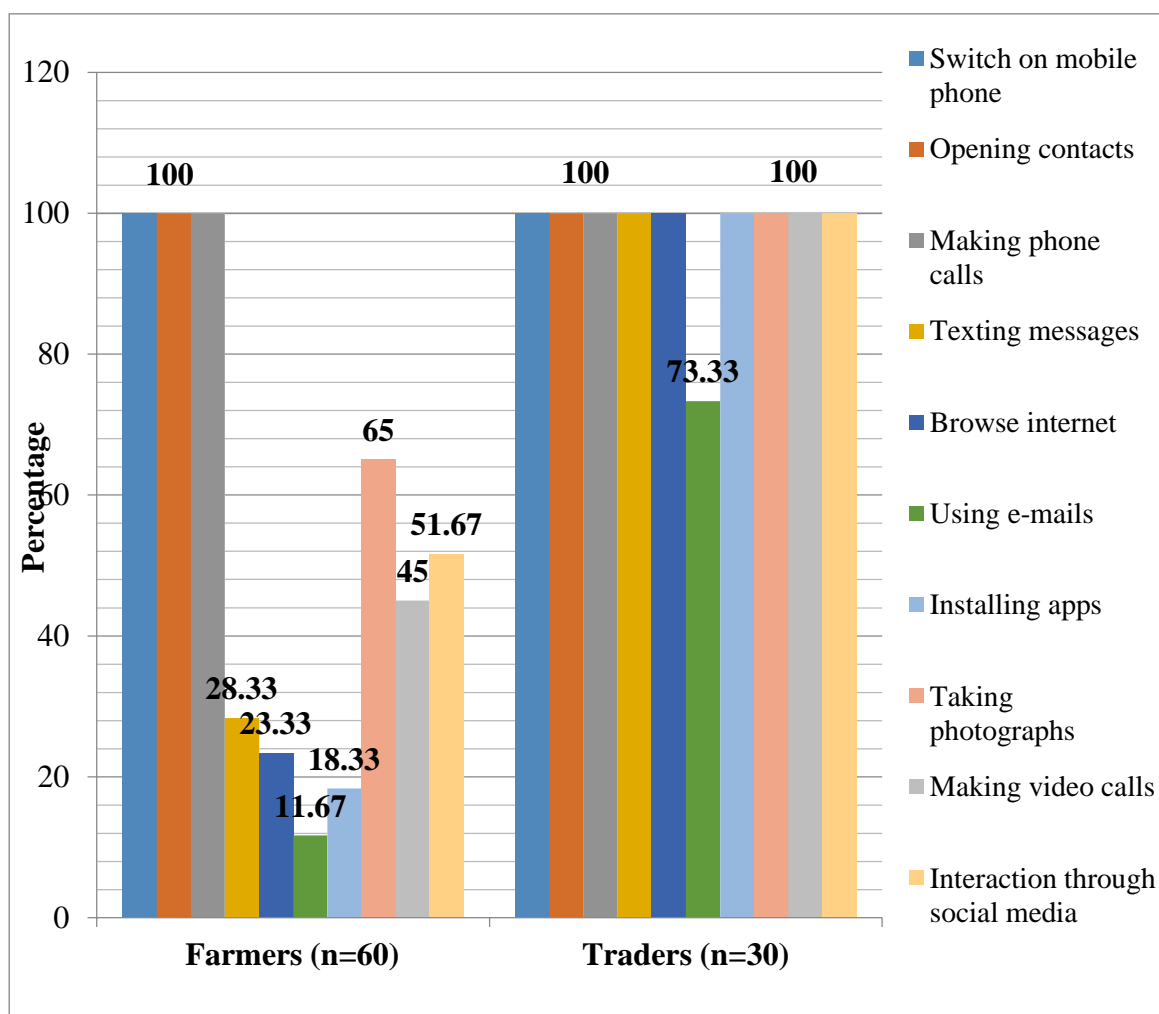
**Table 37. Distribution of traders based on their ability to use mobile phone**

(n=30)

Sl. No.	Statements	Able to use		Unable to use	
		Frequency	%	Frequency	%
1	Switch on mobile phone	30	100.00	0	0

2	Opening contacts	30	100.00	0	0
3	Making phone calls	30	100.00	0	0
4	Texting messages	30	100.00	0	0
5	Browse internet	30	100.00	0	0
6	Using e-mails	22	73.33	8	26.67
7	Installing apps	30	100.00	0	0
8	Taking photographs	30	100.00	0	0
9	Making video calls	30	100.00	0	0
10	Interaction through social media	30	100.00	0	0

From Table 37, it is observed that 100 per cent of the traders were able to switch on and switch off mobile phone, open contacts, make phone calls, text messages, browse internet, install apps, take photographs, make video calls and interact through social media using mobile phone. However, 26.67 per cent of the traders were not able to use e-mails. Thus, Table 47 indicates that 100 per cent of the traders were m-literates with very good ability to use mobile phones.



**Figure 15. Ability of farmers and traders to use mobile phone (m-literacy)**

#### 4.6 Perception of farmers and traders on e-NAM facilities and services

##### 4.6.1 Perception of farmers

The perception of farmers towards e-NAM on selected indicators was examined and the results are presented in Table 38.

**Table 38. Perception of farmers about e-NAM (n=60)**

Sl. No.	Statements	Responses			
		SA	A	DA	SDA
1	Weighing is done properly	23.33	76.67	0	0
2	Quality checking is not done	20.00	66.67	13.33	0

	properly				
3	e-NAM provides better accessibility to market	0	75.00	25.00	0
4	High Supply chain efficiency	0	70.00	30.00	0
5	Commission charges are very high	0	68.33	31.67	0
6	Marketing efficiency is very high	0	66.67	28.33	5.00
7	e-NAM provides better infrastructure/ facilities	0	63.33	36.67	0
8	Selling through e-NAM is an easy process	0	60.00	40.00	0
9	Sufficient warehouse facilities are not there	0	58.33	41.67	0
10	e-NAM provides transparency in marketing	0	58.33	40.00	1.67
11	Better prices through e-NAM	0	55.00	45.00	0
12	Net returns to farmers increased by e-NAM	0	55.00	41.67	3.33
13	Commission agents are unnecessary under e-NAM	0	53.33	46.67	0
14	e-NAM reduces the wastage of farm produce	0	38.33	60.00	1.67
15	Selling the whole lot at a time is not possible in e-NAM	0	38.33	61.67	0
16	Giving immediate cash after sale	0	28.33	71.67	0
17	Better quality certification is	0	15.00	60.00	25.00

	available				
18	Reduced transaction cost to farm produce	0	0	61.67	38.33

SA= Strongly Agree A= Agree DA= Disagree SDA= Strongly Disagree

As evident from Table 38, the farmers perceived that weighing of the produces was done correctly, where in 76.67 per cent of the farmers agreed to it while 23.33 per cent strongly agreed to it. Thus, 100 per cent of the farmers were of the view that correct weighing was done in e-NAM trading. In e-NAM, electronic weighing was followed and hence the errors would be less, which might have led to the above perception.

Majority (86.67%) of the farmers perceived that quality checking was not done properly at e-NAM. Exactly 66.67 per cent farmers agreed to this and 20 per cent strongly agreed to it, while only 13.33 per cent disagreed to it. Majority (75%) of the farmers perceived that e-NAM provides better accessibility to market; while 70 per cent farmers perceived that high supply chain efficiency was made possible with e-NAM. In e-NAM, commission charges were very high as agreed by 68.33 per cent of farmers, while 31.67 per cent recorded their dissent on this. Marketing efficiency of e-NAM was very high, as perceived by 66.7 per cent of farmers. Further, majority (63.33%) of farmers perceived that e-NAM provides better infrastructure facilities. Selling through e-NAM was perceived as an easy process by 60 per cent of farmers. This is in conformity with the result of Geethavani (2019), who reported that 64 per cent of the farmers were favourable to this statement.

With respect to e-NAM, majority of the farmers perceived that „warehouse facilities were not sufficient“ (58.33% farmers), „there was transparency in e-NAM trading“ (58.33%), „better price realisation was possible with e-NAM“ (55%), and „net returns to farmers increased by e-NAM“ (55%). With regard to the necessity of commission agents, a good share of farmers were there on both the sides arguing for (46.67% farmers) and against (53.33% farmers) it.

Majority (61.67 %) of the farmers perceived that e-NAM did not reduce the wastage of farm produce while 38.33 per cent farmers opposed this view. Similarly,

61.67 per cent of the farmers perceived that selling the whole lot at a time was possible in e-NAM while 38.33 per cent disagreed to it, this is in conformity with Geethavani (2019) While 71.67 per cent farmers were of the opinion that they did not get immediate cash after sale.

Further, majority (85%) of the farmers perceived that better quality certification was not available at e-NAM, whereas cent per cent of the farmers perceived that transaction cost to farm produce was not reduced through e-NAM.

#### 4.6.2 Perception of traders

The perception of traders towards e-NAM on selected indicators was analysed and the results are presented in Table 39.

**Table 39. Perception of traders about e-NAM (n=30)**

SI. No.	Statements	Responses			
		SA	A	DA	SDA
1	Weighing is done properly	36.67	63.33	0	0
2	Commission agents are necessary under e-NAM	13.34	43.33	43.33	0
3	Marketing efficiency is very high	10.00	53.33	36.67	0
4	e-NAM reduces the wastage of farm produce	10.00	46.67	43.33	0
5	Net returns increased by e-NAM	10.00	43.33	46.67	0
6	Reduced transaction cost to the produce	3.33	50.00	46.67	0
7	e-NAM is providing better infrastructure facilities	0	60.00	40.00	0
8	e-NAM provides transparency	0	56.67	43.33	0

	in marketing				
9	Buying through e-NAM is an easy process	0	56.67	43.33	0
10	e-NAM provides better accessibility to market	0	46.67	53.33	0
11	High Supply chain efficiency	0	43.33	56.67	0
12	Sufficient warehouse facilities are not there	0	36.67	63.33	0
13	Quality checking is not done properly	0	36.67	63.33	0
14	Better quality certification is available	0	30.00	70.00	0

SA= Strongly Agree A= Agree DA= Disagree SDA= Strongly Disagree

Table 39 shows that all the traders perceived that correct method was followed for weighing the produce, which was strongly agreed by 36.67 per cent, and agreed by 63.33 per cent of the traders. 56.67 per cent of the traders perceived that commission agents were necessary under e-NAM whereas 43.33 per cent of traders disagreed to it. Majority (63.33 %) of the traders perceived that marketing efficiency of e-NAM was very high while the rest 36.67 per cent disagreed to it.

Most (56.67 %) of the traders perceived that e-NAM reduced the wastage of farm produce whereas 43.33 per cent of them disagreed to it. 53.33 per cent each of the traders perceived that the „net returns increased by e-NAM“ and „transaction cost to the produce was reduced through e-NAM“ while the rest 46.67 per cent each of the traders differed to it.

Majority (60%) of the traders perceived that e-NAM provided better infrastructure facilities, while the rest 40 per cent were having difference of opinion in this regard. Similarly, 56.67 per cent each of the traders perceived that „e-NAM provided transparency in marketing“, „buying through e-NAM was an easy process“ and „there was no high supply chain efficiency“, while the rest 43.33 per cent each



disagreed to these. Further, 53.33 per cent of traders perceived that e-NAM did not provide better accessibility to market where as 46.67 per cent traders perceived that e-NAM provided better accessibility to market.

Furthermore, 63.33 per cent each of the traders perceived that „sufficient warehouse facilities were there” and „quality checking was done properly” while 70 per cent of the traders were of the opinion that better quality certification was not available at e-NAM.

#### 4.7 Awareness about e-NAM facilities and services

##### 4.7.1 Farmers’ awareness about e-NAM

The awareness of farmers about e-NAM is presented in Table 40.

**Table 40. Farmers’ awareness about e-NAM (n=60)**

SI. No.	Particulars	Score*	Index
1	Lot number generation	60	100
2	Electronic weighing	60	100
3	Bid creation	60	100
4	Grading	60	100
5	Providing sale bills	60	100
6	Quality checking	57	95
7	Warehouse facilities	51	85
8	e- payments through RTGS/NEFT, UPI BHIM	45	75
9	Real time bidding progress	43	71.66
10	Trading directly through mobile app	41	68.33
11	e-NAM mobile app	24	40
12	Trading details	12	20
13	e- Learning videos about e-NAM	12	20

	process in e-NAM portal		
14	e-NAM MIS	11	18.33
15	Stakeholder data	10	16.66
16	Live trading data	9	15
17	Inter mandi dashboard	6	10
18	Interstate trading dashboard	6	10

\*Possible score ranges from 0 - 60

It is observed from Table 40 that all the farmers (100%) were aware of the lot number generation, electronic weighing, bid creation, grading and provision of sale bills (index: 100). Awareness about quality checking was also very high with an index of 95 followed by awareness on warehouse facilities (index: 85) and awareness on e-payments through RTGS, NEFT, UPI BHIM (index: 75) and awareness of real time bidding progress (index: 71.66). Around two third of the farmers were aware of trading directly through mobile app while 40 per cent of farmers were aware of e-NAM mobile app.

The awareness of farmers about „trading details feature“ and „e-learning videos about e-NAM process“ in e-NAM portal was very low with an index of 20, while awareness about e-NAM MIS (index: 18.33) and availability of stakeholder data (index: 16.33) was still lower.

Ninety per cent of the farmers were not aware about inter mandi dashboard and interstate trading dashboard while 85 per cent were unaware about live trading data. The result is in conformity with that of Swarna (2019), who reported that 76.67 per cent of the farmers were not having knowledge about e-NAM.

#### 4.7.2 Traders' awareness level about e-NAM

The awareness of traders about e-NAM is presented in Table 41.

**Table 41. Traders awareness about e-NAM (n=30)**

SI. No.	Particulars	Score*	Index

1	Lot number generation	30	100
2	Electronic weighing	30	100
3	Quality checking	30	100
4	Grading	30	100
5	Bid creation	30	100
6	Real time bidding progress	30	100
7	Providing sale bills	30	100
8	e- payments through RTGS/NEFT, UPI BHIM	30	100
9	Warehouse facilities	30	100
10	Trading directly through mobile app	30	100
11	Trading details	30	100
12	Stakeholder data	30	100
13	Live trading data	30	100
14	Single trade license valid across all markets	30	100
15	Inter mandi dashboard	24	80
16	e-NAM mobile app	24	80
17	e- learning videos about e-NAM process in e-NAM portal	22	73.33
18	Interstate trading dashboard	22	73.33
19	e-NAM MIS	14	46.66

\*Possible score ranges from 0 - 30

It is observed from Table 41 that all the traders were aware of lot number generation, electronic weighing, quality checking, grading, bid creation, real time bid progress, providing sale bills, e-payments through RTGS/NEFT, UPI BHIM, warehouse facilities, trading directly through mobile app, trading details, stakeholder data, live trading data, and single trade license valid across all markets with an index of 100 each, followed by awareness about e-NAM mobile app and inter *mandi*

dashboard with an index of 80 while awareness on „e-learning videos about e-NAM process in e-NAM portal“ and „interstate trading dashboard“ registered comparatively lower awareness among farmers (index: 73.33) and awareness about e-NAM MIS was comparatively very low with an index of 46.66. Altogether, when compared with farmers, traders were more aware of majority of the facilities and services of e-NAM.

#### 4.8 Utilisation of e-NAM facilities and services

##### 4.8.1 Farmers' utilisation of e-NAM facilities and services

The utilisation of e-NAM facilities and services for various purposes by the farmers were analysed using indices and the results are presented in Table 42.

**Table 42. Utilisation of e-NAM facilities and services by farmers (n=60)**

Sl. No.	Particulars	Index	Rank
1	Checking price	69.66	1
2	Mobile number linking	53.00	2
3	Checking Progress of lot	39.33	3
4	Checking real time bidding progress	38.00	4
5	Assaying/Quality checking of commodities	37.66	5
6	Use of warehouse facilities	35.00	6
7	Finding different markets	28.00	7
8	Use of e-NAM mobile app	26.33	8
9	Checking trading details	25.33	9
10	Viewing e-Learning videos about e-NAM process	25.00	10
11	E-payments	23.33	11
12	Checking mandi dashboard	23.00	12
13	Grievance on e-NAM	22.66	13

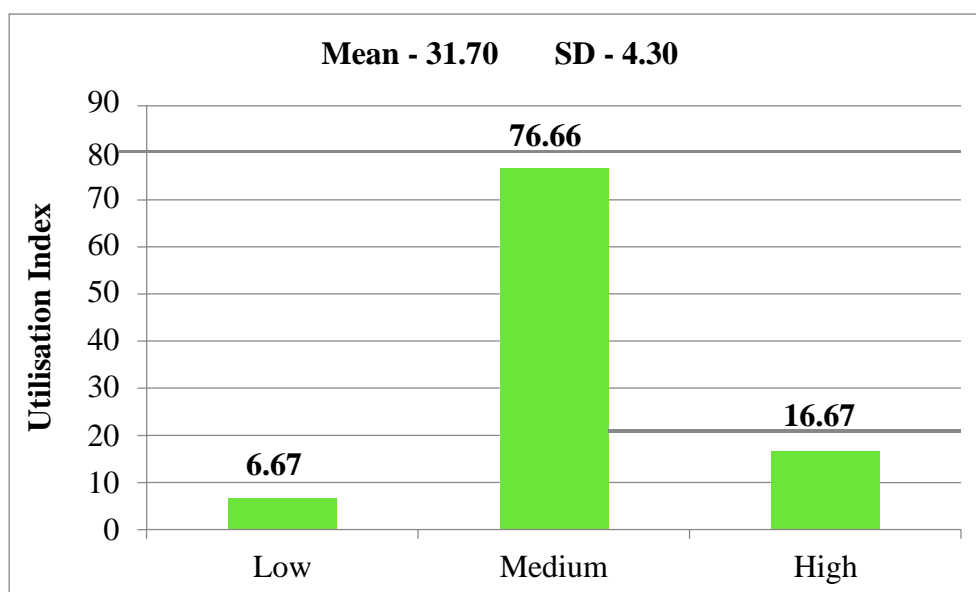
14	Checking stakeholder data	22.33	14
15	Checking live trading data	22.00	15
16	Buying through e-NAM	20.33	16
17	Advance online booking for gate entry through mobile app	20.00	17
18	Checking e-NAM MIS	20.00	18
19	Checking interstate trading dashboard	20.00	19

From Table 42, it is observed that farmers mainly utilised the e-NAM portal for price checking (index: 69.66) followed by linking mobile number with the portal (index: 53). Though the utilisation was less with indices less than 40, some of the farmers used the facilities such as checking progress of lot (index: 39.33), checking real time bidding progress (index: 38), assaying / quality checking of commodities (index: 37.66) and use of warehouse facilities (index: 35).

In addition, very few farmers used the e-NAM facilities for finding different markets with an index of 28 followed by use of e-NAM mobile app (index: 26.33), checking trading details (index: 25.33), and viewing e-learning videos about e-NAM process (index: 25). Negligible number of farmers used the facilities like e-payment (index: 23.33), checking mandi dashboard (index: 23) grievance on e-NAM (index: 22.66), checking stakeholder data (index: 22.33) and live trading data (index: 22).

The service/facility of e-NAM such as buying through portal, advance online booking for gate entry through mobile app, checking e-NAM MIS and checking interstate trading dashboard were not utilised by the farmers.

Altogether, the utilization of the facilities/services of e-NAM was found to be very low. Hence, the market committee may take necessary action to increase the utilisation of e-NAM by increasing warehouse facilities, better quality testing of commodities for getting better prices to farmers, giving awareness on how to use e-NAM mobile app and increasing e-payment usage.



**Figure 16. Distribution of farmers based on their utilisation of e-NAM facilities and services (n=60)**

From Figure 16, observed that majority (76.66%) of the farmers utilising the e-NAM facilities and services with medium level followed by 16.67 per cent of traders utilisation was high and 6.67 per cent of the farmers were utilising e-NAM facilities and services with low level.

#### **4.8.2 Correlation between utilisation of e-NAM by farmers and the independent variables.**

The Spearman correlation analysis was done between the dependant variable, utilisation of e-NAM facilities by farmers and the independent variables and the results are presented in Table 43.

**Table 43. Correlation between utilisation of e-NAM by farmers and the independent variables.**

SI. No.	Factors	Correlation coefficient
1	Age	-0.350**
2	Educational status	0.471**

3	Occupation	0.099
4	Family size	0.033
5	Annual income	-0.134
6	Farm size	-0.159
7	Farming experience	-0.366**
8	Savings	-0.281*
9	Social participation	-0.140
10	Information seeking behaviour	0.197
11	Decision making ability	-0.258*
12	Innovativeness	-0.086
13	Market orientation	0.119
14	Economic motivation	0.074
15	Computer literacy	0.304*
16	m-literacy	0.538**
17	Awareness about e-NAM	0.514**

\*Significant at 0.05 per cent level

\*\*Significant at 0.01 per cent level

Table 43 shows that educational status, computer literacy, m-literacy and awareness about e-NAM were having positive correlation with the utilisation of e-NAM facilities and services. Educational status, m-literacy and awareness about e-NAM were significant at 0.01 level and computer literacy at 0.05 per cent level of significance. The educated farmers may be more e-literate and hence may be more aware of the facilities and services provided through e-NAM thereby increasing the utilization of e-NAM facilities. The positive significant correlation of computer literacy, m-literacy and awareness about e-NAM with utilisation of the services are quite logical as these are prerequisites for utilization of e-NAM. The age, farming experience, savings and decision making ability showed negative correlation with

respect to the utilisation of e-NAM facilities and services. Age and farming experience were significant at 0.01 level. Savings and decision making ability showed significance at 0.05 level. The farmers who are aged and having higher farming experience may be less e-literate as the older generation is not that tech-savvy as compared to the younger generation. This in turn might have reduced the utilization of the e-NAM.

#### 4.8.3 Traders' utilisation of e-NAM facilities and services

The utilisation of the e-NAM facilities and services by the traders for selected purposes was analysed using indices and the findings are presented in Table 44.

**Table 44. Utilisation of e-NAM facilities and services by the traders (n=30)**

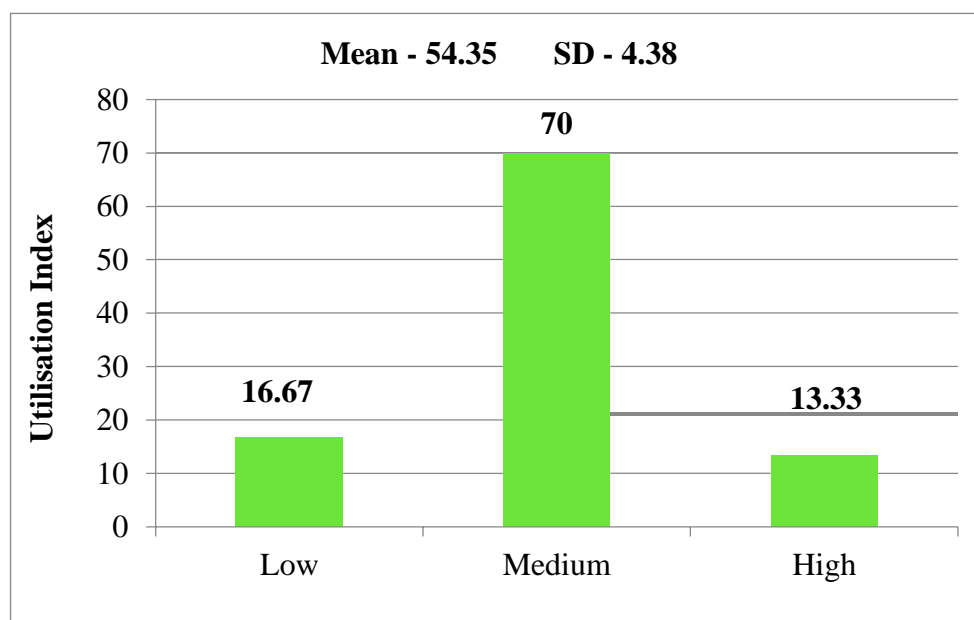
SI. No.	Particulars	Index	Rank
1	Mobile number linking	91.33	1
2	Checking quality of commodities	78.66	2
3	Checking price	70.00	3
4	Checking mandi dashboard	65.33	4
5	Checking real time bidding progress	63.33	5
6	Use of e-NAM mobile app	62.00	6
7	e-payments	61.33	7
8	Finding different markets	60.66	8
9	Checking live trading data	56.66	10
10	Checking stakeholder data	55.33	11
11	Checking trading details	48.66	12
12	Viewing e-Learning videos about e-NAM process	37.33	13
13	Checking interstate trading dashboard	30.00	14
14	Use of warehouse facilities	28.66	15
15	Checking e-NAM MIS	27.33	16



16	Grievance on e-NAM	27.33	17
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From Table 44, it is observed that the traders were mainly using e-NAM portal for mobile number linking (index: 91.33). The traders further used the facilities such as checking quality of commodities (index: 78.66) followed by checking the price (index: 70). Other facilities/services utilised by the traders were checking *mandi* dashboard (index: 65.33), checking real time bidding progress (index: 63.33), use of e-NAM mobile app (index: 62), e-payment (index: 61.33), finding different markets (index: 60.66), checking live trading data (index: 56.66) and checking stakeholder data (index: 55.33).

Traders rarely used the e-NAM facilities like checking interstate trading dashboard (index: 30), warehouse facilities (index: 28.66), checking e-NAM MIS (index: 27.33) and grievance on e-NAM (index: 27.33).



**Figure17. Distribution of traders based on their utilisation of e-NAM facilities and services (n=30)**

From Figure 17, observed that majority (70%) of the traders utilising e-NAM facilities and services were with medium level followed by 16.67 per cent of the

traders with low level utilisation and 13.33 per cent of the traders utilising e-NAM facilities and services with high level.

#### 4.9 Constraints faced by farmers and traders

Farmers and traders face many problems in trading the produce which were categorised here into physical, procedural, technical and economic constraints.

##### 4.9.1 Constraints faced by farmers

###### 4.9.1.1 Physical constraints

The physical constraints faced by farmers are presented in Table 45.

**Table 45. Physical constraints of farmers (n=60)**

SI. No.	Particulars	Index	Rank
1	Inadequate facilities for quality checking	78.33	1
2	Power failures	76.00	2
3	Inadequate facilities for grading	72.33	3
4	Poor net connectivity	65.66	4
5	Non availability of computers	57.66	5
6	Poor transportation facilities	55.00	6
7	Problem with e-NAM server	53.66	7
8	Inadequate facilities of storage	52.00	8
9	Distance to market	46.66	9
10	Labour problems (loading & unloading)	46.33	10
11	Inadequate facilities for weighing	34.00	11

From Table 45, it is observed that the most important physical constraint faced by the farmers was inadequate facilities for quality checking which recorded an index of 78.33. The inadequate facilities for quality checking may adversely affect the income of farmers, and this may be the reason for perceiving this as the most

important constraint. The second important constraint was power failures with an index of 76 followed by inadequate facilities for grading (index of 72.33).

Another important constraint faced by farmers was poor net connectivity with an index of 65.66. This constraint may cause difficulty for trading on e-NAM portal because e-NAM trading is an online platform. The other constraints of farmers in e-NAM trading were non availability of computers (index: 57.66), poor transportation facilities (index: 55), problems with e-NAM server (index: 53.66), and inadequate facilities of storage (index: 52). The constraints such as long distance to market (index: 46.66), labour problems (loading & unloading) (index: 46.33) and inadequate facilities for weighing were considered less important constraints by the farmers (index: 34).

#### 4.9.1.2 Procedural constraints

The procedural constraints faced by the farmer respondents are presented in Table 46.

**Table 46. Procedural constraints of farmers (n=60)**

SI. No.	Particulars	Index	Rank
1	Inability to sell more no. of commodities	88.00	1
2	Difficulty to sell larger lots	60.00	2
3	Delay in receiving payments	58.00	3
4	High time requirement for e-NAM auction	50.66	4
5	Difficulty to sell whole lot at a time	49.00	5
6	Difficulty to sell smaller lots	47.66	6
7	Cumbersome registration process	29.33	7

Table 46, reveals that the most important procedural constraint faced by farmers was inability to sell more number of commodities which recorded an index of

88. This may be due to the fact that only selected commodities were traded in the markets. For example, in Hyderabad market, only one commodity (chilli) was traded through e-NAM, but the farmers desired to sell more number of commodities through a market.

The second important constraint was the difficulty to sell larger lots (index: 60) followed by delay in receiving payments (index: 58). The other constraints faced by farmers were high time requirement for e-NAM auction (index: 50.66), difficulty to sell whole lot at a time (index: 49) and difficulty to sell smaller lots (index: 47.66), which were found comparatively of lesser importance to the farmers.

#### 4.9.1.3 Technical constraints

Technical constraints faced by farmers are presented in Table 47.

**Table 47. Technical constraints of farmers (n=60)**

SI. No.	Particulars	Index	Rank
1	Poor knowledge on computer and internet	88.33	1
2	Lack of knowledge about procedures of e-NAM	44.00	2
3	Non-availability of updated information on prices	39.00	3
4	Complicated sales process	36.33	4

From Table 47, it is observed that the most important technical constraint faced by the farmers was „poor knowledge on computer and internet“, which recorded an index of 88.33. The e-NAM, being an online trading platform, the farmers may find it difficult to trade through e-NAM without sufficient knowledge on computer and internet. The other constraints faced by farmers were lack of knowledge about procedures of e-NAM (index: 44), followed by non-availability of updated information on prices (index: 39) and complicated sales process (index: 36.33).

#### 4.9.1.4 Economic constraints

The economic constraints faced by the farmer respondents are presented in Table 48.

**Table 48. Economic constraints of farmers (n=60)**

SI. No.	Particulars	Index	Rank
1	Less no. of bidders	50.00	1
2	Fluctuation in market prices	48.00	2
3	High transportation cost	46.00	3
4	Problems with commission agents malpractices	32.66	4
5	Corruption of the officials	30.00	5

Table 48, shows that among the constraints faced by the farmers, less number of bidders was recorded an index of 50 followed by fluctuation in market prices (index: 48) and high transportation cost (index: 46). The other constraints were problem with commission agent malpractices (index: 32.66) and problem with corruption of the officials (index: 30).

#### 4.9.1.5 Comparison of constraints faced by farmers in Hyderabad and Warangal markets

The comparison of constraints faced by farmers of the two markets, Hyderabad and Warangal was done using t-test and the results are presented in Table 49.

**Table 49. Difference in constraints of farmers between Hyderabad and Warangal markets**

SI. No.	Particulars	t value	Mean score	
			Hyderabad market	Warangal market
1	Physical constraints	-4.388**	60.24	55.70

2	Procedural constraints	-1.366	55.43	53.90
3	Technical constraints	3.302**	48.67	55.17
4	Economic constraints	4.739**	36.27	42.40

\*\*significant at 0.01 per cent level

t-test was used here to compare the constraints faced by farmers of both the markets. It is observed from Table 49 that, the t-values of physical constraints, technical constraints and economic constraints were found to be significant among farmers in these two markets at one per cent significance level. It can be inferred from the results that, there was significant difference in these categories of constraints faced by farmers in Hyderabad market and farmers in Warangal market. These three categories of constraints were analysed from the personal and locality based point of view of farmers. So the responses given by farmers were different from each other and in each locality.

The t-value of procedural constraints was found to be non-significant, which indicated the similarity of responses made by the farmers in Hyderabad and Warangal markets regarding the procedural constraints faced by them. The procedures followed for trading in both the markets were the same and this may be the reason for the similarity in problems faced by them.

The local authorities have to take necessary actions to reduce the infrastructural problems faced by farmers by providing facilities to transport their produce to markets, facilities such as electricity, internet and computer/ smart phone *etc.* with wide reach among farmers to facilitate online marketing. Awareness and skill to use ICT tools and services should also be provided by concerned authorities through appropriate capacity building programmes to lessen the technical difficulties of farmers and to make online trading easy to them. As the economic constraints differ among the farmers and markets, the market committee and agricultural department need to take necessary actions to resolve the issues faced by the farmers.

It is observed by analysing secondary data that the procedures followed for trading in both the markets are the same. As there was no significant difference in constraints faced by farmers in both markets regarding procedural problems, there is

an utmost need to make required changes in different procedures followed in markets for easy and hassle free selling of produce.

#### 4.9.2 Constraints faced by traders

##### 4.9.2.1 Physical constraints

The physical constraints faced by traders are presented in Table 50.

**Table 50. Physical constraints of traders (n=30)**

SI. No.	Particulars	Index	Rank
1	Power failures	87.33	1
2	Inadequate facilities of quality checking	78.00	2
3	Problem with e-NAM server	73.33	3
4	Transportation problems	72.66	4
5	Non availability of computers	67.33	5
6	Poor warehouse facilities	47.33	6
7	Poor net connectivity	45.33	7
8	Labour problems	39.33	8
9	Inadequate facilities of weighing	26.66	9
10	Lack of provision of manual inspection	24.00	10

From Table 50, it is observed that the most important constraint faced by the traders was power failures, which recorded an index of 87.33. Due to power failures, the traders may face difficulty in e-NAM trading, since the trading process in e-NAM cannot be done without power and computer use. Hence the market authorities have to take necessary actions to overcome this constraint by ensuring uninterrupted power supply to markets.

The second important constraint was inadequate facilities for quality checking which recorded an index of 78 followed by problems with e-NAM server (index: 73.33) and problem with transportation (index: 72.66). Another important constraint

faced by traders was lack of availability of computers (index: 67.33). When sufficient number of computers are not available, it may lead to higher bidding time. Other constraints faced by the traders were poor warehouse facilities (index: 47.33), poor net connectivity (index: 45.33) and labour problems (index: 39.33) which were less important constraints to the traders. The constraints with very less importance were inadequate facilities of weighing and lack of provision of manual inspection with indices of less than 30.

#### 4.9.2.2 Procedural constraints

The procedural constraints faced by traders are presented in Table 51.

**Table 51. Procedural constraints of traders (n=30)**

SI. No.	Particulars	Index	Rank
1	Grading is not done properly	58.66	1
2	Less bidding time	56.00	2
3	Cumbersome registration process	52.00	3
4	Difficulty to buy smaller lots	49.33	4
5	High time requirement for e-NAM auction	44.00	5
6	Difficulty to buy whole lot at a time	42.00	6
7	Difficulty to buy larger lots	34.66	7
8	Difficulty to buy more no. of commodities	26.66	8
9	Delay in delivery of produce	20.00	9

From Table 51, it is observed that the most important procedural constraints faced by the traders were problem with grading (grading not properly done) with an index of 58.66 followed by less bidding time (index: 56) and cumbersome registration process (index: 52). The other constraints faced by traders were difficulty to buy smaller lots (index: 49.33), high time requirement for e-NAM auction (index: 44), and difficulty to buy whole lot at a time (index: 42).



#### 4.9.2.3 Technical constraints

The technical constraints faced by traders are presented in Table 52.

**Table 52. Technical constraints of traders (n=30)**

SI. No.	Particulars	Index	Rank
1	Poor knowledge on computer and internet	78.66	1
2	Non-availability of updated information on prices	60.00	2
3	Lack of knowledge about procedures of e-NAM	52.66	3
4	Technical complication in sales process	34.66	4

From Table 52, it is observed that the most important technical constraint faced by the traders was poor knowledge on computer and internet which recorded an index of 78.66. The e-NAM is an online trading platform, and it is quite natural that the traders may find it difficult to trade through e-NAM without having sufficient knowledge and skill on computer and internet.

The other constraints faced by traders were non-availability of updated information on prices with index of 60, lack of knowledge about procedures of e-NAM (index: 52.66) and complicated sale process (index: 34.66).

#### 4.9.2.4 Economic constraints

The economic constraints faced by traders are presented in Table 53.

**Table 53. Economic constraints of traders (n=30)**

SI. No.	Particulars	Index	Rank
1	Fluctuation of prices	71.33	1
2	High transportation cost	48.66	2
3	Unable to purchase the desired quality produce	29.33	3
4	Corruption of officials	27.33	4
5	Problems with commission agents malpractices	23.33	5

Table 53, shows that the most important constraint faced by the traders was fluctuations in the prices with an index of 71.33. The second important constraint was high transportation cost (index: 48.66). The other constraints, which were of very less importance with an index of less than 30, include inability to purchase the desired quality produce, corruption of officials and problems with commission agents' malpractices.


#### 4.9.2.5 Comparison of constraints faced by traders in Hyderabad and Warangal markets

The comparison of constraints faced by traders of the two markets, Hyderabad and Warangal was done using t-test and the results are presented in Table 54.

**Table 54. Difference in constraints of traders between Hyderabad and Warangal markets**

SI. No.	Particulars	t value	Mean score	
			Hyderabad market	Warangal market
1	Physical constraints	-0.866	56.67	55.60
2	Procedural constraints	-0.380	42.96	42.22
3	Technical constraints	0.100	56.33	56.67
4	Economic constraints	1.201	35.55	37.78

T-test was used to compare the constraints faced by traders of both the markets. It can be observed from the results that, the t-values of physical constraints, procedural constraints, technical constraints and economic constraints were found to be non-significant between traders of these two markets (Table 54). It indicated the similarity of responses made by the traders in Hyderabad and Warangal markets regarding the constraints faced by them.


 NATIONAL AGRICULTURE MARK  
 HYDERABAD  
 LOT RECEIPT

LOT Code : **49-20190327-355**  
 Gate Entry Pass No : 2019030491030003022  
 Purpose : Auction/E-Tender  
 Date : 27/03/2019 10:31:04  
 Farmer : R Balu  
 Mobile No :  
 Village : Maltepally  
 Commission Agent : S. Venugopal S.o S. Shankar  
 Company : S. Shankaraiiah And Sons  
 Commodity : Chillies  
 Bags : **10.00**  
 Bag Type : 40KG BAG  
 Appx. Quantity : **4.00 Qui**  
 Vehicle No : TS05UR3037  
 Market/SubMarket :  
 Lot Type : Primary Sale  
 Govt Id :

*Handwritten notes:*  
 30  
 30  
 60

Plate 3. Showing lot ID receipt of farmer



Plate 4. Showing the traders inspecting the quality of the produce manually

LAXMI'S COMPANY  
General Merchants & Commission Agent  
Gandhinagar, HYDERABAD-503001

30.13/2020

1	50-20200312-9	Finger	4790-	
2	50-20200313-59	churna.	4260-	P. J. Reddy

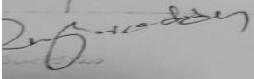




Plate 5. Showing the form for rejecting the bid by the farmer

NATIONAL AGRICULTURE MARKET  
HYDERABAD

SALE BILL

Sale Bill No.	NAM0491904004437	Sale Bill Date	09/04/2019 15:22:06
Agreement No	2019040491160002409	Agreement Date	09/04/2019 15:21:54
Trade Type	eTrade	Trader Name	Puppala Dathay - Dattatraya Traders S No 9-7-108 Flat No 303 Sri Krupa Market Malakpet Hyd.
Commission Agent	Ch. Narsinga Rao, S/o Ch.pentiah - Chindam Pentiah Narasimrao And Company	Trader Mob.No.	Flat No 303 4th Floor, H.No.9-7-108 Sri Krishna Krishna Nagar Colony Santhoshnagar Hyd.
Commission Agent License No	20101491296	Trader License No	0
Lot Type	Primary Sale	Seller Name	Ambaiah Gadwal Gadwal

Commodity	LOT Code	Bag Type	No of Bags	Rate	Weight	Total Amount
Chillies	49-20190409-547	40KG BAG	28	8250.00	10.53 Qui	86842.00

Commodity Price			Commodity Price							
86842.00			86842.00							
Component & Per (%)			Component & Per(%)		TDS Deducted		Amt After Deduction			
COMMISSION	2.00 %	(-)	1736.84	Base Amt	%	Amt	Amt After Deduction			
HAMALI CHARGES	Rs 3.91 /Bag	(-)	109.48	MARKET FEE	1.00 %	(+)	868.42	0.00	868.42	
CHATAWALA	Rs 3.13 /Bag	(-)	87.64	<b>Component Total (Exclusive)</b>					<b>0.00</b>	<b>868.42</b>
<b>Component Total (Inclusive)</b>			<b>1933.96</b>							

Net Amount Payable to Seller : 84908.04

Total Amount Payable by Trader: 87711.00

Seller Signature \_\_\_\_\_ CA Signature \_\_\_\_\_ Trader Signature \_\_\_\_\_

Plate 6. Showing the sale bill

## **SUMMARY AND CONCLUSION**

## 5. SUMMARY AND CONCLUSION

India is an agrarian country. Agriculture not only meets the food and nutritional requirement, it also contributes to the production, employment and demand through various forward and backward linkages. Even though India is an agricultural country, its agricultural marketing has not been found effective. Thus the farmers were unable to get reasonable price for the products even after their hard work and are fully exploited by the middleman due to lack of market intelligence. In order to encourage direct agricultural marketing infrastructure facilities in the country, the Government of India, introduced a model APMC Act in 2003, in consultation with the states for development and strengthening of agricultural marketing with better infrastructure. Under these laws, farmer had to sell their produce at state owned *mandis*. The market price received by the farmers for their produce becomes lower than the price at which the produce is sold to the retailer.

The e-NAM is a pan-India electronic trading platform launched by Government of India. It connects the selected APMCs to build a unified national market for agricultural commodities across the country. The e-NAM is a virtual market, but at the back end, there is a physical market which assists all the APMC related information and services through a single window system and it includes information about commodity arrivals and prices of the available commodity. The integration of *mandis* across the country through a common e-platform ensures a transparent sale transaction, and a unified license for trader, single point levy of market fee and provides higher returns to farmers.

The e-NAM is a recently introduced e-platform for agricultural marketing in India. A very limited number of studies have been taken up with respect to the arrival and trading of commodities in Telangana. However, no efforts have been undertaken in the State of Telangana to analyse the perception of the stakeholders especially the farmers and traders and the problems, if any faced by them with respect to utilisation of e-NAM. In this backdrop, the present study was undertaken with the specific objectives:

1. To understand the process and functioning of e-NAM facilities under selected APMCs in Telangana State.
2. To study the perception of farmers about e-NAM and its utilisation.
3. To identify the constraints in availing e-NAM services.

The study was conducted in Hyderabad and Warangal districts of Telangana state. The farmers and the traders, registered and trading under e-NAM portal constituted the sampling frame of the study. A total of 90 respondents (60 farmers and 30 traders) formed the sample of the study, for which 30 farmers and 15 traders was selected from each district, using the random sampling procedure.

Based on the objectives of the study, review of literature and discussion with experts, a list of independent and dependent variables were identified for the study. The independent variables selected for the study includes socioeconomic profile characteristics of the respondents (farmers and traders) viz., age, gender, educational status, occupational status, family size, farm size (only for farmers), farming / trading experience, annual income, savings, indebtedness, innovativeness, social participation, information seeking behaviour, decision making ability, market orientation, economic motivation and other variables viz., awareness about e-NAM services, e-literacy, perception on e-NAM, utilisation of e-NAM and constraints faced in utilising e-NAM.

#### **Findings of the study drawn from the analysis are summarized**

1. **Age** - Majority (50%) of the farmers and 76.67 per cent of the traders participating in e-NAM were middle aged (35-55 years of age).
2. **Gender** - Majority (88.33%) of the farmers and all the traders participating in e-NAM were males.
3. **Educational status** – Most (83.33%) of the farmers were literate and majority of them (31.67%) had primary school level of education. All the traders were literate with „high school and above“ level of education.
4. **Occupational status** - Majority of the farmers (66.37%) were depending on agriculture alone and 73.33 per cent of the traders were depending on trading alone as their main occupation.

5. **Family size** - Majority of the farmers (55%) had small family with less than five members in their family and 50 per cent of the traders had medium sized family with five to eight members in their family.
6. **Experience** - Majority (65%) of the farmers were having more than 10 years of farming experience while 83.33 per cent of the traders were having more than 10 years of experience in trading and 63.67 per cent of the traders were having 3 years of e-NAM trading experience.
7. **Farm size** - Majority of the farmers (40%) belonged to small farmer category and 38.33 per cent to large farmer category.
8. **Annual income** - Majority of the farmers (40%) had an annual income of 1 to 2 lakhs per annum and 63.34 per cent of the traders had 2 to 5 lakhs of annual income.
9. **Savings** - Majority of the farmers (77.91%) had an average savings of less than 1 lakh and majority (60%) of the traders had 1 to 2 lakhs savings per annum.
10. **Indebtedness:**

**Source of credit** - Majority of the farmers (51.66%) availed loans from cooperative banks and 46.67 per cent of the traders availed loan from private banks.

**Credit amount**- Majority of the farmers (36.67%) had taken ₹1 lakh to ₹2 lakhs of credit and 36.67 per cent of the traders had taken more than ₹15 lakhs of credit.

**Rate of interest** - Majority (48.33%) of the farmers had borrowed for an interest rate of more than 20 per cent followed by 43.33 per cent of the farmers for less than 10 per cent interest rate. Majority (46.67%) of the traders had borrowed with an interest rate of 10 to 20 per cent.

**Repayment period** –Majority of the farmers (50%) had availed the credit with a repayment period of 12 to 24 months and 80 per cent of the traders had borrowed the credit with a repayment period of more than 24 months.
11. **Innovativeness** - In case of adopting new technologies, majority of the farmers (53.33%) and traders (43.33%) were imitators.



- 12. Information seeking behaviour** - Majority of the farmers (56.67%) and traders (76.67%) were having medium level of information seeking behaviour.
- 13. Social participation**- Majority of the farmers (63.33%) did not have membership in any organisation, while 36.67 per cent of farmers had membership in one organisation. The farmers (54.55%) attended meetings rarely. Majority of the traders (60%) had membership in one organisation, while 23.33 per cent had membership in more than one organisation. and the frequency of attending meetings by majority of the traders (53.34%) was often to always.
- 14. Decision making ability** - Majority of the farmers (65%) and traders (76.67) were having medium level of decision making ability.
- 15. Market orientation** - Majority of the farmers (56.67%) and 80 per cent of the traders were having medium level of market orientation.
- 16. Economic motivation** - Majority (66.66% each) of the farmers and traders had medium level of economic motivation.
- 17. Computer literacy** - Majority of the farmers were computer illiterate. Only 13.33 per cent of farmers had basic knowledge on computer. However, 60 per cent of the traders were computer literates.
- 18. m-literacy** - All the farmers were able to use the basic functions of mobile phone *viz.*, switch on and off mobile phone, opening contacts, making calls while 65 per cent of the farmers were able to take photographs. All the traders were able to use majority of the functions of mobile phone.
- 19. Perception on e-NAM** –All the farmers perceived that „correct weighing was done in e-NAM trading“. Similarly majority of the farmers perceived that, „quality checking was not done properly at e-NAM“, „e-NAM provided better accessibility to market“ and „transaction cost to farm produce was not reduced through e-NAM“.
- The traders also perceived that correct method was followed for weighing the produce. They further perceived that „marketing efficiency was very high“, „e-NAM reduced the wastage of farm produce“ and „better quality certification was not available“.

**20. Awareness level** – All the farmers were aware of the lot number generation, sale bills, grading, electronic weighing, bid creation. Many of the facilities and services available in e-NAM were known to very few farmers.

All the traders were aware most of the e-NAM facilities while a few traders were not aware about the inter mandi dashboard and e-NAM mobile app. Their awareness about e-NAM MIS was very low.

**Utilisation of e-NAM**-The farmers mainly utilised the e-NAM portal for price checking (index: 69.66) followed by mobile number linking with the portal (index: 53). Buying through portal, advance online booking for gate entry through mobile app, checking e-NAM MIS and checking interstate trading dashboard were not utilised by the farmers.

The traders mainly utilised e-NAM portal for mobile number linking (index: 91.33) followed by checking quality of the commodities (index: 78.66). They rarely used e-NAM facilities such as checking interstate trading dashboard (index: 30), warehouse facilities (index: 28.66), checking e-NAM MIS (index: 27.33) and grievance on e-NAM (index: 27.33).

**21. Correlation between utilisation of e-NAM and independent variables of farmers** – The educational status of farmers, their computer literacy, m-literacy and awareness about e-NAM were having positive correlation with utilisation of e-NAM facilities and services at 0.01 per cent level of significance. Age, farming experience, savings and decision making ability showed negative correlation with utilisation of e-NAM facilities and services at 0.05 per cent level of significance.

**22. Constraints faced by farmers and traders:**

**Physical constraints** - The most important physical constraint faced by majority of the farmers was inadequate facilities for quality checking with an index of 78.33 followed by power failures (index: 76) and inadequate facilities for grading (index: 72.33).

The most important constraint faced by the traders was power failure problem, with an index of 87.33 followed by inadequate facilities of quality testing (index: 78), problem with e-NAM server (index: 73.33) and non-availability of computers (index: 67.33).

**Procedural constraints** - The most important procedural constraint faced by the farmers was inability to sell more number of commodities which recorded an index of 88 followed by difficulty to sell larger lots (index: 60) and delay on receiving payments (index: 58).

The important constraints faced by traders were lack of proper grading (index: 58.66) followed by less bidding time (index: 56) and cumbersome registration process (index: 52).

**Technical constraints** – The most important technical constraint faced by the farmers was poor knowledge on computer and internet which recorded an index of 88.33. The other constraints faced by majority of the farmers were lack of knowledge about procedure of e-NAM (index: 44) followed by non-availability of updated information on prices (index: 39) and complicated sale process (index: 36.33).

The most important constraint faced by the traders was poor knowledge on computer and internet with an index of 78.66 followed by non-availability of updated information on prices (index: 60) and lack of knowledge about procedure of e-NAM (index: 52.66).

**Economic constraints**-The main economic constraint faced by the farmers was less number of bidders with an index of 50, followed by fluctuation in market prices (index: 48), and problem with commission agents (index: 32.66).

The most important economic constraint faced by the traders was fluctuations of prices with an index of 71.33. Other constraints faced by the traders were high transportation cost (index: 48.66) followed by inability to purchase the desired quality produce (index: 29.33) and problems with commission agents (23.33).

**23. Comparison of constraints faced by farmers and traders in Hyderabad and Warangal markets** - The t-values of physical constraints, technical constraints and economic constraints were found to be significant among the farmers in two markets at one per cent significance level. Thus, there was significant difference in these three categories of constraints faced by farmer

respondents in Hyderabad market and Warangal market. The t-value of procedural constraints was found non-significant among the farmers.

The t-values of physical, procedural, technical and economic constraints were found to be non-significant between trader respondents of Hyderabad market and Warangal markets.

### **Implications of the study**

- 1 The study showed that infrastructure and grading facilities in the Hyderabad market was insufficient. Similarly the basic facilities including storage facilities for produce, parking, farmer's rest rooms and quality testing facilities were also not sufficient. Thus the study implies the need for increasing the basic infrastructure facilities including storage, quality testing, internet and parking space.
- 2 Farmers were not getting immediate payment after sale. This is a key factor to be taken care of to increase the usage of e-NAM by the farmers
- 3 The study showed that majority of the farmers were not aware of many of the facilities and services available in e-NAM. Similarly, the study showed that the utilisation of various facilities and services of e-NAM by farmers was to large extent limited to checking prices and mobile number linking. All the other services were utilised by only a few farmers. So awareness and sensitisation efforts, and trainings among farmers about e-NAM platform is critical to make the farmers and traders understand the e-NAM process, how e-NAM benefits them and the various services of e-NAM. Such an effort should be made on a mission mode/campaign mode at village level to increase e-NAM utilisation.
- 4 The study showed that in Hyderabad market only one commodity was traded through e-NAM portal. Increase in the number of commodities traded through e-NAM platform will encourage the farmers and traders to use the e-NAM trading platform more enthusiastically.

- 5 The study showed that educational status, farming experience, savings, e-literacy, awareness about e-NAM and decision making ability was found significantly correlated with the utilisation of e-NAM facilities and services by the farmers. These attributes of the farmers may be taken care of to increase the utilisation of e-NAM.
- 6 The study showed that around 90 per cent of the farmers were computer illiterate. Since e-literacy has a bearing on the use of the e-NAM platform, focus should be given to increase the computer literacy of the farmers.
- 7 The study showed that nearly less than 30 per cent of the farmers were able to use mobile phone to browse internet, using e-mails, and installing apps. So hand holding of farmers for increasing their m-literacy is also vital in enhancing the utilization of e-NAM. Many facilities and services of e-NAM can be used directly from mobile phones. Thus both computer literacy and m-literacy would be catalytic in the success of e-NAM.
- 8 The study revealed that the important constraints faced by the farmers *viz.* inadequate facilities for quality checking, power failures, poor net connectivity inability to sell more number of commodities less number of bidders, and delay in receiving payments. The important constraints faced by the traders were power failures in the market, problems with e-NAM servers, transportation problems, lack of proper grading and less bidding time. There is a need to reduce such constraints to improve the utilisation of e-NAM by different stakeholders.

## **Conclusion**

Though the farmers were aware of the facilities of e-NAM such as lot number generation, electronic weighing, bid creation, grading and providing sale bills, majority of the farmers were not at all aware of many of the facilities and services available in e-NAM. However, the traders were better aware about these facilities. Similarly, the utilisation of various facilities and services of e-NAM was to large extent limited to checking prices and mobile number linking; all the other services

were utilised by only a few farmers. The position of the traders with respect to the utilisation was better. Thus increasing infrastructural facilities in the markets and creating awareness among the farmers and providing necessary skill in using the facilities and handholding them in effective utilisation of e-NAM would be crucial in the success of e-NAM in India.

### **Future line of research**

The present study was confined to Hyderabad and Warangal districts in Telangana. The study was constrained by the time resources available to the researcher and the covid -19 pandemic situations. Hence it is suggested that similar studies can be conducted in Telangana covering other districts. Similarly a comprehensive study covering all the states of India having e-NAM may also be attempted so as to identify the strengths, weaknesses, and opportunities of e-NAM.

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## **APPENDICES**

**Respondent no:**

**KERALA AGRICULTURAL UNIVERSITY  
COLLEGE OF HORTICULTURE, VELLANIKKARA  
DEPARTMENT OF AGRICULTURAL EXTENSION**

**Utilisation behaviour of registered farmers of selected Agricultural Produce Market  
Committee (APMC) of Telangana State on e-NAM portal**

**Interview Schedule - Farmers  
(For Academic purpose only)**

**1. Name :**

**2. Contact No.:**

**3. Address:**

Gram Panchayat:

Block:

District:

**4. Age:** \_\_\_\_\_ years

**5. Gender:** M / F

**6. Education:**

**7. Annual income Rs.** \_\_\_\_\_

**8. Family details:**

<b>Sl. no.</b>	<b>Name of family member</b>	<b>Education</b>	<b>Occupation</b>	<b>Annual income (in Rupees)</b>

			<b>Total</b>	
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9. Land holding \_\_\_\_\_ acres

10. Farming experience \_\_\_\_\_ years

11. Savings per annum Rs. \_\_\_\_\_

12. Credit

Sl. No.	Source of credit	Amount of loan (Rs.)	Rate of interest (%)	Duration of loan (months)
1	Cooperative banks			
2	Private banks			
3	Moneylenders			
4	Friends /relatives			
5	Traders/commission agents			
6	Others			

13. Social participation

Sl. No.	Social participation status	Put a tick (✓) against the statement	Frequency of attending meetings				
			Always	Often	Sometimes	Rarely	Never
1	No membership						
2	Membership in one organization						
3	Membership in more than one organization						
4	Office bearer in						

	one organization						
5	Office bearer in more than one organization						

#### 14. Information seeking behaviour

Sl. No.	Information source	Always	Often	Sometimes	Rarely	Never
1	<b>Informal sources</b>					
	Family members					
2	Friends / relatives					
3	Neighbours					
4	Progressive farmers					
5	<b>Formal sources</b>					
	Village panchayat members					
6	AO/AEO					
7	Scientists from agricultural university					
8	Salesman					
9	Bank officials					
10	<b>Mass media</b>					
	Newspapers					
11	Radio					
12	Television					
13	Farm literature					
14	Others					

### 15. Decision making ability

Sl. No.	Statements	SA	A	UD	DA	SDA
1	I analyze the problems by considering the prospects and constraints and take decisions					
2	I will not take a decision without consulting others					
3	Once I take a decision, I will stick on to it					
4	I can take firm decisions and initiate action when there are more alternatives					
5	In general I prolong my decisions					
6	I need a lot of time to take a decision					

\*SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

### 16. Innovativeness

When would you like to adopt a new / improved practice/ technology?

Sl. no.	Statement	Put a tick (✓) against the statement
1	As soon as it is brought to my knowledge	
2	After I had seen other people tried successfully	
3	I prefer to wait and take my own time	
4	I am not interested to adopt new technologies	

### 17. Market orientation

Sl. No.	Statements	SA	A	UD	DA	SDA
1	One should get daily updates of market news					

2	There is no need to have market intelligence for remunerative price for their products					
3	It is not necessary to have knowledge on market information or far away markets					
4	One should sell his/her produce to the nearest market irrespective of price					
5	One should purchase his/her inputs from shops where his/her friends or relatives are purchasing					
6	One should grow those crops which have more market demand					

\*SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

### 18. Economic motivation

Sl. No.	Statement	SA	A	UD	DA	SDA
1	A farmer should work towards larger yields and economic profits					
2	A farmer should try innovative marketing practices which may earn him more money by reducing the cost of marketing					
3	The most successful farmer is one who makes the most profits					
4	A farmer should try new methods to increase monetary profits than going in					

	for old marketing methods					
5	A farmers should earn his living but the most important thing in his life cannot be defined in economic term					
6	It is difficult to the farmer's children to make good start, unless he provides them with economic assistance					

\*SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

## 19. Farmer's e-Literacy

### Computer literacy

Sl. No.	Statements	Ability to use	
		Able	Unable
1	Switch on a computer		
2	Shut down a computer		
3	Use the computer mouse with ease		
4	Open a file		
5	Create a folder		
6	Opening videos in computer		
7	Create a word document		
8	Browse internet		
9	Using e-mails		
10	Interaction through social media		

### m-Literacy

Sl. No.	Statements	Ability to use	
		Able	Unable



1	Switch on mobile phone		
2	Opening contacts		
3	Making phone calls		
4	Texting messages		
5	Browse internet		
6	Using e-mails		
7	Installing apps		
8	Taking photographs		
9	Making video calls		
10	Interaction through social media		

## 20. Awareness about e-NAM facilities and services

Sl. No.	Particulars	Aware	Unaware
1	lot number generation		
2	Electronic weighing		
3	Quality checking		
4	Grading		
5	Bid creation		
6	Real time bidding progress		
7	Providing sale bills		
8	e- payments through RTGS/NEFT, UPI BHIM		
9	e- learning videos about e-NAM process in e-NAM portal		
10	e-NAM mobile app		
11	Warehouse facilities		
12	Trading directly through mobile app		
13	e-NAM MIS		
14	Trading details		

15	Stakeholder data		
16	Live trading data		
17	Inter mandi dashboard		
18	Interstate trading dashboard		

## 21. Perception of farmers about e-NAM

Sl. No.	Particulars	S A	A	D A	S D A
1	Marketing efficiency is very high				
2	e-NAM provides transparency in marketing				
3	Better quality certification is available				
4	Net returns to farmers increased by e-NAM				
5	Reduced transaction cost to farmer produce				
6	High Supply chain efficiency				
7	e-NAM provides better accessibility to market				
8	Correct weighing				
9	Quality checking are not done properly				
10	Sufficient warehouse facilities are not there				
11	Giving immediate cash after sale				
12	e-NAM is providing better infrastructure/ facilities				
13	Get better prices through e-NAM				

14	Selling through e-NAM is an easy process				
15	Commission agents are unnecessary under e-NAM				
16	Commission charges are very high				
17	Selling the whole lot at a time is not possible in e-NAM				
18	e-NAM reduces the wastage of farm produce				

\*SA – Strongly agree, A – Agree, DA – Disagree, SDA – Strongly disagree

## 22. Utilization of e-NAM

Sl. No.	Particulars	Very high	High	moderate	Low	Very low
1	Checking price					
2	Finding different markets					
3	Buying through e-NAM					
4	Checking Progress of lot					
5	Checking real time bidding progress					
6	Mobile number linking					
7	Viewing e-Learning videos about e-NAM process					
8	Assaying/Quality checking of commodities					
9	Use of warehouse facilities					
10	e-payments					
11	Use of e-NAM mobile app					
12	Advance online booking for gate entry through mobile app					

13	Grievance on e-NAM					
14	Checking e-NAM MIS					
15	Checking trading details					
16	Checking stakeholder data					
17	Checking mandi dashboard					
18	Checking interstate trading dashboard					
19	Checking live trading data					

### 23. Constraints in availing e-NAM services

Sl. No.	Particulars	VI	I	FI	SI	NI
	<b>Physical Constraints</b>					
1	Poor transportation facilities					
2	Labour problems ( loading & unloading)					
3	Inadequate facilities of storage					
4	Non availability of computers					
5	Poor net connectivity					
6	Power failures					
7	Problem with e-NAM server					
8	Inadequate facilities for weighing					
9	Inadequate facilities for quality checking					
10	Inadequate facilities for grading					
11	Distance to market					
	<b>Technical Constraints</b>					
1	Poor knowledge on computer and internet					
2	Complicated sales process					
3	Lack of knowledge about procedures of					

	e-NAM					
4	Non-availability of updated information on prices					
<b>Economic Constraints</b>						
1	Less no. of bidders					
2	Corruption of the officials					
3	Problems with commission agents malpractices					
4	Fluctuation in market prices					
5	High transportation cost					
<b>Procedural constraints</b>						
1	Cumbersome registration process					
2	High time requirement for e-NAM auction					
3	Difficulty to sell smaller lots					
4	Difficulty to sell larger lots					
5	Inability to sell more no. of commodities					
6	Difficulty to sell whole lot at a time					
7	Delay in receiving payments					

\*VI - Very important, I - Important, FI - Fairly important, SI - Slightly important, NI - Not important

## 24. Suggestions

**Respondent no:**

**KERALA AGRICULTURAL UNIVERSITY  
COLLEGE OF HORTICULTURE, VELLANIKKARA  
DEPARTMENT OF AGRICULTURAL EXTENSION**

**Utilisation behaviour of registered farmers of selected Agricultural Produce Market  
Committee (APMC) of Telangana State on e-NAM portal**

**Interview Schedule - Traders  
(For Academic purpose only)**

- 1. Name :**
- 2. Contact No.:**
- 3. Address:**
  - a. Gram Panchayat:
  - b. Block:
  - c. District:
- 4. Age: \_\_\_\_\_ years**
- 5. Gender: M / F**
- 6. Education:**
- 7. Annual income Rs. \_\_\_\_\_**
- 8. Family details:**

<b>Sl. No.</b>	<b>Name of family member</b>	<b>Education</b>	<b>Occupation</b>	<b>Annual income (in Rupees)</b>

			<b>Total</b>	

9. Experience in trading of agricultural commodities \_\_\_\_\_ months/years

10. Experience through e-NAM trading \_\_\_\_\_ months

11. Savings per annum Rs. \_\_\_\_\_

**12. Credit**

Sl. No.	Source of credit	Amount of loan (Rs.)	Rate of interest (%)	Duration of loan (months)
1	Cooperative banks			
2	Private banks			
3	Moneylenders			
4	Friends /relatives			
5	Others			

**13. Social participation**

Sl. No.	Social participation status	Put a tick (✓) against the statement	Frequency of attending meetings				
			Always	Often	Sometimes	Rarely	Never
1	No membership						
2	Membership in one organization						
3	Membership						

	in more than one organization						
4	Office bearer in one organization						
5	Office bearer in more than one organization						

#### 14. Information seeking behaviour

Sl. No.	Information source	Always	Often	Sometimes	Rarely	Never
1	<b>Informal sources</b>					
	Family members					
2	Friends / relatives					
3	Neighbours					
4	Progressive traders					
5	<b>Formal sources</b>					
	Bank officials					
6	Technical experts					
7	<b>Mass media</b>					
	Newspapers					
8	Radio					
9	Television					
10	Farm literature					
11	Others					



### 15. Decision making ability

Sl. No.	Statements	SA	A	UD	DA	SDA
1	I analyze the problems by considering the prospects and constraints and take decisions					
2	I will not take a decision without consulting others					
3	Once I take a decision, I will stick on to it					
4	I can take firm decisions and initiate action when there are more alternatives					
5	In general I prolong my decisions					
6	I need a lot of time to take a decision					

\*SA - Strongly agree, A - Agree, UD - Undecided, DA - Disagree, SDA - Strongly disagree

### 16. Innovativeness

When would you like to adopt a new / improved practice/ technology?

Sl. no.	Statement	Put a tick (✓) against the statement
1	As soon as it is brought to my knowledge	
2	After I had seen other people tried successfully	
3	I prefer to wait and take my own time	
4	I am not interested to adopt new technologies	

### 17. Market orientation

Sl. No.	Statements	SA	A	UD	DA	SDA
1	One should get daily updates of					

	market news					
2	There is no need to have market intelligence for remunerative price for their products					
3	It is not necessary to have knowledge on market information or far away markets					
4	One should purchase the produce from the nearest market irrespective of price					
5	One should purchase the produce from markets where his/her friends are purchasing					
6	One should buy those produce which have high market demand					

\*SA - Strongly agree, A - Agree, UD - Undecided, DA - Disagree, SDA - Strongly disagree

### 18. Economic motivation

Sl. No.	Statement	SA	A	UD	DA	SDA
1	A trader should work towards larger economic profits					
2	A trader should try innovative marketing practices which may earn him more money by reducing the cost of marketing					
3	The most successful trader is one who makes the most profits					

4	A trader should try new methods to increase monetary profits than going in for old marketing methods					
5	A trader should earn his living but the most important thing in his life cannot be defined in economic term					
6	It is difficult to the trader children to make good start, unless he provides them with economic assistance					

\*SA - Strongly agree, A - Agree, UD - Undecided, DA - Disagree, SDA - Strongly disagree

## 19. Traders e-Literacy

### Knowledge on computer

Sl. No.	Statements	Ability to use	
		Able	Unable
1	Switch on a computer		
2	Shut down a computer		
3	Use the computer mouse with ease		
4	Open a file		
5	Create a folder		
6	Opening videos in computer		
7	Create a word document		
8	Browse internet		
9	Using e-mails		
10	Interaction through social media		

### **m-Literacy**

<b>Sl. No.</b>	<b>Statements</b>	<b>Ability to use</b>	
		<b>Able</b>	<b>Unable</b>
1	Switch on mobile phone		
2	Opening contacts		
3	Making phone calls		
4	Texting messages		
5	Browse internet		
6	Using e-mails		
7	Installing apps		
8	Taking photographs		
9	Making video calls		
10	Interaction through social media using mobile		

### **20. Awareness about e-NAM facilities and services**

<b>Sl. No.</b>	<b>Particulars</b>	<b>Aware</b>	<b>Unaware</b>
1	Lot number generation		
2	Electronic weighing		
3	Quality checking		
4	Grading		
5	Bid creation		
6	Real time bidding progress		
7	Providing sale bills		
8	e- payments through RTGS/NEFT, UPI BHIM		
9	e- learning videos about e-NAM process in e-NAM portal		
10	e-NAM mobile app		

11	Warehouse facilities		
12	Trading directly through mobile app		
13	e-NAM MIS		
14	Trading details		
15	Stakeholder data		
16	Live trading data		
17	Inter mandi dashboard		
18	Interstate trading dashboard		
19	Single trade license valid across all markets		

## 21. Perception of traders about e-NAM

Sl. No.	Particulars	S A	A	D A	SD A
1	Marketing efficiency is very high				
2	e-NAM provides transparency in marketing				
3	Better quality certification is available				
4	Net returns increased by e-NAM				
5	Reduced transaction cost to the produce				
6	High Supply chain efficiency				
7	e-NAM provides better accessibility to market				
8	Correct weighing				
9	Quality checking are not done properly				
10	Sufficient warehouse facilities are not there				

11	e-NAM is providing better infrastructure facilities				
12	Buying through e-NAM is an easy process				
13	Commission agents are unnecessary under e-NAM				
14	e-NAM reduced the wastage of farm produce				

\*SA – Strongly agree, A – Agree, DA – Disagree, SDA – Strongly disagree

## 22. Utilization of e-NAM

Sl. No.	Particulars	Very high	High	moderate	Low	Very low
1	Checking price					
2	Finding different markets					
3	Checking quality of commodities					
4	Checking real time bidding progress					
5	Viewing e-Learning videos about e-NAM process					
6	Use of warehouse facilities					
7	e-payments					
8	Mobile number linking					
9	Use of e-NAM mobile app					
10	Grievance on e-NAM					
11	Checking e-NAM MIS					
12	Checking trading details					
13	Checking stakeholder data					
14	Checking mandi dashboard					
15	Checking interstate trading					

	dashboard					
16	Checking live trading data					

### 23. Constraints in availing e-NAM services

Sl. No.	Particulars	VI	I	FI	SI	NI
<b>Physical Constraints</b>						
1	Non availability of computers					
2	Poor net connectivity					
3	Labour problems					
4	Problem with e-NAM server					
5	Poor warehouse facilities					
6	Transportation problems					
7	Power failures					
8	Lack of provision of manual inspection					
9	Inadequate facilities of weighing					
10	Inadequate facilities of quality checking					
<b>Technical Constraints</b>						
1	Poor knowledge on computer and internet					
2	Technical complicated of sales process					
3	Lack of knowledge about procedures of e-NAM					
4	Non-availability of updated information on prices					
<b>Economic Constraints</b>						
1	Problems with commission agents malpractices					
2	Corruption of officials					

3	High transportation cost					
4	Difficulty in depositing cash before trade					
5	Fluctuation of prices					
6	Unable to purchase the desired quality produce					
<b>Procedural constraints</b>						
1	Cumbersome registration process					
2	High time requirement for e-NAM auction					
3	Difficulty to buy smaller lots					
4	Difficulty to buy larger lots					
5	Difficulty to buy whole lot at a time					
6	Delay in delivery of produce					
7	Difficulty to buy more no. of commodities					
8	Bidding time is less					
9	Grading is not done properly					

\*VI - Very important, I - Important, FI - Fairly important, SI - Slightly important, NI - Not important

## 24. Suggestions



**UTILISATION BEHAVIOUR OF REGISTERED FARMERS OF SELECTED  
AGRICULTURAL PRODUCE MARKET COMMITTEES (APMCS) OF  
TELANGANA STATE ON e-NAM PORTAL**

By

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**ABSTRACT OF THE THESIS**

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## Abstract

National Agricultural Market (e-NAM) is a pan-India electronic trading platform launched in 2016 by Government of India. The e-NAM is a virtual market, but at the back end, there is a physical market which assists all the APMC related information and services through a single window system and it includes information about commodity arrivals and prices of the available commodity. The integration of markets across the country through a common e-platform ensures a transparent sale process. As on August 2020, 1000 markets from 18 States and 3 Union Territories were connected with e-NAM.

The present study intended to analyse the process and functioning of e-NAM facilities under selected APMCs in Telangana State, the perception of farmers about e-NAM and its utilisation and to identify the constraints in availing e-NAM services. The study was conducted in Hyderabad and Warangal districts of Telangana state. A total of 90 respondents (60 farmers and 30 traders) formed the sample of the study using random sampling procedure.

First of all, the study analysed and described the process and functioning of e-NAM. Besides, the results of the study revealed that majority (50%) of the farmers belonged to middle aged group, 88.33 per cent of farmers were males, and 50 per cent of farmers had small family size (<5 members in their family). With regard to their educational status, 31.67 per cent completed primary school level of formal education. Further, 66.37 per cent of farmers were depended on agriculture alone and 65 per cent were having more than 10 years of farming experience. Forty per cent each of the farmers possessed small farms (2.5-5 acres) and were having an annual income of ₹1 lakh to ₹2 lakhs. Nearly half of the farmers had savings between ₹50000-₹100000 and availed loans from cooperative banks (51.66%). Majority of the farmers had medium level of information seeking behaviour (56.67% farmers), medium level of decision making ability (65%), market orientation (56.67%) and economic motivation (66.66%). Though majority (90%) of the farmers were computer illiterate, all the farmers were able to use the basic functions of mobile phones.

Three fourth of the traders belonged to middle aged group, all the traders were males, 50 per cent traders had medium sized family (5-8 members in their family), pursued high school level education (33.33%), and trading alone was the main occupation for 73.33 per cent traders with ₹2 -₹5 lakhs of annual income (63.34%) and ₹1 to ₹2 lakhs savings per annum (60%).

Exactly 46.67 per cent of the traders availed loans from private banks with an interest rate of 10 to 20 per cent. Majority of the traders had medium level of information seeking behaviour (76.67%), market orientation (80%) and economic motivation (66.66%). All the traders were able to use computer and mobile phones.

All the farmers perceived that weighing of the produces at e-NAM was done correctly. Similarly, 100 per cent of the farmers perceived that transaction cost to farm produce was not reduced through e-NAM. All the farmers were aware of the lot number generation, sale bills, grading, electronic weighing and bid creation, However, majority of the farmers were not aware of many of the facilities and services available in e-NAM. The farmers mainly utilised the e-NAM portal for price checking followed by mobile number linking with e-NAM portal. All the other services were utilised by only a very few farmers. The study further revealed that educational status, computer literacy, m-literacy and awareness about e-NAM were having positive correlation with utilisation of e-NAM facilities, while age, farming experience, savings and decision making ability showed negative correlation with the utilisation of e-NAM facilities.

The traders also perceived that correct method was followed at e-NAM for weighing the produce. They further perceived that the marketing efficiency was very high with e-NAM, while better quality certificate was not available at e-NAM. All the traders were aware of most of the e-NAM facilities and services unlike the farmers. The traders were mainly utilising e-NAM portal for mobile number linking followed by checking quality of the commodities and price checking. Use of warehouse facilities checking e-NAM MIS, grievance on e-NAM services were the underutilized services by the traders.

The most important constraints faced by majority of the farmers were inadequate facilities for quality checking, inability to sell more number of commodities, poor knowledge on computer and internet and the limited number of bidders taking part in bidding. The most important constraints faced by traders were the problem of power failure, poor knowledge on computer and internet, lack of proper grading, and the less bidding time.

Thus creating awareness among farmers and providing necessary skill in using various e-NAM facilities and handholding them in effective utilisation of e-NAM would be crucial in the success of e-NAM in India.