

# **IMPACT OF SOCIAL MEDIA ON ORANGE GROWERS**

## **THESIS**

**Submitted to  
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola  
in partial fulfilment of the requirements  
for the Degree of**

**DOCTOR OF PHILOSOPHY  
IN  
AGRICULTURE  
(EXTENSION EDUCATION)**

**By  
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**Enrolment Number- JJ/23**

**2022**

## DECLARATION OF STUDENT

I hereby declare that the experimental work and its interpretation of the Thesis entitled "**IMPACT OF SOCIAL MEDIA ON ORANGE GROWERS**" or part thereof has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis/publication of any University or Scientific organization. The source of material used and all assistance received during the course of investigation have been duly acknowledged.

**Place :** Akola

**(Datir Preeti Rambhau)**

**Date :** / / 2022

**Enrolment No. JJ/23**

## CERTIFICATE

This is to certify that thesis entitled “**IMPACT OF SOCIAL MEDIA ON ORANGE GROWERS**” submitted in partial fulfillment of the requirement for the degree of “**Doctor of Philosophy in Agriculture (Extension Education)**” of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **Datir Preeti Rambhau** under my guidance and supervision.

The subject of the thesis has been approved by the Student’s Advisory Committee.

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## **(D) Abbreviations**

%	: Per cent
/	: Per
@	: At the rate
Agri	: Agriculture
Agric. Sci.	: Agricultural Science
Agril.	: Agricultural
AAU	: Anand Agricultural University
ANGRAU	: Acharya N. G. Ranga Agricultural University
App	: Applied
ARIS	: Agricultural Research Information System
B. Sc.	: Bachelor of Science
Curr	: Current
DAATTC	: District Agricultural Advisory Transfer of Technology Centre
DAESI	: Diploma in Agricultural Extension Services for Input Dealers
DBSKKV	: Dr. Balasaheb Sawant Kokan Krishi Vidyapeeth
Dept	: Department
Dr. PDKV	: Dr. Panjabrao Deshmukh Krishi Vidyapeeth
Dev	: Development
Dist.	: District
Doctor	: Doctor
DSAO	: District Superintendent Agriculture Officer
Econ	: Economics
Engg	: Engineering
e.g.	: Exampi grantia (example)
Educ	: Education

<i>et al.</i>	:	et alia (and associates)
Etc	:	Etceteras (Excetra)
Extn. Educ.	:	Extension Education
FAOSTAT	:	Food and Agriculture Organization Corporate Statistical Database
Fig	:	Figure
Freq.	:	Frequency
GDP	:	Gross Domestic Product
GFRAS	:	Global Forum of Rural Advisory services
GoM	:	Government of Maharashtra
Govt.	:	Government
GR	:	Government Resolution
Guj	:	Gujrat
Ha	:	Hectares
HAPIS	:	Horticulture Area Production Information System
i.e.	:	Id est (That is)
IARI	:	Indian Agricultural Research Institute
ICAR	:	Indian Council of Agricultural Research
ICSSR	:	Indian Council of Social Science Research
ICT	:	Information and Communication Technology
IJAEB	:	International Journal of Agriculture, Environment and Biotechnology
Int	:	International
IPM	:	Integrated Pest Management
J	:	Journal
JNKVV	:	Jawaharlal Nehru Krishi Vishwa Vidyalaya
KVK	:	Krishi Vigyan Kendra
M	:	Meter

Microbiol	:	Microbiology
M.Sc.	:	Master of science
MPKV	:	Mahatma Phule Krishi Vidyapeeth
MS	:	Maharashtra State
MR	:	Most Relevant
MRS	:	Mean Relevancy Score
MRSAC	:	Maharashtra Remote Sensing Application Centre
NCEUS	:	National Commission for Enterprises in the Un-organised Sector
NGO	:	Non Government Organization
NHM	:	National Horticulture Mission
NRCC	:	National Research Centre for Citrus
NSSO	:	National Sample Survey Organization
No.	:	Number (s)
NR	:	Not Relevant
NS	:	Non Significant
PAU	:	Punjab Agriculture University
PRA	:	Participatory Rural Appraisal
Ph. D.	:	Doctor of Philosophy
R	:	Relevant
R.D.	:	Rural Development
RAMETI	:	Regional Agriculture Extension Management Training Institute
Res.	:	Research
Rs.	:	Rupees
S. D.	:	Standard deviation
SHG	:	Self Help Group
Sl. No	:	Serial number

Soc. Sci.	:	Social Sciences
Socio	:	Sociology
Std	:	Standard
SOP	:	Standard Operating Procedure
Tech	:	Technology
TV	:	Television
UG	:	Under Graduate
UGC	:	University Grants Commission
Univ.	:	University
Unpub	:	Unpublished
US	:	United States
Viz.	:	Vide licet (Namely)
VNMKV	:	Vasantrao Naik Marathwada Krishi Vidyapeeth
WWW	:	World Wide Web
Yrs.	:	Years

## **E) THESIS ABSTRACT**

- a) **Title of the Thesis** : **IMPACT OF SOCIAL MEDIA ON ORANGE GROWERS**
- b) **Full name of student** : **Datir Preeti Rambhau**
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- i) **Signature of the student** :
- j) **Signature, Name and Address of forwarding Authority** :

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---

### **ABSTRACT**

The study entitled, "Impact of Social Media on Orange Growers" was purposively conducted in Amravati and Nagpur district of Vidarbha region in Maharashtra state. The study was conducted to study the personal, socio-economic, communicational and psychological characteristics of orange growers, to study the utilization pattern of social media by orange growers, to develop and standardize attitude scale for

measurement of attitude of orange growers towards social media, to measure the attitude of orange growers towards social media, to study the impact of social media on orange growers, to study the relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with attitude and impact of social media on orange growers, to study the constraints faced by orange growers in use of social media and suggestions obtained from orange growers to overcome the constraints and identify the reasons behind the fruit drop in oranges and removal of orchards as perceived by orange growers.

The ex-post-facto research design of social research was used. In all 300 respondents were selected purposively by simple random sampling method. The data were collected by personally interviewing the respondents with the help of structured interview schedule. The frequency, percentage, arithmetic mean, standard deviation, Karl Pearson's Spearman's rank correlation, multiple linear regression and Z test were applied for interpreting the results.

The findings of the present study revealed that, nearly half (47.34%) of the social media user respondents had under graduate degree level education. More than one third (34.00%) of the overall respondents had higher secondary school level education (11<sup>th</sup>+12<sup>th</sup>), nearly half (44.00%) of the respondents had medium family size (5 to 6 members), more than one third (38.67%) of the overall respondents were engaged in agriculture + Horticulture +allied occupation and nearly half (48.67%) of the social media user respondents had agriculture and horticulture along with allied occupation as occupation. Nearly half of the overall respondents (46.33%) had semi medium size of land holding (2.01 to 4.00 ha).

Majority (60.67%) of the respondents had small size of orchard (Up to 1.33 ha). More than two fifth (40.67%) of the respondents had medium experience in orange cultivation (15.36 to 26.66 years). Majority (57.33%) of the overall respondents had medium level of social participation (2 to 3) while majority (73.33%) of the social media user respondents were having medium level of social participation. 45.67 per cent of the respondents had annual income up to Rs. 7,96,000/-, The 34.67

per cent of the social media user respondents had annual income from orange Rs. 9,18,001/- to 11,59,000/-. 88.00 per cent of social media user orange growers had high availability of social media (Above 6) and overall 44.00 per cent of the orange growers had higher availability of social media.

Majority (55.67%) of the overall respondents had medium sources of information (47.84 to 54.39) and nearly half (48.00%) of the social media user respondents had medium sources of information. Majority (59.67%) of the respondents had medium innovativeness and majority (57.33%) of the social media user respondents were having medium innovativeness. Majority (56.67%) of the respondents had medium risk orientation (17.92 to 26.35). Majority (60.00%) of the respondents had medium market orientation (18.75 to 25.00) and 70.00 per cent of the social media user respondents had high utilization pattern index (62.93 to 71.36). In case of attitude of respondents towards social media, 50.34 per cent of the respondents had highly favourable attitude towards social media. While majority of the social media user respondents (87.33%) had highly favourable attitude towards social media.

In reference with eight impact parameters, changes were recorded in knowledge level, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence over social media non user respondents as effect of social media utilization for orange cultivation in study area. Majority of the respondents (54.00%) experienced medium level of change in knowledge, majority (75.33%) of the respondents were experienced medium level of change in self confidence. Majority (65.33%) of the respondents were found in medium category of increase in impact of social media. The results of correlation in relation to the attitude of social media user respondents revealed that, characteristics namely; social participation, availability of social media, sources of information, innovativeness, risk orientation, market orientation and utilization pattern were positively and significantly related with attitude at 0.01 level of probability.

The results of correlation with regards to the impact of social media on social media user respondents proved that, education, occupation, size of orchard, farming experience, social participation, annual income, availability of social media, sources of information, innovativeness, risk orientation, market orientation, utilization pattern of social media and attitude were positively and significantly related with overall impact of social media at 0.01 level of probability. Land holding was positively significant with impact of social media at 0.05 per cent level of significance. In case of social media non user orange growers market orientation showed positive and significant correlation with impact of social media at 0.01 level of probability.

The coefficient of determination ( $R^2$ ) of the independent variables was 0.56. The regression coefficient ( $\beta$ -value) were found to be significant for education, occupation, social participation, annual income, availability of social media, sources of information market orientation, utilization pattern and attitude towards social media. The regression coefficients of these variables were 0.461, 0.881, 1.424, 1.119, 1.180, 0.800, 0.279, 0.172 and 0.411 respectively.

The constraints faced by the social media user respondents in use of social media were studied. It was observed that, major constraints faced by them were irregular internet connectivity with Garret score 78.60 followed by sometimes content are not need based and irrelevant with the individual needs (71.40) and authenticity of agricultural information shared through social media is less due to unavailability of professionals (60.68). In case of social media non user respondents, the major constraints faced by them were irregular internet connectivity with Garret value 78.64 followed by complex nature of social media (69.36) and no faith in social media information due to traditional belief in existing system (59.20) respectively.

The suggestions offered by the respondents to overcome the problems were recorded. They were provide the regular strong internet connectivity in rural area (74.33%) followed by social media should provide right information at right time in right format covering the emergency

messages like climate changes (70.67%) and practicable solutions with minimum input cost should be provided through social media (65.33%). The reasons behind the fruit drop in oranges were recorded such as high temperature (97.33%) followed by high humidity (94.33%), phytophthora (88.00%) and fruit sucking moths (83.33%), respectively. Reasons behind removal of orchards as perceived by the respondents were recorded such as unsatisfactory market price to oranges (97.67%) followed by high cost of cultivation and interculture operations (86.04%) and unavailability of water at appropriate time (62.79%), respectively.

It is concluded that, social media is one of the important connecting link between orange growers and technology. As it helps to increase the knowledge and self confidence, so increase in self confidence helps for overall development of human being specially the orange growers. Therefore, it is suggested to use social media with more modification in the field of agriculture.

# CHAPTER I

## INTRODUCTION

### 1.1 Background information

**“Social media spark a revelation that we, the people, have a voice and through the democratization of content and ideas we can once again unite around common passions, inspire movements and ignite change.”**

**-Brian Solis.**

Global agriculture has witnessed a paradigm shift in the past few decades and extension mechanism need to stay ahead and equip the farmers by developing their management and decision making skills; help rural people develop leadership and organizational skills; participate in cooperative credit societies and other support organizations. But the ground reality is hard-hitting with only one extension worker available for every 2879 farmers in India (Mukherjee and Maity, 2015). A recent survey reported that only 41 per cent of the farm households received any assistance from either government or private extension services, and the government extension machinery covering only 11 per cent of the households who received extension assistance (Bera, 2014). As an aftereffect of globalization, agriculture needed to change rapidly to keep pace with the global economy but infrastructural issues, low productivity, poor extension coverage, and low quality manpower became major challenges which still persist. In a world where information drives the change, extension needs to be adept with latest digital media to influence and facilitate farmers.

The most important issue with extension mechanism is the lack of technical human resource. A large number of positions in public extension system in India are vacant, leaving the extension workers personnel to overwork, thus decreasing their efficiency (Mukherjee and Maity, 2015). Also the extension system is entrusted with multiple development activities besides their mandated work, which eventually dilute the focus on extension and decrease efficiency. As statistics suggest,

majority of the farmers still remain unreached. With the abilities of reaching large number of people individually and simultaneously, Information and Communication Technologies (ICTs) are assuming a greater role in the extension work. Though television and radio have been used for disseminating agricultural information for a long time (Purushothaman *et al.*, 2003), the recent developments in the mobile, computing and networking technologies provide new ways of technology transfer. Increase in mobile subscriptions in the last decade have also increased the use of web based services and applications like web portals and mobile apps. According to the January 2017 update of ICRA Ltd. (Investment Information and Credit Rating Agency Ltd.), till 30 October 2016, there were 1078 million mobile subscribers in India and which is growing 7.5 per cent annually (ICRA Research Services, 2017). Unique mobile user penetration in 2016-2017 has been 35 per cent, whereas the mobile's share of web traffic is 79 per cent. India's internet users grew by 40 per cent while globally the growth was of 9 per cent, making the growth 4 times higher in India (ETtech, 2016). Social media penetration is 14 per cent while growth of social media users in 2016-2017 have been 40 per cent (55 million), which is second highest in the world (We are social, 2017). Social media platforms like Facebook, YouTube, Twitter and Google+ have higher levels of use among Indians compared to US, UK and European countries. These developments have opened up new avenues for improving reach of extension services for the needy farmers and other stakeholders. The first smart phone with a fingerprint reader was the Motorola Atrix 4G in 2011. In September 2013, the iPhone 5S was unveiled as the first smart phone on a major U.S. carrier since the Atrix to feature this technology. Once again, the iPhone popularized this concept. In 2018, the first smart phones featuring fingerprint readers embedded within OLED displays were announced, followed in 2019 by an implementation using an ultrasonic sensor on the Samsung Galaxy S10. In 2019, the majority of smart phones released have more than one camera, are waterproof with IP67 and IP68 ratings, and unlock using facial recognition or fingerprint scanners. The number of smart phone users worldwide is projected to amount to nearly

2.7 billion by 2019. It was expected that, by 2017, almost a third of the total global population will use a smart phone.

Being cheap is at the heart of Jio's strategy. Jio services provide low cost technology and 4G services at very cheaper rate for highest data network speed. A Jio monthly plan begins at about \$1. The cost of voice calls has plummeted for its subscribers and data is almost free. To keep up, competitors have been forced to try to match its ultralow charges. 4G smart phones it offers subscribers are priced to appeal to the mass market; they are stripped-down, low-end and basic. But they do the job. It's interesting to note here that while Reliance Jio has capped data usage in its flagship plan to 1GB per day, there are no restrictions on voice calls. If, indeed, the company is bearing a cost of as much as Rs70 per subscriber on interconnect costs, it probably should consider a fair usage policy that contains costs, besides an increase in tariffs to cover other costs. People are now more mobile friendly and accessing different information on mobile. In 2018, around 1.56 billion smart phones were sold worldwide. In the first quarter of 2019, around 88.00 per cent of all smart phones sold to end users were phones with the Android operating system. In 2020, the number of global smart phone users is projected to total 3.5 billion, marking a 9.3 per cent increase from 2019. As the telecommunication services launched in the year 2015 from which use of mobile phones for accessing different type of information by people is increased due to its cheap rates and highest data speed.

Social media are interactive computer-mediated technologies that facilitate the creation or sharing of information, ideas, career interests and other forms of expression via virtual communities and networks. The variety of stand-alone and built-in social media services currently available introduces challenges of definition; however, there are some common features:

1. Social media are interactive Internet-based applications.
2. User-generated content such as text posts or comments, digital photos or videos, and data generated through all online interactions, is the lifeblood of social media.

3. Users create service-specific profiles and identities for the website or app that are designed and maintained by the social media organization.
4. Social media facilitate the development of online social networks by connecting a user's profile with those of other individuals or groups.

**“Social media is your opportunity to reach a massive number of people with transparency, honesty and integrity.” ~ Brian E. Boyd Sr.**

Users usually access social media services via web-based apps on desktops and laptops, or download services that offer social media functionality to their mobile devices (e.g., smart phones and tablets). Observers have noted a wide range of positive and negative impacts of social media use. Social media can help to improve an individual's sense of connectedness with real or online communities and can be an effective communication (or marketing) tool for corporations, entrepreneurs, non-profit organizations, advocacy groups, political parties, and governments.

## **1.2 Need and importance of study**

Maharashtra is a second largest producer of citrus and contributes 15.8 per cent of citrus to the total production of citrus in the country. The orange is one of the most important fruit crops of Vidarbha region of Maharashtra. Vidarbha region is known to the entire world for its awesome quality of oranges. State produces 1.76 m MT of citrus from an area of 0.28 m ha having productivity of 6.4 MT/ha. State is producing about 22 per cent of total production of mandarin orange in the country. State produces 0.74 m MT of mandarin orange from an area of 0.14 m ha with productivity of 5.5 MT/ha. The major orange producing belt is in the Vidarbha region of the State covering the districts of Nagpur, Akola, Amravati, Wardha, Yavatmal, Buldhana and Washim. The main variety grown is Nagpur mandarin and Kinnow. The area, production and productivity of mandarin orange in Maharashtra state is 107.32 thousand ha., 797.95 million tonnes and 7.43 mt/ha, respectively and contributes 15.64 per cent share in India. (Source: National Horticulture Board)

Different ICAR institutes, state agricultural universities and different private organizations are providing different farm advisory services through whatApp group, farmers group, twitter, YouTube, email, message services and apps, others. On an average public extension services only reach 6.8 per cent of farmers (GFRAS, 2012). NSSO, 2014 has indicated that of the 40.6 per cent households who received extension assistance, only 11 per cent of the services came from physical government machinery extension agents, Krishi Vigyan Kendras and agricultural universities. This gap needs to be filled through exploring other options of alternate agricultural extension service delivery mechanisms. Information and Communication Technologies (ICTs) can deliver agricultural extension information with greater ease, more rapidly and with higher accuracy (Goyal, 2011, Karthikeyan, 2012 and World Bank, 2016). These technologies are reviving agricultural extension and advisory services around the world (World Bank, 2016). ICT based applications in agriculture have varied from web portals, telecentres, mobile telephony and hybrid projects (ICTs with traditional extension elements) (Shanthinichandra *et al.*, 2013). Mass media including internet is now the second most important source of useful information to agricultural households in India (NSSO, 2014). Moreover, ICT interventions have received encouragement from the Indian Ministry of Agriculture (ICAR, 2016). Recently two mobile apps were launched on crop insurance and agrimarket (GOI, 2015). Social media is yet another ICT based tool, which once used purely for entertainment, has great potential to be used for knowledge sharing and collaboration even in agriculture (Goyal, 2011). These ICT tools are relatively easier to use and are gaining popularity in agriculture sector (Saravanan and Bhattacharjee, 2016). Through these tools farming community can learn and share information in multiple ways in form of texts, photos, pictures, audio, audio-visuals and web links (Andres and Woodard, 2013). Social media gives opportunities to farmers for cocreating content and promotes co-learning among farmers (Jackson *et al.*, 2009). Further, content creation is faster through social media than traditional mass media channels of extension communication (Lucas, 2011). The benefits of social media goes beyond cost effective ways of communication to empowering social connections

and long term engagement in extension programs (Neill *et al.*, 2011). For farming community, social media can be a good way of networking and gaining through social capital in form of trust, engagement and community involvement (Stanley, 2013 and Mains, 2013). Moreover, the issues of physical distance and isolation in agriculture can be reduced through these tools (Varner, 2013). Social media has been aptly called as one of the most participative extension tools of recent times.

As data packs get cheaper and internet becomes more accessible, more Indians are embracing the digital lifestyle. At the same time, smart phones are increasingly becoming the primary screen for Indian customers. In fact, it seems that India entirely skipped the desktop generation and went straight to mobiles. In 2019, a whopping 99 percent of the rural internet users in the country primarily used mobile phones to access the internet. This means mobile phone applications are a booming market in India. In 2020, the highest number of WhatsApp and TikTok mobile app downloads in the world were from India. The average internet user in the country spends over three hours per day on social media. YouTube is one of the biggest online video platforms worldwide, with the most popular YouTube channels having accumulated over 100 million subscribers. In 2019, the microblogging, site Twitter was projected to reach 7.5 per cent of internet users in India, up from seven percent in 2014. This stood at over 12 per cent among social network users for 2019, while it was just over two percent for the country's population during the same year. Indian mobile data users consume 8.3 gigabits (GB) of data each month on average, compared with 5.5 GB for mobile users in China and 8-8.5 GB in advanced digital economy of South Korea. Indians have 1.2 billion mobile phone subscriptions and downloaded more apps 12.3 billion in 2018. While a government push has helped to digitise the economy, private sector firms such as Reliance Jio has helped bring down data costs by more than 95 per cent since 2013, it said, adding the cost of one gigabyte fell from 9.8 per cent of per capita monthly GDP in 2013 (roughly USD 12.45) to 0.37 per cent in 2017 (the equivalent of a few cents).

According to market research firm techARC, India had 502.2 million smart phone users as of December 2019, which means over 77 per cent of Indians are now accessing wireless broadband through smart phones. Samsung with 34 per cent led the smart phone installed base in the calendar year 2019, followed by Xiaomi at 20 per cent, Vivo at 11 per cent and OPPO at 9 per cent, respectively. Factors like availability of good-quality affordable smart phones, expansion of online as well as offline channels, expansion of 4G/LTE networks by the operators are among the key reasons driving the smart phone user growth. Jio mobile services were launched on 27 December 2015 with a beta for partners and employees and became publicly available on 5 September 2016. As of 31 December 2019, it is the largest mobile network operator in India and the third largest mobile network operator in the world with over 387.5 million subscribers. The 4G services were launched internally on 27 December 2015. The company commercially launched its 4G services on 5 September 2016, offering free data and voice services till December 31, which was later extended till March 31, 2017. Within the first month, Jio announced that it had acquired 16 million subscribers. Jio crossed 50 million subscribers marked in 83 days since its launch, subsequently crossing 100 million subscribers on 22 February 2017. By October 2017 it had about 130 million subscribers.

The special features of participation, openness, conversation, community and connectedness makes social media a unique user experience (Mayfield, 2008). Facebook has 300 million active users in India, YouTube gets more than 50 million creator each 265 million active users, WhatsApp has 340 million users in India alone and the highest monthly active users in the world India was ranked second with 100 million Instagram user platform reported one billion monthly active users in June 2018. As of July 2020, LinkedIn had an audience reach of 170 million users in the United States. The country is by far the leading market of the professional job networking service, with runner-up India only accounting for an audience of 68 million. India ranked in second place with a Snapchat audience base of 33.8 million users. (www. statista.com, 2019)

The world combine spends 10 billion hours on social media per day with mean active users spending 2 hours and 29 minutes every day on different social media platforms. India with population over 1.3 billion has 1.06 billion mobile phone connections. The number of social media users in India are 450 million as in 2020 and 467.0 million in January 2022 (Digital 2022). WhatsApp is the most used social media with 53 crore active users followed by YouTube (448 million) and Facebook (41 million). Instagram, Twitter and Telegram have 21 million, 4 million and 1.75 million active users respectively (Digital 2020). All these statistics prove the huge potential that social media can be for extension practitioners to reach out to the people. India is a huge market for social media that is constantly expanding into the rural areas and that improves the scope of reaching not only the farmers but the farm families and youth altogether for higher impact.

Social media can be advantageously used in agricultural extension, as discussed below (Saravanan *et al.*, 2015):

- Highly cost effective
- Simultaneously reaches large numbers of clients
- Location and client specific, problem-oriented
- User-generated content and discussion among the community members
- Easily accessed from mobile phones

### **Social media and extension**

The daily life of people are restructuring due to internet based services, instead of dividing them into on-line and offline experience. Rural people are using social media for connecting with friends and family, reading current news, to get information from peers. Connecting that to agriculture and leveraging it to bridge the farmer-extension gap can prove to be a boon to the agriculture sector and the farm families.

A thorough planning is needed before engaging online through social media, specifically about objectives, target audience, channels and approaches. Posting information at times when target

audience are most probably active online. Interacting in real time to keep the interest of the involved clients alive, sharing only relevant posts or information.

Focusing on specific platforms based on clients' preferences and engage them continuously rather than engaging in a number of platforms but failing to engage properly. Keeping holistic view in mind while sharing information rather than focusing on single enterprise as most smallholders have multiple enterprises on their farm. Tagging individual clients to whom the information might be specifically useful and share for all so that the intended audience receives it personally while others can also be benefited.

The citrus yield is projected to be 20.59 million tonnes (Table 1) with productivity of 15-16 tonnes/ ha by 2050. Accordingly, the per capita availability of citrus fruit will be 12.65 kg. But citrus cultivation in India is plagued with various problems due to limiting growing conditions, limiting water resources and high incidence of pests and diseases warranting great care from planting till the plants come to bearing in order to sustain a productive life of a minimum of 15-20 years. There is growing interest and awareness among the citrus growers for adoption of latest technologies for commercial cultivation of citrus.

**Table 1. Projected area and production of citrus in India**

Citrus type	Area (Lakh ha)			Production (Lakh tonnes)		
	1992-93	2010-11	2050	1992-93	2010-11	2050
Mandarin	1.66	3.24	4.80	13.40	32.55	72.00
Sweet orange	1.10	1.57	4.00	8.93	13.16	60.00
Acid lime and lemon	0.93	2.19	3.80	7.46	21.08	57.00
Other citrus fruits	0.17	1.46	1.70	3.90	7.90	16.90
<b>Total</b>	<b>3.86</b>	<b>8.46</b>	<b>14.30</b>	<b>33.69</b>	<b>74.69</b>	<b>205.90</b>

(Source: Ladaniya, 2015)

The Mandarin orange (*Citrus reticulata*) is a tropical and sub-tropical tree belonging to the family *Rutaceae*. The orange was likely to have been

named mandarin because it was introduced to the West by China. “Mandarin” was an English reference for Chinese government officials. The mandarin group includes all type of loose jacket oranges commonly called by the Indian name santra such as Nagpuri santra, khasi orange and desi type orange. The mandarin is locally knows as “Nagpuri santra” has reputation and it is the best of its kind grown in India. An orange fruit is good source of vitamins and minerals. It is very rich in vitamin C (ascorbic acid), fruit sugars and in addition to this it also contains vitamin A and B. In 2017, 73 million tonnes of oranges were produced worldwide, with Brazil producing 24 per cent of the world total, followed by China and India.

**Table 2. Production of orange crops in world (Year: 2017-18)**

Sl.No.	Name of country	Production (million tonnes)
1	Brazil	17.46
2	China	8.69
3	India	7.65
4	Mexico	4.63
5	United States	4.62
6	Spain	3.36
7	Egypt	3.01
<b>World</b>		<b>73.31</b>

(Source: FAOSTAT, 2017)

Orange (*Citrus reticulata*) is most common among citrus fruits grown in India. It occupies nearly 40 percent of the total area under citrus cultivation in India. Nagpur mandarin is one of the best mandarins in the world. Orange is rich in vitamin A, B, C and phosphorus. Orange is consumed fresh or in the form of juice, jam, squash and syrup. It is the main source of peel oil, citric acid and cosmetics which have international market value.

The state-wise area, production and important Mandarin orange varieties grown in India are as under.

**Table 3. Area and production of orange crops in India**

(Year: 2017-18 Area in '000 Ha and Production in '000 MT)

Sl.No.	State/UTs	Kinnow /Mandarin Orange	
		Area	Production
1	Arunachal Pradesh	11.924	57.272
2	Assam	17.557	236.404
3	Jammu and Kashmir	1.150	2.054
4	Karnataka	0.580	9.200
5	Madhya Pradesh	120.518	2039.820
6	Maharashtra	107.303	836.866
7	Manipur	9.817	96.992
8	Mizoram	0.016	0.041
9	Nagaland	6.535	53.417
10	Punjab	41.937	988.030
11	Sikkim	13.072	19.556
12	Tamil Nadu	1.603	4.917
13	Telangana	0.329	4.821
14	Tripura	6.342	29.381
	<b>All India Total</b>	<b>338.683</b>	<b>4378.771</b>

(Source-HAPIS, 2017)

Maharashtra is the one of the largest producer of orange in the country. The Nagpur mandarin orange is one of the most important fruit crops of Maharashtra. The famous Nagpur orange (mandarin) is grown in humid tropical Vidarbha region of Maharashtra where summer temperature reaches as high as 45-46<sup>0</sup>C. It is a glorious natural gift to Vidarbha region of Maharashtra covering district Amravati, Nagpur, Wardha, Yavtmal and Akola. But the Amravati and Nagpur district contributes about 84.00 percent of total area under orange orchards in Maharashtra state.

**Table 4. District wise area and production of orange crops in Maharashtra**

(Year: 2017-18 Area in '000 Ha and Production in '000 MT)

Sl. No.	Districts	Mandarin Orange	
		Area	Production
1	Ahmednagar	1.860	10.080
2	Akola	4.582	54.984
3	Amravati	70.660	570.800
4	Aurangabad	0.027	0.270
5	Beed	0.111	0.786
6	Bhandara	0.043	0.210
7	Buldhana	1.500	15.092
8	Chandrapur	0.005	0.024
9	Gondia	0.000	0.002
10	Hingoli	0.557	5.764
11	Jalgaon	0.013	0.090
12	Latur	0.009	0.072
13	Nagpur	19.976	109.873
14	Nanded	0.075	2.925
15	Nandurbar	0.005	0.043
16	Nashik	0.015	0.105
17	Palghar	0.002	0.011
18	Parbhani	0.660	5.478
19	Satara	0.014	0.143
20	Thane	0.000	0.000
21	Wardha	3.700	25.900
22	Washim	2.000	22.000
23	Yavatmal	1.490	12.216
	<b>State Total</b>	<b>107.303</b>	<b>836.866</b>

(Source-HAPIS, 2017)

The present study was conducted in Amravati and Nagpur district where orange is grown on large scale. This study is essential to know attitude and impact of social media on orange growers. This study

would be helpful to the extension worker to solve the problems regarding use of social media uses in agriculture.

### **1.3 Objectives of the study**

The following specific objectives were studied,

1. To study the personal, socio-economic, communicational and psychological characteristics of orange growers
2. To study the utilization pattern of social media by orange growers
3. To develop and standardize attitude scale for measurement of attitude of orange growers towards social media
4. To measure the attitude of orange growers towards social media
5. To study the impact of social media on orange growers
6. To study the relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with attitude and impact of social media on orange growers
7. To study the constraints faced by orange growers in use of social media and suggestions obtained from orange growers to overcome the constraints
8. To identify the reasons behind the fruit drop in oranges and removal of orchards as perceived by orange growers

### **1.4 Hypothesis**

Keeping the objective of study in view, the following research hypothesis was framed on the different aspects of the study, while formulating the hypothesis, the nature of relationship between the variables was determined on the basis of review of literature. The hypothesis was set up and presented as follows,

H<sub>1</sub> = There is significant relationship between the selected characteristics of orange growers with attitude and impact of social media on user and non user orange growers.

$H_0$  = There is no significant relationship between the selected characteristics of orange growers with attitude and impact of social media on user and non user orange growers.

### **1.5 Scope and limitations of the study**

The present study is an effort to evaluate impact of Social Media i.e., Whatsapp, YouTube, Internet, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others. on orange growers, which was restricted to the area in Amravati and Nagpur district of Vidarbha region in Maharashtra state. Impact of social media was measured as social media user and social media non user orange growers, about attitude as intervening variables and per cent change in knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence of the orange growers as a dependent variable. For the study personal, socio-economic, communicational and psychological profile of orange growers was considered.

1. The study was conducted only in two districts namely, Amravati and Nagpur. This being the student's research project time, money and other resources do not permit to cover large area for the study.
2. Due to limited resources, 300 respondents were selected for the study. Hence conclusion drawn on the basis of the study could not be generalized and made applicable to the larger area.
3. The findings of the study were based on the responses expressed by the respondents therefore; the objectivity of the data would be limited to the opinions expressed by the respondents.
4. The study was conducted in Amravati and Nagpur district. Hence, the findings of the study were applicable in any other area having similar social and economical conditions but its applicability in the other area would be limited.

Despite all the above limitations, strong and best efforts were made to collect the relevant data for the comprehensive study of effect of social media in the study area.

## **1.6 Organization of thesis**

The present research on Impact of Social Media on Orange Growers has broadly been presented in seven chapters as per the thesis manual prescribed by the university with respective nomenclature sequentially as Introduction, Review of Literature, Methodology, Results and Discussion, Summary and Conclusion, Implications and Literature Cited at the end.

The first chapter is “Introduction” in which the statement of the problem as a framework of the topic under study has been introduced, the importance and need of the study, the specific objectives, hypothesis and scope and limitation of the study has been presented. The second chapter namely “Review of Literature”, comprises review of relevant literature and findings of various past research studies conducted in different locations on the similar topics. The findings that emerged out after the investigation concluded by the researchers in the past have been categorically presented. An attempt has been made to analyze the trend of findings. The conceptual model was developed for the present study and presented in this chapter.

“Methodology” is the third chapter which deals with research methods, techniques and tools used for measuring variables their categorization. It included aspects such as locale of study, description of the study area, research design, sampling procedure, variables included in the study and their quantification strategy employed to analyze the impact of social media on orange growers and statistical means used for the analysis of data.

The fourth chapter is “Results and Discussion”, devoted to the results of the present study and relevant discussion thereon. The findings that emerged out of the present investigation have been suitably presented in tables and data depicted have been appropriately interpreted and briefly

discussed for appropriateness in this chapter. The findings presented have been supported with findings either similar or contradictory as the case may be, obtained by the researchers in past. The readability of the documented data has been enhanced by transforming into proper figures, graphs and charts. "Summary and Conclusion" is the fifth chapter which included not only the results of investigation but also summarization of other details and suitable conclusions drawn based on the obtained results.

Summary and Conclusion is followed by sixth chapter "Implications". On the basis of the findings of present investigation, implications emanated have been presented in two parts implication for research and implication for action. The implications concerning the research included suitable guidelines and suggestions for further research based on experiences during conducting the study and conclusions. The implications for action are connected with the guidelines and suggestions for the administrators and policymakers and other related individuals of the extension system. Last seventh chapter is "Literature Cited", finally Vita and Appendix at the end.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

The main function of the review of literature was to make the research worker up-to-date with the ongoing research in the particular aspect of investigation. The meaning of literature is the writing or the study of books others. Literature helps to acquire general background knowledge in the given field of investigation. It provides valuable information, related to the objectives of the proposed research. A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. The purpose of a literature review is to gain an understanding of the existing research and debates relevant to a particular topic or area of study. A well- structured literature review is characterized by a logical flow of ideas, current and relevant references with consistent, appropriate referencing style, proper use of terminology and an unbiased and comprehensive view of the previous research on the topic. Keeping this in view, and based on the objectives set forth in this study an attempt was made in this chapter to present pertinent studies which had meaningful relations attempt to review the available literature, which has direct and indirect bearing on the topic and are presented under the following sub headings.

2.1 Reviews related to independent variables

2.2 Reviews related to intervening variable

2.3 Reviews related to dependent variable

2.4.1 Reviews related to relationship of independent variables and utilization pattern

2.4.2 Reviews related to relationship of independent variables and attitude towards social media

2.4.3 Reviews related to relationship of independent and dependent variable

2.4.4 Reviews related to multiple regression analysis

2.5 Reviews related to constraints

2.6 Reviews related to suggestions

2.7 Conceptual model of the study

## **2.1 Reviews related to independent variables, personal, socio-economic, communicational and psychological characteristics of the orange growers**

### **2.1.1 Education**

Bharti Patel (2015) in a study on utilization pattern of communication channels by the farmers of Sehore block of Sehore district revealed that higher proportion of the farmers 43.00 per cent were of primary and middle education group followed by higher education group 34.00 per cent and illiterate and formal education group 23.00 per cent, respectively.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) indicated that out of 120 respondents, 40.00 per cent were found to be high school level educated whereas, 24.17 per cent had middle school education, 18.33 per cent were educated up to graduate's level and remaining 17.50 per cent were primary group level.

Tekale and Mano (2016) studied entrepreneurial behavior of orange growers in Vidarbha revealed that 26.66 per cent of the respondents were educated up to higher secondary school, 22.50 per cent of the respondents were educated up to college level while 18.33 per cent of the respondents were educated up to middle school 16.67 per cent went to up to highschool, 08.33 per cent were educated up to primary schooling and 07.50 per cent of the respondents were illiterate.

Yogita Wankhade (2016) studied Soil testing status of orange orchards in Amravati district, found that, 35.00 per cent of the orange growers were educated up to higher secondary level, followed by 34.00 per cent of them were educated up to college level and 19.00 percent respondents were educated up to high school level, 11.00 per cent of them had middle school level education and only 1.00 per cent of them had primary school level education.

Kumar and Kumar (2018b) in the study of Impact of ICT on agricultural information access among farmers in Haryana revealed that 46.00 per cent of the respondents had 9<sup>th</sup> to 12<sup>th</sup> (Higher secondary school) standard educated followed by 23.00 per cent were graduate and 20.00 per cent had education up to 8<sup>th</sup> class, respectively.

Kumar *et al.* (2020) studied adoption of natural farming and it's effect on crop yield and farmers' livelihood in India reported that conspicuous number of the natural farmers are graduate or above (44.00%) and illiterates take a major share among non-natural farmers compared to natural farmers.

Ekhande *et al.* (2021) studied on profile of sweet orange growers in Maharashtra state stated that, 35.00 per cent of the respondents had higher secondary school level education followed by 23.33 per cent of the respondents had high school level education while 14.16 per cent of them were educated up to graduate level, 15.00 per cent of them had middle school level education, 8.34 per cent of them had post graduate level education while 1.67 per cent of the farmers were educated up to primary school and 2.50 per cent of them were illiterate.

Ghadge (2021) studied resource management behaviour of orange growers for production and marketing of oranges in Vidarbha revealed that, nearly one third (31.25%) of the orange growers were educated up to higher secondary school followed by 30.00,22.50,10.42 and 05.83 per cent who had passed college, high school , middle school and primary school education respectively.

Adhikari *et al.* (2022) studied farmers perception on pestilence and management of Chinese citrus fly, *Bactrocera minax* in citrus orchards of Nepal revealed that near about one forth 64.50 per cent of the respondents were educated up to 10<sup>th</sup> class, 18.40 per cent of them were educated up to 12<sup>th</sup> class similarly 9.80 per cent of the respondents were illiterates, whereas 5.90 per cent of them and 1.40 per cent were found to be graduate degree holders and masters degree holders, respectively.

Colussi *et al.* (2022) studied on how communication affect the adoption of digital technologies revealed that 39.70 per cent of the farmers were educated up to bachelor's degree whereas, 35.10 per cent of them were educated up to post graduate degree followed by 11.90 per cent of the farmers had high school diploma level education, 7.20 per cent of them were with unfinished bachelor's degree, 2.40 per cent of them had unfinished middle school education while 2.20 per cent of the farmers were educated with unfinished highschool level education and 1.5 per cent of them had middle school level diploma, respectively.

### **2.1.2 Family size**

Meena *et al.* (2012) in his studies on knowledge level and adoption pattern of rice production technology among farmers revealed that majority of the farmers belonged to large family size. This group constituted 63.00 per cent of the total sample and rest 37.00 per cent farmers were from small families.

Nguyen and Yapwattanaphuna (2015) study on banana farmers' adoption of sustainable agriculture practices in the Vietnam uplands: the case of Quang Tri Province revealed that mean household size was 5.4 members per household.

Sonal Gupta (2015) reported that 50.83 per cent of the respondents indicate medium size of family, 29.17 per cent small size of family, while only 20.00 per cent showed big family.

Tekale and Mano (2016) reported that 52.50 per cent of the respondent orange growers had medium family size followed by 35.00 per cent of them had small family size and 12.50 per cent of the respondents had large family size.

Kumar *et al.* (2019) in the study of reshaping the future of agriculture: A youth and social media perspective showed that 37.50 per cent of the farming youth belong to the category of those with up to 5 members and 6 to 8 members in their families, followed by 25.00 per cent belonging to the category of above 8 members. 42.5 per cent non-farming youths belong to large families with 5 to 6 members, followed by 35 per

cent in the category of above 6 members and 22.5 per cent to the category up to 4 members, respectively.

Singh and Kameshwari (2019) studied on relationship between characteristics of farmers and impact of ICT enabled web portal (Krishinet) observed that majority of the respondents (51.79%) had medium (8-11 members) size of family while 26.79 per cent of them had small (4-7 members) size of family and 21.42 per cent of the respondents had large (12-15 members) family size.

### **2.1.3 Occupation**

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models found that 71.70 per cent of the mobile users were full time farmers, whereas 28.30 per cent were engaged in farming and other activity, similarly 60 per cent mobile non users were full time farmers, while 38.30 per cent were engaged in farming and other occupations.

Sonam Agrawal (2015) in her study on impact of watershed development programme in income, employment generation and change in cropping pattern of the beneficiaries of Jabalpur district reported that higher 33.50 per cent of the beneficiaries had cultivation and caste occupation, followed by 24.00 per cent had cultivation and business, 18.50 per cent had only cultivation, 14.00 per cent had cultivation and labour, and 10.00 per cent had cultivation and service, respectively.

Darshan and Meena (2017) studied influence of socio-economic characteristics of farmers on their use of social media in Haryana revealed that 45.00 per cent of the farmers were practicing crop + dairy combination of occupation, followed by crop + dairy farming + business (22.50.00%) and then service + crop + dairy farming (20.00%) and crop only (12.50%), respectively.

Kumar (2018a) studied role of social media in dissemination of agricultural innovations in Haryana found that 75.00 per cent of the respondents were engaged in farming and only 25.00 per cent of the farmers had job or other business along with farming.

Vishakha Bansal and Vandana Joshi (2019) studied socio economic characteristics of farmers regarding use of ICT tools revealed that 42.00 per cent of the respondents had their own business as a main occupation followed by 40.00 per cent of them had farm allied occupation and 18.00 per cent of them had farming as a main occupation. In case of subsidiary occupation 82.00 per cent of the farmers had farming as a main occupation whereas 10.00 per cent of them were engaged in business as their main occupation and only 8.00 per cent of the farmers had service as a main occupation.

Ghadge (2021) studied resource management behaviour of orange growers for production and marketing of oranges in Vidarbha revealed that three-fourth (73.33%) of the orange growers had the agriculture as a main occupation followed by 09.58 per cent orange growers had agriculture + business and 07.50 per cent orange growers had agriculture + subsidiary occupation. Only 06.67 per cent orange growers doing agriculture as well as service and 02.92 per cent orange growers having agriculture + labour as a occupation.

#### **2.1.4 Land holding**

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) depicts that out of the 120 respondents, 45.83 per cent indicate medium land holding, 30.00 per cent small land holding, while only 24.17 per cent showed big land holding.

Kanchan Kadu (2016) studied knowledge and adoption of improved technologies by orange growers reported that, higher percentage (41.00 %) the orange growers were found in semi-medium land holding category, 36.00 per cent were in small land holding category whereas, medium land holding possessed by 16.00 per cent of the respondents. While 5.00 per cent of the respondents were from large land holding category and only 2.00 percent from marginal land holding..

Dhumale (2017) studied constraints in production and marketing of oranges found that, 45.84 per cent of orange growers were in

semi-medium land holding category, 30.00 percent found in medium land holding category and 15.83 percent orange growers possess small land holding.

Yogita Wankhede (2016) studied soil testing status of orange orchards in Amravati district reported that, 41.00 per cent of the respondents had semi-medium (2.01 ha to 4.00 ha) land holding, followed by 36.00 per cent farmers possess small (1.01 to 2.00 ha) land holding. Whereas, 16.00 per cent of the farmers were found in medium (4.01 to 10.00 ha) land holding group, followed by 05.00 per cent of the farmers were found in big (above 10.00 ha) land holding category and only 02.00 per cent possessing marginal (up to 1.00 ha) land holding.

Anushree Baruah (2018) studied the farmers' view towards the use of information and communication technology in agriculture reported that majority (50.00 %) of the respondents had small size of land, 20.00 per cent of the farmers were landless, 17.00 per cent of the farmers were marginal, 09.00 per cent of the farmers had medium size of land and only 04.00 per cent of the farmers had large size of land.

Singh *et al.* (2019) observed that, 30.50 per cent of the citrus estate societies beneficiaries were falling under semi medium (5 to 10 acres) operational land holding followed by 29.5 per cent respondent beneficiaries having small (2.5-5.0 acres) operational land holding. While 15.5 per cent of the respondent beneficiaries were falling under medium (10 to 25 acres) operational land holding, whereas 13.5 per cent and 11.0 per cent had marginal (< 2.5 acres) and large (> 25 acres) operational land holding respectively.

Tekale *et al.* (2019) studied on Role of mobile agro advisory services in enhancing farmers return concluded that 55.00 per cent of the respondents had semi-medium land holding followed by 20.00 per cent of them had small size of land holding followed by 19.17 per cent of them had medium land holding and 5.83 per cent of them had marginal land holding.

Ghadge (2021) revealed that, 29.58 per cent of orange growers were semi-medium farmers, one fourth (25.42 %) orange growers

were medium farmers, 22.08 per cent orange growers were small farmers and 16.67 per cent orange growers were marginal farmers. Only few (06.25 %) per cent orange growers were large farmer.

Kamatar *et al.* (2021) studied on profile characteristics of progressive and non progressive sugarcane growers showed that 71.66 per cent of the progressive farmers were small farmers having land holdings in between 5.01-25.00 acre whereas 28.33 per cent of them were marginal farmers having land size in between 2.5-5.00 acre and 16.67 per cent of them were big farmers having land holdings above 25.00 acre. In case of non progressive farmers, 61.66 per cent of them were small farmers having land holdings in between 5.01-25.00 acre whereas 48.33 per cent of them were marginal farmers having land size in between 2.5-5.00 acre and none of them were big farmer.

#### **2.1.5 Size of orchard**

Kanchan Kadu (2016) studied knowledge and adoption of improved technologies by orange growers observed that majority (75.00%) of the respondents had small size of orchard (up to 2.00 ha) whereas, 22.00 per cent respondents had medium size of orchard (2.01 to 3.00 ha) followed by only 3.00 per cent of the respondents were possessed large size of orchard (above 3.00 ha) under cultivation of orange crop.

Yogita Wankhede (2016) in study of soil testing status of orange orchards in Amravati district pointed out that more than three fourth (84.00 %) of the orange growers had area under orange orchards up to 02.00 ha followed by 11.00 per cent growers had area between 2.01 to 4.00 ha and remaining 05.00 per cent had area above 4.01 ha under orange orchards

Dhumale (2017) studied constraints in production and marketing of oranges showed that majority (56.66 %) of the respondents had medium size of orchard (1.01 to 03.00 ha) whereas, 25.83 per cent respondents had small size of orchard (up to 01.00 h) and 17.51 per cent of the respondents had large size of orchard (above 3.00 ha) under cultivation of orange crop.

Ghadge (2021) studied resource management behaviour of orange growers for production and marketing of oranges in Vidarbha showed that, majority of orange growers (67.50 %) had small size of orchard whereas 16.67 per cent orange growers had big size of orchard and 15.83 percent of orange growers had medium size of orchards.

### **2.1.6 Farming experience**

Kachave (2012) studied on adoption gap in sweet orange production practices reported that, 65.00 percent of the sweet orange growers were in medium category of 12 to 22 years of farming experience.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) concluded that nearly half of the respondents, 48.33 per cent possessed medium farming experience, 26.67 per cent high farming experience and remaining 25.00 per cent indicate low farming experience.

Khou and Kishore (2018) studied on the role of social media mobile applications and it's impact on agricultural marketing in Puducherry region concluded that 46.00 per cent of the respondents had medium (10-15 years) experience in cultivation

Anushree Baruah (2018) studied the farmers' view towards the use of information and communication technology in agriculture: A study among the farmers in the NER (North Eastern Region) of India found that a bulk of respondents (46.00%) had work experience ranging between 11-20 years, 37.00 per cent of the respondents having 1-10 years of farming experience while 17.00 per cent of the respondents had above 20 years of farming experience.

Kumar and Kumar (2018b) in study of impact of ICT on agricultural information access among farmers in Haryana reported that almost 55.00 per cent of the farmers had spent more than 15 years, 24.00 per cent of the farmers had below 5 years of experience, 16.00 per cent of the farmers had 6-10 years of farm experience and only 05.00 per cent of the farmers had experience in agriculture sector for their earning and livelihood.

Girei *et al.* (2020) studied on Assessing performance of orange marketing in Lafia metropolis revealed that 52.50 per cent of the respondents had experience of 1-5 years followed by 32.5 per cent of them had 6-10 years of experience, 11.2 per cent of the orange marketers had 11-15 years of experience while 3.8 per cent of the respondents had 16-20 years of experience.

Ghadge (2021) studied resource management behaviour of orange growers for production and marketing of oranges in Vidarbha concluded that, nearly half (48.33%) of the orange growers had high experience in orange cultivation followed by 32.92 per cent orange growers had medium experience in orange cultivation and 18.75 per cent had low experience in orange cultivation.

Pranali Thakare (2021) studied impact of jalyukt shivar campaign on beneficiary farmers reported that over two fifth of the respondents (41.88%) had 20 to 31 years of experience in farming, followed by 30.63 per cent of them had up to 19 years of farming experience. Remaining 20.31 per cent of respondents had 32 to 43 years of farming experience, followed by 07.18 per cent of the respondents had above 43 years of farming experience.

### **2.1.7 Social participation**

Uma Sah *et al.* (2007) Changing the Cognitive and Affective Domains of Women Dairy Farmers: Impact of Training Intervention observed that 82.50 per cent of the respondents had no social participation.

Gavit (2013) studied utilization of information sources by orange growers revealed that two fifth of the respondents (45.00%) had belonged to medium category of social participation. This was followed by 40.00 per cent of the respondents who had occupied low level of social participation and least of the respondents (15.00%) were belonged to high social participation category.

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models showed that majority of the community radio listeners (76.66%) had

membership in one organization and only 6.66 per cent of the respondents had no membership in any organization. More than half of the non listeners (51.11%) didn't have membership in any organization and around 35.55 per cent were found to be members in one organization. Equal percentage of respondents (6.66%) had membership in more than one organization and office bearers in any one organization.

Mano (2016) in his study on entrepreneurial behaviour and knowledge on export standard by orange growers in Vidarbha reported that two fifth of the respondents (46.67%) had belonged to medium category of social participation, followed by 32.50 per cent who had occupied low level and least of the respondents (20.83%) were belonged to high level of social participation.

Kumar *et al.* (2019) in study of reshaping the future of agriculture: A youth and social media perspective revealed that 100 per cent of the farming youth were involved in religious groups followed by age-grades (10%) and no farming youth is interested or involved in young farmers' organizations. Surveys shows that the farming youth were not involved or interested in the young farmer's organizations, so it can be stated that if they are not involved in any organization, then how can they get new information So involvement of the farming youth in NGOs and other organizations is a must, to change the present scenario.

Vishakha Bansal and Vandana Joshi (2019) studied socio economic characteristics of farmers regarding use of ICT tools observed that 92.00 per cent of the respondents never participated in grampanchayat whereas only 8.00 per cent of them participated in grampanchayat regularly. In case of zilapanchayat, 44.00 per cent of the farmers had never participated in any organization whereas 36.00 per cent of them regularly participated in zilapanchayat and 20.00 per cent of the respondents occasionally participated in zilapanchayat.

### **2.1.8 Annual income**

Sorate (2011) studied technological gap in cultivation of grape in Buldana district observed that, large majority of the grape growers (89.00 %) had annual income up to Rs.845666.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (MP) reported that out of 120 respondents the majority i.e. 49.17 per cent showed low annual income, 29.17 per cent medium annual income and remaining 21.66 per cent indicate high annual income.

Kumar *et al.* (2019) studied reshaping the future of agriculture: A youth and social media perspective revealed that maximum number of the respondents (77.50%) belong to the category with annual income up to Rs 2,45,000, whereas 12.00 per cent and 10 per cent of the respondents belonged to the income range of above Rs 3,36,000 and between Rs 2,45,001 to Rs 3,36,000, respectively. It can be said that the maximum respondent had the annual income up to Rs 2,45,000/-.

Saryam and Jirli (2020) studied on socio economic status of orange farmers in Chindwara district of Madhya Pradesh (MP) revealed that 67.00 per cent of the respondents had medium annual income (Rs. 100001/- to Rs. 200000/-) followed by 24.00 per cent of them had annual income less than Rs. 100000/- and 9.00 per cent of them had annual income above Rs. 200000/-

Ekhande (2021) studied on profile of sweet orange growers in Maharashtra state observed that 74.16 per cent of farmers had medium level of annual income whereas 13.34 per cent of them had high annual income and 12.50 per cent of them had low annual income.

Kamatar *et al.* (2021) studied on profile characteristics of progressive and non progressive sugarcane growers indicated that 41.66 per cent of the progressive farmers had medium (Rs. 7,21,278/- to Rs. 50,41,797/-) annual income followed by 36.67 per cent of them had high (Above Rs. 20,41,797/- ) annual income and 21.66 per cent of them had low (Up to Rs. 7,21,278/-) annual income. In case of non progressive farmers, 65.00 per cent of the respondents had low (Up to Rs. 7,21,278/-)

annual income whereas 35.00 per cent of them had medium (Rs. 7,21,278/- to Rs. 50,41,797/-) annual income and none of them had higher annual income.

### **2.1.9 Availability of social media**

Muhammad *et al.* (2004) showed that majority of the respondents do not watch these telecast, most of the viewers regularly watch Haryali than Kisan Time, most of the viewers regard the telecasts as informative and interesting, a relatively low number of respondents perceive the contents of the telecast as useful, practicable and timely and most of the respondents perceive the presentation style of the telecast as highly impressive.

Banmeke and Ajayi (2008) studied Farmers' perception of the agricultural information resource centre, found that respondents mostly used information board, video presentation and the radio programme at the centre. The most frequently sought information is on fertilizer application, harvesting methods and market information.

Emmanuel (2010) revealed that among the rice farmers, radio was used by 83.00 per cent, TV was used by 39.00 per cent farmers and mobile phones were used by 55.00 per cent of the respondents.

Hasan and Sharma (2011) reported that 90.00 per cent of urban women read newspaper for taking information, news and for the entertainment. Almost 65.00 per cent of the respondents read magazine sometimes and 10.00 per cent of them read it regularly.

Sharma (2012) reported in the study of mass media utilization pattern of farm women that majority of the respondents (60.00%) possessed radio sets. Only 25.00 per cent of respondents subscribe newspapers (Danik Bhaskar) of Hindi language, 30.00 per cent had TV and only doordarshan channel was available. Magazine was not subscribed by any respondent as they were very busy in their farm and home from morning to evening. The respondents reported that they were illiterate and they can't make use of them.

Darshan and Meena (2017) studied influence of socio-economic characteristics of farmers on their use of social media in Haryana found that (100.00%), (47.50%), (5.00%), (90.00%), (77.50%), (15.00%) and (12.50%) farmers possessed TV, radio, computer, mobile, smart phones, laptops and tablets, respectively.

Kumar *et al.* (2017) studied availability of information and communication technologies (ICT) tools usage by farmers in Haryana reported that availability of mobile among the farmers was found 100 per cent while television 60 per cent, FM/Radio 29.58 per cent, Internet 24.17 per cent, whatsapp 19.17 per cent, respectively. Mobile camera was found 14.17 per cent followed by facebook (7.91%), YouTube (06.25%), Computer (05.42%), E-mail (04.58%), E-book (02.50%) and CD/VCD (01.66%) available/access by the farmers.

Mishra (2022) studied social media use profile of farmers in Haryana revealed that majority of the respondents had (69.00%) used social media at medium level followed by 18.50 per cent of them had high use of social media and 12.50 per cent of them had low use of social media respectively.

Ayushi Pal and Kameshwari (2022) studied knowledge level of farmers towards use of social media for seeking agricultural information: A study in Udham Singh Nagar District of Uttarakhand observed that 100 per cent of the farmers had ownership of television and mobile phone while 53.77 per cent of them had ownership of newspaper, 50.00 per cent of them had computer with internet and 4.72 per cent of farmers had radio ownership.

#### **2.1.10 Source of information**

Bharti Patel (2015) studied utilization pattern of communication channels by the farmers of Sehore block of Sehore district, out of total farmers utilizing communication channels, the higher proportion of the farmers 47.00 per cent were of medium information seeking behaviour group, followed by low information seeking behaviour group

31.00 per cent and high information seeking behaviour group 22.00 per cent, respectively.

Harneet Kaur (2016) studied role of social media (YouTube) in promoting agri-business in Punjab reported that 68.00 per cent of the respondents were using mobile phone as primary source of using YouTube followed by personal computer that is 32.00 per cent, respectively.

Rana and Parihar (2019) reported that, majority of the mango growers in Jammu district (85.00 %) had contact with Horticulture department, 15 per cent mango growers had contact with fellow farmers and neighbors.

Singh *et al.* (2019) studied extent of adoption of the recommended citrus production practices by the beneficiaries of citrus estates in Punjab reported that, 45.5 per cent of all the respondent beneficiaries had medium level of mass media exposure followed by 41.0 per cent having high level mass media exposure. Only 13.5 per cent of the respondent beneficiaries had low level of mass media exposure.

Reddy *et al.* (2020) found that, majority of the respondents (48.33%) had high information acquisition behaviour followed by medium (30.83%) and low (20.83 %) information acquisition behaviour. He also reported that progressive/experienced farmers of same village, neighbours and local input dealers were the popular personal-localite channels of acquiring information regularly; whereas farm telecasts followed by agricultural exhibitions and kisan melas were the regularly utilized impersonal cosmopolite channels by the respondents for the information acquisition.

Saryam and Jirli (2020) studied on socio economic status of orange farmers in Chindwara district of Madhya Pradesh evident that information sources of respondents from mass media exposure of information, respondents were regularly in contact with television (63.00%), krishi melas (51.50%), exhibition (43.5%), news (41.00%), smart phone (38.00%), magazine, leaflets, bulletins (27.00%), radio (25.50%), internet (15.50%), film regarding fruit farming (15.00%) and folk media (9.00%) for

contacted with obtaining orange orange production and agricultural information and had medium to high utilization of mass media sources.

Pranali Thakare (2021) studied impact of jalyukt shivar campaign on beneficiary farmers reported that majority of the respondents (62.50%) were using medium sources of information, followed by 21.25 per cent of the respondents used low level of sources of information, remaining 16.25 per cent respondents were using high number of sources of information.

### **2.1.11 Innovativeness**

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models revealed that more than one- third of the community radio listeners (36.66%) were less innovative, followed by medium level of innovativeness (23.33%), very low level of innovativeness (16.65%), highly innovative (12.22%) and very highly innovative (11.11%). While non listeners were found to be in the order of less innovative (28.88%), very low level of innovativeness (26.66%), higher innovativeness (20.00%), medium level of innovativeness (15.55%) and very highly innovative (8.88%), respectively.

Jijina (2016) studied social media and farmers in Kerala found that there has been cent per cent increase in the past year in rural social media users in India and many reported going online only to join social media. Farmers are becoming more and more innovative in using social media and selfies or farming selfies trending across social media platforms, farming selfie.com.

Mano (2016) in his study on entrepreneurial behaviour and knowledge on export standard by orange growers in Vidarbha found that majority of the respondents (62.50%) had medium level of innovativeness, followed by 21.67 per cent and 15.83 per cent who belonged to high and low level of innovativeness category, respectively.

Neethi and Sailaja (2018) studied relationship of farmers profile with utilization of extension services concluded that majority

(56.67%) of the respondents had medium innovativeness followed by low (25.00%) and high (18.33%) respectively.

Ghadge (2021) concluded that higher percentage (44.58%) of orange growers belonged to medium level of innovativeness, followed by high level of innovativeness to the extent of 35.00 per cent. The 20.42 per cent of orange growers belonged to low level of innovativeness.

Ayushi Pal and Kameshwari (2022) concluded that 80.19 per cent of the farmers had medium level of innovativeness followed by 17.92 per cent of them had high level of innovativeness whereas 1.89 per cent of them had low innovativeness.

### **2.1.12 Risk orientation**

Dhakar *et al.* (2013) conducted study in Rewa district utility perception of farmers in relation to modern mass media under information communication technology in Rewa district of MP to about 50.00 per cent of the respondents had higher level of risk orientation and 49.60 per cent had medium level of risk orientation.

Kanchan Kadu (2016) studied knowledge and adoption of improved technologies by orange growers majority (72.00%) of respondents had medium level of risk orientation, while 16.00 per cent who were under low category of risk orientation whereas, 12.00 per cent respondents were under high category.

Kumar *et al.* (2019) in study of reshaping the future of agriculture: A youth and social media perspective found that the majority (77.50%) of the farming youth through there was a high level of risk involved in the social media usage, while 15 per cent and 7.50 per cent of the farming youth felt there was low and medium level of risk involved in the social media usage. Majority of the farming youth thought about social media usage in farming as risky due to lack of proper knowledge of social media use, and therefore, to increase the involvement of the youth in social media first, there is a need to improve their education level of this particular area.

Tekale *et al.* (2019) studied on role of mobile agro advisory services in enhancing farmers return concluded that 54.17 per cent of the respondents had medium risk performance followed by 24.16 per cent of them had high risk performance and 21.67 per cent of the respondents had low risk performance.

Ghadge (2021) studied resource management behaviour of orange growers for production and marketing of oranges in Vidarbha reveal that majority (47.92 %) of the orange growers had medium level of risk orientation, whereas, 31.66 per cent and 20.42 per cent belonged to high and low category of risk orientation.

### **2.1.13 Market orientation**

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models that more than half of the community radio listeners (54.44%) had medium level of market orientation, followed by higher market orientation (21.11%), low level of market orientation (15.55%), very low level of market orientation (6.66%) and very high market orientation (2.20%). While, the distribution of the non-listeners based on market orientation were in the order of medium level of market orientation (53.33%), very low market orientation (17.77%), high market orientation (15.55%), very high market orientation (8.88%) and low level of market orientation (4.44%). Similarly majority of the mobile advisory users had high level of market orientation (45.55%) followed by medium level of market orientation (30%), low level of market orientation (12.76%), very high market orientation (6.66%) and very low market orientation (5%). Whereas the distribution of non-listeners based on market orientation were in the order of medium level of market orientation (62.50%) followed by high level of market orientation (17.50%), very high level of market orientation (09.16%), low level of market orientation (6.66%) and very low level of market orientation (4.16%), respectively.

Neethi and Sailaja (2018) studied relationship of farmers profile with utilization of extension services indicated that majority (45.83%)

of the respondents had medium level of market orientation followed by high (30.83%) and low (23.33%) levels, respectively.

Ekhande (2021) studied on profile of sweet orange growers in Maharashtra state revealed that 65.00 per cent of the respondents had medium market orientation followed by 19.16 per cent of them had high market orientation and 15.84 per cent of the respondents had low market orientation.

#### **2.1.14 Utilization pattern of social media by orange growers**

Shrinivas (2013) studied on critical analysis on effectiveness of diploma in agricultural extension service for input dealers programme in Andhra Pradesh concluded that 46.70 per cent of DAESI dealers had medium mass media utilization followed by 33.30 per cent and 20.00 per cent DAESI dealers had low and high mass media utilization respectively.

Tekale (2013) studied utilization of information sources by orange growers it showed that 73.00 per cent respondents had medium level of utilization of information sources and 18.00 per cent respondents had low level of utilization of different information sources

Meshram *et al.* (2014) in study on utilization of need based agricultural and allied technologies through kisan mobile advisory services among the farmers in Umaria district of (MP) observed that utilization of messages on the aspect of applicability of message was found to be maximum as indicating the utilization index- 87.50, followed by understandability of message, need based message and time based message. Out of 120 respondents i.e. 42.50 per cent indicate medium utilization of kisan mobile advisory services, followed by 34.17 per cent high utilization of kisan mobile advisory services. It is evident from the data that 23.33 per cent respondents showed low utilization of kisan mobile advisory services.

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models reported that 41.66 per cent of the mobile advisory beneficiaries expressed medium level of extent of utilization of the services, while

community radio beneficiaries (35.55%) showed lower level of extent of utilization.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (MP) reported that majority of the respondents i.e. 43.33 per cent indicate medium extent of utilization of ICTs followed by 35.00 per cent high extent of utilization of ICTs. It is evident from the data that 21.67 per cent respondents showed low extent of utilization of ICTs.

Shiby and Shetty (2017) studied the influence of mass media on the access and utilization of agricultural information revealed that 86.60 per cent of the respondents had less utilization of agricultural information whereas 6.8 per cent of them had medium utilization followed by 4.00 per cent of them had no utilization and 2.4 per cent of them had high utilization of agricultural information by means of mass media.

Chinmayee Jally (2018) Studied on impact of the diploma in agricultural extension services for input dealers (DAESI) in Odisha reported that 85.00 per cent of the DAESI input dealers had medium to high level of mass media utilization whereas non – DAESI dealers had medium to low (83.33%) mass media utilization. 75.86 per cent of total dealers had medium level of mass media utilization followed by low (15%) and high (9.14%) respectively.

Neethi and Sailaja (2018) studied relationship of farmers profile with utilization of extension services concluded that majority (62.50%) of the respondents had medium utilization of DAATTC services followed by high (20.00%) and low (17.50%) utilization of DAATTC services.

Ekhande (2021) studied on profile of sweet orange growers in Maharashtra state reported that 74.16 per cent of the respondents belonged to medium mass media use. Whereas, 12.50 per cent and 13.34 per cent of them belonged to low and high mass media use category respectively.

Jat *et al.* (2021) studied use of ICTs by tribal farmers for obtaining agricultural information in Southern Rajasthan revealed that 59.37 per cent of the respondents had moderate use of ICT tools for information seeking behavior followed by 23.75 per cent of them had less use of IC tools and 16.88 per cent of them had high use of ICT tools like television, radio, e-literature, touch screen computer, mobile phones, Internet, e-choupal, video conference, e-mail, expert system, multimedia teleconference, e- learning and CD/DVD, others for seeking agricultural information.

Kaur *et al.* (2021) studied on use of social media by farmers of Uttarakhand revealed that WhatsApp was used by maximum number of farmers (97.39%) followed by Facebook (76.61%) and YouTube (67.51%). On the other hand, Twitter was used by least number of farmers (6.48%). majority of the farmers (66.23%) were using WhatsApp frequently. 23.37 per cent of the farmers were using WhatsApp sometimes and 7.79 percent of the farmers were using WhatsApp rarely. It was also found that only 2.59 percent of the farmers were not using WhatsApp even though they had smart phone. 38.96 percent farmers were using Facebook frequently followed by 25.97 percent farmers who were using Facebook sometimes and 11.68 percent of the farmers were using Facebook rarely. Further, 23.37 percent of the farmers were not having Facebook account. Maximum numbers of the farmers (40.25%) were using YouTube frequently, 22.07 percent of the farmers were using YouTube sometimes and 5.19 percent of the farmers were using it rarely. A substantial number of farmers (32.49%) did not access YouTube. Majority of the farmers (64.95%) did not have an email account. This was due to the fact that most of the farmers belonged to the age group of 33- 55 years. It was seen that 15.58 percent of the farmers were using email account sometimes; followed by 12.98 percent farmers who were rarely using email and only 6.49 percent of the farmers were using email accounts frequently. Majority of the farmers (83.11%) never used any agricultural websites and portals because they lack awareness about the websites and portals. Language also acted as a barrier as most of these sites are in

English language. It was found that 12.98 percent of the farmers were using agricultural websites and portals sometimes, 2.59 percent of the farmers were using it rarely and only 1.29 percent farmers used agricultural websites/portals frequently.

Mishra *et al.* (2022) reported that 69.00 per cent of the respondents belonged to medium category with respect to overall use of social media whereas 18.50 per cent of them belonged to high (18.50%) category and 12.50 per cent of them had low use of social media.

## **2.2 Reviews related to intervening variable**

### **2.2.1 Attitude towards social media**

Meera *et al.* (2004) studied Information and communication technology in agricultural development: A comparative analysis of three projects from India reported the favourable attitude of agricultural scientists/extension functionaries towards utilizing IT for agriculture development was projected to be realized over the years.

Kumar (2008) studied information and communication technologies enable agricultural extension system in Andhra Pradesh reported that majority of the ICT based extension service beneficiaries (71.34%) had favourable attitude towards ICT based extension services.

Dhaka and Chayal (2010) in the study on farmers experience with ICTs on transfer of technology in changing agri-rural environment found that majority of the farmers had favorable attitude towards the information Technology.

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models, higher proportion of the mobile advisory beneficiaries (41.12%) had favourable attitude, while 95.00 per cent of the mobile advisory beneficiaries and 93.30 per cent of the community radio listeners were lessee-ready.

Thakur and Chandar (2018) studied effectiveness of whatsapp for sharing agricultural information among farmers of Himachal Pradesh reported that age, gender, perceived ease of use, usefulness,

previous whatsapp use in agriculture, number of posts shared in whatsapp group have linear relationship with attitude towards its use in agriculture. Age had significant negative association with overall attitude towards use of whatsapp in agriculture. This meant that young farmers were more likely to develop favourable attitude towards use of whatsapp in agriculture. Perceived usefulness, previous whatsapp use in agriculture, number of posts shared in whatsapp had positive and significant relationship with attitude. Previous use of internet or social media for agricultural information was significantly related to the attitude towards use of whatsapp in agriculture. The number of posts shared in the group had also significant association with the attitude.

Raghuprasad *et. al.* (2021) studied attitude of farmers towards utilization of ICT tools in farm communication observed that majority of the farmers had favourable (40.83%) to least favourable (31.67%) attitude towards utilization of ICTs.

## **2.3 Dependent variable**

### **2.3.1 Overall Impact of social media on orange growers**

Songara (2007) in his study on impact assessment of Agricultural Technology Information Centre (ATIC)- A formative evaluation found that regarding the field crop changes due to ATIC 39.2 per cent, 50.6 per cent and 50.6 per cent of the respondents opined that their practices namely; application of FYM, use of high yielding varieties and plant protection measures practices have quite improved due to ATIC. He also concluded that 55.7 per cent, 57.00 per cent and 55.7 per cent respondents opined that their practices namely; spacing, time of sowing and sowing methods have no change due to ATIC and regarding the animal husbandry practices about 41.8 per cent and 46.8 per cent of the respondents opined that their breeding and milking management practices have improved due to ATIC. He also found that economic empowerment on account of ATIC. About 48.1%, 50.6%, 60.8% and 45.00 per cent respondents were found quite chanced about availability of seeds at reasonable price, knowledge about credit facilities, knowledge about

purchase of agricultural machinery and cultivation of horticultural plants respectively.

Gandhi *et al.* (2008) studied on digital green project reported that it increased the adoption of certain agriculture practices sevenfold over a classic extension approaches. Digital Green project was shown to be ten times more effective per dollar spent. Further, 85.00 per cent of adoption of improved technologies achieved as against 11.00 per cent of adoption by traditional extension methods.

Narasimha and Pushpa (2009) studied Impact of implement of village knowledge center, found that due to communication technology (Television and Computer-internet) in the selected villages knowledge centre there has been increasing awareness about pesticides, fungicides, fertilizer, tractors, power-tillers others.

Belay and Temesgen (2011) in perspective of agricultural extension studied extension and information technology development noted that social media have found to have great potential and can be used for the facilitation of knowledge sharing and collaboration in agriculture.

Rajni Jain *et al.* (2012) studied ICTs and farm women: access, use and impact concluded that adopters had better participation in decision making (Mean= 0.487) and had better productivity (Mean= 42793). The findings reaffirmed the crucial role being played by ICTs in improving the status of respondents (Mean=57200) and increasing their economic welfare (Mean=350268) respectively.

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models majority of the mobile advisory beneficiaries (58.34%) expressed that there was no change in the educational awareness while the remaining 41.66 per cent expressed that the awareness level had increased due to the adoption of mobile advisories while about three fourth of community radio listeners (72.22%) agreed that their awareness had increased. A majority of the mobile advisory beneficiaries enjoyed high social status (48.88 %) and high self satisfaction (53.33 %) as compared to the

community radio listeners. About 07.40 per cent increase in the cost of cultivation and 27.30 per cent increase in net income of wheat were observed due to ICT based extension services, while 13.30 per cent increase in cost of cultivation and 25.30 per cent increase in net income was observed in soybean. Adoption of Community radio services led to the additional annual farm income of Rs. 9,967, while the same was Rs. 12,680 for the mobile advisory beneficiaries. Additional net income of Rs. 2713 was achieved by the mobile advisory users as compared to the community radio listeners.

Neeta Wadetollu (2016) studied impact of vocational training programs of Krishi Vigyan Kendra stated that there was definite impact of training on those farmers who underwent the training of KVK. In case of knowledge level that majority (70.00%) had high level of knowledge about vocational programmes and medium (68.33%) level of adoption. In case of non trainees they had medium level of knowledge (83.33%) and low level of adoption (88.33%), respectively.

Kumar and Kumar (2018b) studied the impact of ICT on agricultural information access among farmers in Haryana reported that significant difference with age, education, income have been found on the impact of ICT on accessing agricultural information and non significant difference with land holding and experience among farmers in Haryana. The mean score of 3 and above was used to state agreements through statements and below that level shows their disagreement towards access of agricultural information through use of information and communication technology in Haryana. In this study all values above minimum level of 3 represent the positive perception of farmers to accessing the agricultural information through use of ICT.

Campenhout *et al.* (2020) studied on information and communication technologies to provide agricultural advice to smallholder farmers concluded that increase in knowledge outcomes, particularly for new practices and technologies, increase in adoption of recommended practices, particularly those were new and otherwise unknown to farmers. It

was found that maize yield was increased by 10.5 per cent due to video-enabled extension approach.

Vishakha Yadav *et al.* (2020) studied on impact of mass media on agriculture practices in district Lucknow revealed that before application of mass media large number of farmers (52.50 %) had low level of knowledge but after use of mass media, maximum number of farmers (41.25%) had high level of knowledge about harvesting and marketing of wheat crop while 37.50 per cent of farmers had medium level of knowledge and 21.25 per cent of the farmers had low level of knowledge.

Pranali Thakare (2021) studied impact of Jalyukt Shivar Campaign on beneficiary farmers reported that, In case of overall impact nearly three fourth (72.50%) of the respondents were found in medium impact category, followed by 14.69 and 12.81 per cent of the respondents were found in high and low impact categories, respectively.

Colussi *et al.* (2022) studied on how communication affect the adoption of digital technologies revealed that in relation to the influence of mass media group, websites and blogs had an average of 3.38, newspaper had mean of 1.75 as newspaper have been trying to make the transition from print to digital, television had second highest level of influence among all mass media with 2.41 mean while radio, open television and magazine had 2.17, 2.15 and 2.11 as a average mean. In case of social media, WhatsApp had 3.65 mean influence followed by YouTube (3.17), Instagram (2.61), Facebook (2.40), LinkedIn (2.03) and Messenger had average mean of 1.71 which influence on farmer's decision.

Guntukogula *et al.* (2022) studied on effectiveness of agricultural information disseminated through social media concluded that, 39.17 per cent of the respondents perceived effectiveness of agricultural information to the medium level of effectiveness followed by less level of effectiveness (38.33%), very high level of effectiveness (8.33%), high level of effectiveness (7.50%) and very less (6.67%). Overall 55.00 per cent of the respondents perceived that agricultural information received through social media as effective and above.

Richa Kumari et al. (2022) studied on progressive and non progressive farmers apropos utilizing ICT to advance agriculture reported that respondents gained information from the ICT to develop the agriculture in different agricultural activities, like viz., preharvest & post-harvest agricultural activities. Out of 80 respondents, among progressive farmers the mean score value of information gained for land preparation from radio were 18 and T.V were 17. Whereas, among non-progressive farmers, the mean score value of information gained for land preparation from radio and T.V were 15.33. Out of 80 respondents, among progressive farmers the mean score value of information gained for soil testing from radio were 18.66 and T.V. were 16. Whereas, among non-progressive farmers, the mean score value of information gained for Soil testing from radio were 14.66 and T.V. were 13., respectively.

#### **2.3.1.1 Change in Knowledge**

Patil (2004) studied impact of IVLP on adopted farmers concluded that there was 18.83 per cent change in knowledge over control group and 'Z' value (6.87) significant at 0.05 per cent level of probability.

Ayushi Pal and Kameshwari (2022) studied knowledge level of farmers towards use of social media for seeking agricultural information: A study in Udham Singh Nagar District of Uttarakhand revealed that 85.85 per cent of the farmers had medium level of knowledge towards use of social media as a source of agricultural information whereas 14.15 per cent of them had less knowledge level.

#### **2.3.1.2 Change in Adoption**

Patil (2004) studied impact of IVLP on adopted farmers concluded that there was 23.77 percent change in adoption over control group and 'Z' value (2.03) significant at 0.05 per cent level of probability.

Gudadhe (2015) studied Impact of Integrated Pest management practices on soyabean concluded that majority of the respondents (62.00%) belong to medium level of adoption regarding Integrated Pest Management practices of soyabean.

Kamatar *et al.* (2021) studied on profile characteristics of progressive and non progressive sugarcane growers revealed that 55.00 per cent of the progressive farmers had higher adoption followed by medium adoption 25.00 per cent and 20.00 per cent of them had low adoption of improved cultivation practices. In case of non progressive farmers, 60.00 per cent of the respondents had low level of adoption whereas 21.67 per cent of them had medium level of adoption and 18.33 per cent of them had high level of adoption of improved cultivation practices.

### **2.3.1.3 Change in Production**

Patil (2004) studied impact of Institute Village Linkage Programme (IVLP) on adopted farmers concluded that there was 17.06 percent change in production over control group and 'Z' value (2.01) significant at 0.05 per cent level of probability.

Gudadhe (2015) studied Impact of Integrated Pest management practices on soyabean under NRTT project concluded that average change in production is in positive direction (23.69%).

Campenhout *et al.* (2020) studied on information and communication technologies to provide agricultural advice to smallholder farmers stated that there was little impact on production related outcome from provided messages and 10.50 per cent impact through videos provided on recommended practices.

Pranali Thakare (2021) studied impact of Jalyukt Shivar Campaign on beneficiary farmers reported that, majority (66.25%) of the respondents noticed medium increase in crop production, followed by nearly one fifth (18.44%) of the respondents noticed high increase in crop production. The 15.31 per cent of the respondents noticed low increase in crop production.

### **2.3.1.4 Change in Orchard management**

Khade (2017) studied impact of Commodity Interest Groups on its members working under ATMA in Vidarbha concluded that majority 90.56 per cent of the respondents had high level of farm skill followed by

medium level and near about 67.74 per cent change of farm skill was found in use of drip irrigation technology of cotton CIG members after joining the CIG groups and 'Z' value (2.64) significant at 0.01 per cent level of probability.

### **2.3.1.5 Change in Annual income**

Patil (2004) studied impact of IVLP on adopted farmers concluded that there was 22.53 percent change in annual income over control group and 'Z' value (1.46) non significant.

Gudadhe (2015) studied Impact of Integrated Pest management practices on soyabean under NRTT project concluded that per cent change in annual income after adoption of IPM practices on soyabean under NRTT project was 28.30 per cent.

Neeta Deokate (2018) studied impact of WAN irrigation project on agriculture and socio economic development of beneficiary farmers reported that 62.79 per cent change was observed in case of annual income and the 'Z' value was significant at 0.01 per cent level of probability.

### **2.3.1.6 Change in Family expenditure**

Shubhangi Parshuramkar (2013) studied impact of MGNREGA on rural livelihood of Eastern Vidarbha concluded that average family expenditure was Rs.41595 in case of after MGNREGA and Rs. 32079 in case of before MGNREGA and per cent change was 29.67 per cent with 'Z' value 22.93 which was significant at 0.01 per cent.

Neeta Deokate (2018) studied impact of WAN irrigation project on agriculture and socio economic development of beneficiary farmers reported that overall 41.54 per cent change in case of expenditure pattern and the 'Z' value was significant at 0.01 per cent level of probability.

### **2.3.1.7 Change in Material possession**

Ingale (2002) studied impact of lift irrigation project in beneficiaries found that 66.66 per cent of the beneficiaries were found to be in medium category of change in their material possession.

Vidya Tayde (2003) studied evaluation of sprinkler irrigation scheme concluded that over two third of the respondents (70%) appeared in medium category of change in material possession from 58.97 per cent to 89.42 per cent, the 'Z' value of 4.29 for the mean difference was found to be significant at 0.01 level of significance.

### **2.3.1.8 Change in Self confidence**

Taufiq *et al.* (2011) Studied on entrepreneurial characteristics of agripreneurs under the scheme of Agriclincs and Agribusiness centers reported that majority of the respondents (69.17%) had medium level of self confidence, followed by 23.33 per cent under high level of self confidence. The rest had low self confidence level (7.50%).

Patel *et al.* (2008) studied on consequences of farmers 'Attributes on their attitude towards IPM strategy reported that 55.00 per cent of the dairy farmers had medium level of self confidence whereas equal number of dairy farmers had low (22.5%) and high level of self confidence (22.5%)

Sharma (2017) highlighted in the study on entrepreneurial behavior of agri-input retailers in Bilaspur that more than half (55%) of the agri-input retailers had medium level of self confidence, 26.66 per cent of them had high level and only 18.34 per cent of them had low level of self confidence

Chinmayee Jally (2018) Studied on impact of the diploma in agricultural extension services for input dealers (DAESI) in Odisha reported that 88.34 per cent of the DAESI dealer had medium to high level of self confidence whereas non dealers had medium to low (95%) level of self confidence and majority of total input dealers had medium (65.00%) level of self confidence. There was 3.33 per cent and 16.67 per cent increase in self confidence of DAESI dealers at medium to high level respectively.

## **2.4.1 Reviews related to relationship of independent variables and utilization pattern of social media**

### **2.4.1.1 Education with utilization pattern of social media**

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) reported that education was found to be positively and significantly related with extent of utilization of ICTs.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that education was positively and significantly correlated with utilization of DAATTC services by farmers.

Mishra *et al.* (2022) studied social media use profile of farmers in Haryana indicated that education is positively significant with social media use at 0.01 % level of probability.

### **2.4.1.2 Family size with utilization pattern of social media**

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) found that family size had not significant correlation with utilization pattern of ICTs

### **2.4.1.3 Occupation with utilization pattern of social media**

Grover *et al.* (2007) Adoption of information and communication technologies by farming households in Haryana found that occupation was found to have a significant affect on adoption of ICT.

Ghadge (2021) found that occupation had not significant correlation with utilization of resources

### **2.4.1.4 Land holding with utilization pattern of social media**

Bhagat *et al.* (2004) reported that the variable land holding had positive relation with extent of use of information.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) reported that land holding was found to be positively and significantly related with extent of utilization of ICTs

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that farm size was positively and significantly correlated with utilization of DAATTC services by farmers.

Mishra (2022) studied social media use profile of farmers in Haryana indicated that land holding is positively significant with social media use at 0.01 % level of probability.

#### **2.4.1.5 Size of orchard with utilization pattern of social media**

Ghadge (2021) found that size of orchard was positively and highly significant with resource utilization.

#### **2.4.1.6 Farming experience**

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.) found that farming experience had significant correlation with utilization pattern of ICTs.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that farming experience was positively and significantly correlated with utilization of DAATTC services by farmers.

#### **2.4.1.7 Social participation with utilization pattern of social media**

Mukherjee *et al.* (2012) conducted study in Aligarh district of Utter Pradesh to find out factors associated with farmer's membership in Tata Kisan Sansar and found that social participation was positively and significantly correlated with dependent variable farmers' membership in Tata Kisan.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (MP) found that social participation had no significant correlation with utilization pattern of ICTs.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that social participation was

positively and significantly correlated with utilization of DAATTC services by farmers.

Mishra *et al.* (2022) studied social media use profile of farmers in Haryana indicated that social participation is positively significant with social media use at 0.01 per cent level of probability.

#### **2.4.1.8 Annual income with utilization pattern of social media**

Shaffrill and Samah (2009) found that income per month of the VDC members indicated positive and significant relationship with their perception towards the importance of ICT.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that annual income was positively and significantly correlated with utilization of DAATTC services by farmers.

Mishra *et al.* (2022) studied social media use profile of farmers in Haryana indicated that annual income is positively significant with social media use at 0.01 per cent level of probability.

#### **2.4.1.9 Availability of social media with utilization pattern of social media**

Shinde and Mall (2009) reported the correlation analysis revealed that independent variable facilities available had positive and significant relationship with electronic media use behavior of the farm scientists

#### **2.4.1.10 Source of information with utilization pattern of social media**

Naik (2014) studied the effectiveness and impact analysis of innovative information and communication technology based extension models reported that in case of community radio listeners mass media exposure had positive and significant correlation with extent of utilization

#### **2.4.1.11 Innovativeness with utilization pattern of social media**

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of

(MP) found that innovativeness had significant correlation with utilization pattern of ICTs.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that innovativeness was positively and significantly correlated with utilization of DAATTC services by farmers.

#### **2.4.1.12 Risk orientation with utilization pattern of social media**

Chouhan (2009) reported that risk performance of the viewers had positive and significant correlation ( $r= 0.430$ ) with perception of viewers regarding Krishi Darshan Programme of Doordarshan

#### **2.4.1.13 Market orientation with utilization pattern of social media**

Mukherjee *et al.* (2012) conducted study in Aligarh district of Utter Pradesh to find out factors associated with farmer's membership in Tata Kisan Sansar and found that marketing orientation was positively and significantly correlated with dependent variable farmers' membership in Tata Kisan

Jyoti Patil (2019) studied evaluation of organic soyabean cultivation in western Vidarbha concluded that 60.00 per cent of the organic soyabean growers were in medium level of market orientation followed by 20.50 per cent of the organic soyabean growers were in high level of market orientation.

Neethi *et al.* (2018) studied relationship of farmers profile with utilization of extension services concluded that market orientation was positively and significantly correlated with utilization of DAATTC services by farmers.

#### **2.4.1.14 Attitude with utilization pattern of social media**

Raju *et al.* (1986) studied impact of non institutionalized training on knowledge, attitude and adoption concluded that there was significant difference between attitude if trained farmers and that of untrained farmers.

Katarya and Singh (1987) studied on factors associated with gain in knowledge through farmers training and concluded that attitude had positive and significant relationship with score of initial and post knowledge of the farmers in training programme.

Vijaya Khadekar (1997) studied impact of training on cultivation of mushroom to the unemployed observed that after proper training and demonstration respondents have changed their attitude as they have shown positive attitude towards training programme.

Mukta Solanke (2018) studied formal and informal credit utilization pattern by the small farmers observed that attitude had positive and highly significant correlation relationships with utilization pattern.

## **2.4.2 Reviews related to relationship of independent variables and attitude of social media**

### **2.4.2.1 Education with attitude towards social media**

Bhati (2015) studied on attitude of beneficiaries towards Mahatma Gandhi National Rural Employment Gurantee Act Programme revealed positive and non-significant correlation between education and attitude of the beneficiaries towards MNREGA

Khondokar (2015) studied attitude and level of knowledge of farmers on ICT based farming depicted that education had significant relationship with attitude towards ICT tools

Hakeem *et al.* (2015) studied on role of Farmer Field School in application of IPM in Thai-Qar Proviance of southern ira found that education had positive and significant relationship application level of IPM by farmers.

Kumar (2016) studied on extent of knowledge of ATMA beneficiaries and non beneficiaries farmers towards improved wheat cultivation technology and found that education had positive and highly significant relationship with knowledge about improved wheat cultivation technology of trained farmers.

#### **2.4.2.2 Family size with attitude towards social media**

Raghuprasad (2012) studied on attitude of farmers towards utilization of information communication technology tools in farm communication found that family size had non significant relationship with attitude of respondents

#### **2.4.2.3 Occupation with attitude towards social media**

Haseena Bibi (2017) studied on development of scale to measure the attitude of farmers towards farmers field school observed that occupation had no significant relationship with attitude of farmers.

#### **2.4.2.4 Land holding with attitude towards social media**

Naik *et al.* (2020) studied on attitude of farmers towards ICT tools reported that, land holding had positive and highly significant relationship with attitude of farmers

#### **2.4.2.5 Size of orchard with attitude towards social media**

Khondokar (2015) studied attitude and level of knowledge of farmers on ICT based farming revealed that farm size had no significant relationship with farm size

#### **2.4.2.6 Farming experience with attitude towards social media**

Shinde (2011) studied on attitude of the cotton growers towards IPM observed positive and highly significant relationship between experience of cotton growers in cultivation and their attitude towards IPM

Onima (2014) studied on development of scale to measure the attitude of farmers towards mixed farming indicated that farming experience had non significant correlation with attitude of farmers towards mixed farming

Rathod (2014) in the study of development of scale to measure the attitude of farmers towards capsicum cultivation reported that there was positive and significant correlation between experience of farmers and their attitude towards cultivation

Khondokar (2015) studied attitude and level of knowledge of farmers on ICT based farming farming experience had negative and non significant

Singh *et al.* (2016) studied on attitude of beneficiary farmers towards national horticultural mission found that experience in horticulture showed non-significant relationship with attitude of beneficiaries towards NHM.

#### **2.4.2.7 Social participation with attitude towards social media**

Onima (2014) studied on development of scale to measure the attitude of farmers towards mixed farming observed that social participation of farmers had non-significant correlation with attitude of respondents towards mixed farming

Pauline and Karthikeyan (2015) in the study on farmer to farmer extension through farmer friend found that social participation had positive and significant relationship with participation of Farmers Friend under ATMA.

Kumar (2016) found that social participation had positive and highly significant relationship with knowledge about improved wheat cultivation technology of trained farmers.

Naik *et al.* (2020) studied on attitude of farmers towards ICT tools reported that social participation had positive and highly significant relationship with attitude.

#### **2.4.2.8 Annual income with attitude towards social media**

Khondokar (2015) studied attitude and level of knowledge of farmers on ICT based farming concluded that annual income had non significant relationship with attitude towards ICT tools

#### **2.4.2.9 Source of information with attitude towards social media**

Naik *et al.* (2020) studied on attitude of farmers towards ICT tools reported that extension contact had positive and significant relationship with attitude of farmers.

#### **2.4.2.10 Innovativeness with attitude towards social media**

Naik *et al.* (2020) reported that innovativeness had positive and significant relationship with attitude of farmers

#### **2.4.2.11 Risk orientation with attitude towards social media**

Haseena Bibi (2017) studied on development of scale to measure the attitude of farmers towards farmers field school observed that risk orientation had positive and highly significant relationship with attitude of farmers towards FFS.

#### **2.4.2.12 Market orientation with attitude towards social media**

Naik *et al.* (2020) studied on attitude of farmers towards ICT tools reported that economic orientation had positive and highly significant relationship with attitude of farmers

#### **2.4.2.13 Utilization pattern with attitude towards social media**

Mukta Solanke (2018) studied formal and informal credit utilization pattern by the small farmers observed that utilization pattern had positive and highly significant correlation relationships with attitude

Mahajan *et al.* (2022) studied on correlates between profile of farmers with attitude by using ICTL tools in agricultural production observed that utility of ICT in extension had positive and significant relationship with attitude

### **2.4.3 Reviews related to relationship of independent and dependent variable**

#### **2.4.3.1 Education with impact of social media**

Nejkar (2008) studied on post training performance of recipients of training of KVK Ratnagiri concluded that education is significant with impact.

Neeta Wadetollu (2016) studied impact of vocational training programs of Krishi Vigyan Kendra concluded that education had positive and significant correlation with impact.

Ayushi Pal and Kameshwari (2022) showed that innovativeness of the farmers was significantly related with knowledge level

of farmers towards use of social media as a source of agricultural information indicating that majority of the farmers were prone to change in life were ready to use various new sources of information.

#### **2.4.3.2 Family size with impact of social media**

Nejkar (2008) studied on post training performance of recipients of training of KVK Ratnagiri concluded that family size had non significant relationship with impact.

Neeta Wadetollu (2016) studied impact of vocational training programs of Krishi Vigyan Kendra concluded that family size had non significant correlation with impact.

#### **2.4.3.3 Occupation with impact of social media**

Nejkar (2008) studied on post training performance of recipients of training of KVK Ratnagiri concluded that occupation had significant relationship with impact.

Prasad and Kushwaha (2015) studied impact of KVKs training programme on socio economic status of farm women observed that occupation had significant relationship with impact.

Neeta Wadetollu (2016) studied impact of vocational training programs of Krishi Vigyan Kendra concluded that occupation had positive and significant correlation with impact of trainees and non significant with non trainees.

#### **2.4.3.4 Size of orchard with impact of social media**

Patil (2013) studied Socio economic transformation by adoption of pomegranate cultivation in Buldana district revealed that area under pomegranate cultivation had not significant correlation with socio economic transformation.

More (2016) studied knowledge and adoption of recommended cultivation practices in banana concluded that area under banana had positive and significant relationship with their knowledge and adoption.

Guntukogula *et al.* (2022) studied on effectiveness of agricultural information disseminated through social media observed that farm size is significant with perceived effectiveness of agricultural information perceived through social media at 0.01 per cent level of significance.

#### **2.4.3.5 Land holding with impact of social media**

Lagad (2015) studied impact of biodynamic compost method on its beneficiaries concluded that land holding had negative and highly significant relationship with impact.

#### **2.4.3.6 Farming experience with impact of social media**

Patil (2013) studied Socio economic transformation by adoption of pomegranate cultivation in Buldana district revealed that farming experience had positive and highly significant correlation with socio economic transformation.

#### **2.4.3.7 Social participation with impact of social media**

Ugalmugle (2013) studied impact of swaranant community radio programme on listener farmers concluded that social participation had positive and highly significant correlation with adoption impact.

#### **2.4.3.8 Annual income with impact of social media**

Neeta Wadetollu (2016) studied impact of vocational training programs of Krishi Vigyan Kendra concluded that annual income had positive and highly significant correlation with impact trainees and non trainees.

Singh and Kameshwari (2019) studied on relationship between characteristics of farmers and impact of ICT enabled web portal (Krishinet) indicated that annual income had significant relationship with impact at 5 per cent level.

#### **2.4.3.9 Availability of social media**

Gudadhe (2015) studied Impact of Integrated Pest management practices on soyabean under NRTT project showed that availability of inputs had non significant relationship with impact.

Ayushi Pal and Kameshwari (2022) media ownership had non significant relationship with knowledge level of farmers.

#### **2.4.3.10 Sources of information with impact of social media**

Ugalmugle (2013) studied impact of swaranant community radio programme on listener farmers concluded that source of information had positive and highly significant correlation with adoption impact.

#### **2.4.3.11 Innovativeness with impact of social media**

Lagad (2015) studied impact of biodynamic compost method on its beneficiaries concluded that innovativeness had positive and significant relationship with impact.

Singh and Kameshwari (2019) studied on relationship between characteristics of farmers and impact of ICT enabled wen portal (Krishinet) showed that innovativeness had no significant relationship with impact of Krishinet portal.

#### **2.4.3.12 Risk orientation with impact of social media**

Maraddi and Varma (2001) studied adoption of cotton production technologies by farmers of Malprabha command area concluded that risk orientation had positive and significant relationship with adoption.

Ugalmugle (2013) studied impact of swaranant community radio programme on listener farmers concluded that risk preference had positive and highly significant correlation with adoption impact.

#### **2.4.3.13 Market orientation with impact of social media**

Shrinivas (2013) studied on critical analysis on effectiveness of diploma in agricultural extension service for input dealers programme in Andhra Pradesh showed that management orientation had positive and significant relationship with the knowledge on paddy

Jyoti Patil (2019) studied evaluation of organic soyabean cultivation in western Vidarbha concluded that market orientation had positive and significant relationship with extend of adoption.

#### **2.4.3.14 Utilization pattern with impact of social media**

Chinmayee Jally (2018) Studied on impact of the diploma in agricultural extension services for input dealers (DAESI) in Odisha reported that mass media utilization showed positive and highly significant relationship with knowledge impact

Shambharkar (2018) studied stress management of farmers in distress prone area of Vidarbha concluded that there was positive and highly significant relationship of utilization of available resources with stress management.

Ayushi Pal and Kameshwari (2022) revealed that social media exposure of farmers was significantly related to knowledge level of farmers therefore, it can be generalized that greater the use of various social media platforms on a regular basis higher will be the knowledge level about use of social media for seeking agricultural information.

#### **2.4.3.15 Attitude with impact of social media**

Patel (1987) studied image and impact of training and visit system observed that contact farmers had significantly favorable attitude towards new agricultural recommendations.

Ankita Angaitkar (2018) studied impact of Convergence of Agricultural Interventions in Maharashtra (CAIM) on beneficiaries of distress prone districts in Vidarbha concluded that attitude had positive and highly significant relationship with impact.

#### **2.4.4 Reviews related to multiple regression analysis**

Vidya Tayde (2003) concluded that sources of information and social participation found to be highly significant correlation with change in production, material possession, annual income.

Khade (2017) studied impact of Commodity Interest Groups on its members working under ATMA in Vidarbha concluded that occupation showed significant relationship at 0.05 per cent level of probability.

Ankita Angaitkar (2018) studied impact of Convergence of Agricultural Interventions in Maharashtra (CAIM) on beneficiaries of distress prone districts in Vidarbha concluded that education and attitude were positive and significantly correlated with impact at 0.01 per cent level of probability.

## **2.5 Constraints**

Rajni Jain *et al.* (2012) studied ICTs and farm women: Access, use and impact revealed that shortage of time followed by language problem while social reasons and non working of devices are some other reasons affecting the use of ICT.

Saravanan (2013) in the study on ICTs for agricultural extension in India: policy implications for developing countries reported that ICTs for agricultural extension projects need to be compared and evaluated objectively. Low cost ICT tools such as mobile phones having lot of promise for agricultural extension. At the same time, experiences are indicating that ICT are going to play greater role in private sector agribusiness, market information and market intelligence. Further, certain type of farm information (*e.g.* informing government schemes) and online monitoring of the progress of the governmental schemes are proved successful. Hence, it is high time to find out appropriate information to provide through ICTs. As indicated earlier, formulating National and State level e-Agriculture policy, human resource development, strengthening ICT infrastructure, localizations and customization of appropriate content are to be taken-up to harvest the benefits of ICTs for agricultural extension services provision and agricultural development.

Khondokar (2015) studied attitude and level of knowledge of farmers on ICT based farming stated that unavailability of electricity as a major problem having mean score 2.33 followed by lack of knowledge on ICT (2.08), insufficient availability of ICT services to rural farmers (2.01), lack of training on specific aspects (1.99), complex process on specific aspects (1.37), affiliation of the farmers in less important topics (1.37), less technical support from experts (1.29), selling small amounts of products in

the market (1.21), biasness in enlisting farmers name for training (1.17) and social barriers of using internet with mean score 1.00 respectively.

Sonal Gupta (2015) in study, the major constraints experienced by the respondents were arranged in descending order on the basis of rank order as use of complex words (65.83%), problems related to network of cell phone (63.33%), problems related to language (60.83%), problems related to content of message (55.83%), lack of information about availability of resources / inputs (54.17%), short duration supply or insufficient availability of electricity (51.67%), lack of extension activities (50.83%), untimely delivery of message (46.67%), application of message in fields are too much expensive (43.33%). non- availability of mobile phone message related literature (42.50%), respectively.

Jijina (2016) studied on social media and farmers and stated that, there is lack of infrastructure, educational and technical illiteracy, negative attitude towards social media, training needs and ensuring participation in using social media.

Bite (2017) in study on role of social media in agriculture marketing and its scope reported various problems like adoption of social media as a tool of agricultural marketing, limited access to social media because of data, network, No training and education about use of social media in agriculture marketing, people are less trusted on e-buying, e-selling of agricultural commodity on social media with frequency of +9 21, 45, 35 and 34, respectively.

Khou and Kishore (2018) studied on the role of social media mobile applications and it's impact on agricultural marketing in Puducherry region reported that 82.00 per cent of the respondents had very less trust on e-buying and e-selling of agricultural commodity followed by 78.00 per cent of them strongly agreed on limited access to social media because of weak data and network, 73.47 per cent of them strongly agreed to absence of training and education on use of social media on agricultural marketing and 36.00 per cent of the respondents had no idea or low level of knowledge on use of social media for marketing of agricultural products.

Jiriko *et al.* (2020) studied constraints to use social media in accessing agricultural information among crop farmers in Makurdi local government area of Benue state, Nigeria reported that the constraints that were highly loaded in techno-infrastructure factors were lack of internet connectivity (0.559), high cost of internet access (0.568) and unavailability of ICT tools (0.402). In case of knowledge related factors the constraints were complexity of social media facilities (0.555), low ICT literacy (0.610) respectively.

Bhagyashri Kesharwani *et al.* (2022) studied social media help farmers for improving agriculture practices stated that there is lack of authenticity, absence of professionals, misuse of social media, limited access to social media because of data, network others., need of training and education about the use of social media in Agri marketing, people are less trusted on e-buying and e-selling of agricultural commodity on social media, all the activities are restricted by time, technology, networks others. and the cost of technology use in agriculture is more.

## **2.6 Suggestions**

Yadav (2012) studied awareness and access to modern communication media among the farmers of Udaipur District of Rajasthan reported that suggestions namely, availability of modern media at panchayat samiti head quarter, modern media services be made subutilized, training for youth, computer education be made compulsory in rural school and marketing of CDs containing packages of different crops at subsidized rate obtained higher ranks by the respondents and viewed more positively with MPS ranging from 7.17 to 98.34.

Sonal Gupta (2015) in study on utilization of information and communication technologies (ICTs) for selected crops in Rewa district of (M.P.)The important suggestions offered by the respondent for enhancing their profitability for mobile phone message have been arranged in descending order on the rank basis as local needs and preference for the messages should be considered (70.83%), use of local and familiar words in messages (60.83%), economics of techniques delivered through message should be highlighted (51.66%), to improve coverage and

efficiency of agricultural information delivery systems (49.16%), mobile short messaging services (SMS) (46.66%), qualified & well – motivated staff to serve as an interface (42.50%), information regarding resources/ inputs availability should also be provided (35.83%), location specific research and data based information should be provided (34.17%), providing SMS in mobile in addition to voice mail as it could be stored, followed and shared with fellow farmers (33.33%), farmers–led extension and strengthening of public extension services (31.66%).

Tekale (2017) studied on communication behavior of agriculture assistants of department of agriculture in Nagpur district recommended that, for timely and effective communication of agriculture assistant with farmers, government should provide laptop, smart mobile phones and internet facilities to them and reduce their official paper work load and they should be provided training on modern agricultural technology.

Kumar *et. al* (2019) in study of reshaping the future of agriculture: A youth and social media perspective reported that the overall suggestions made by the farming youth to enhance their participation were divided in to 6 categories namely: Psychological suggestion, Social suggestion, Economical suggestion, Technical suggestions, Infrastructural suggestions and other suggestions. Among all the 37 suggestions made by them, youth's involvement in policy making was overall ranked 1<sup>st</sup> with mean score 2.60, followed by strengthen higher education in agriculture and put agriculture in the school curriculum which ranked 2<sup>nd</sup> (2.56) and 3<sup>rd</sup> (2.55), respectively. Suggestions obtained with mean score 2.45, 2.24, 2.17, 2.02, 2.00, 1.97 and 1.92 were extension officer should motivate farmer for Kisan Call Centre and other agriculture related schemes, followed by psychological suggestion, youth must be aware through social media, good quality farm literature should be made available, young farmer profile of every village should be made available on social media whereas infrastructural suggestion was training programme related to ICT for farmers, improve internet connection and plan should be made to cover farm losses through social media for youth, respectively.

Jiriko *et al.* (2020) studied constraints to use social media in accessing agricultural information among crop farmers in Makurdi local government area of Benue state, Nigeria concluded that, respondents should be encouraged to use social media in accessing agricultural information through provision of adequate training by extension personal. It also suggested need of regular supply of physical infrastructure such as electricity by government at all levels in order to encourage social media use in accessing agricultural information for increased productivity

Krishnaji *et al.* (2020) reported that suggestions given by farmers were avoid too much reception of programmes and usage of old video footage (73.75%) followed by providing information on source of input availability (70.83%), more emphasis on programmes related to government schemes and subsidies (68.33%), training technical experts to improve their script preparation and presentation related skills (65.00%), broadcasting the programmes related to market intelligence (62.08%), broadcast programmes on post harvest management, value addition related information (57.92%), publicizing programme schedules in all the major newspapers well in advance for wider publicity among farmers (54.17%), increasing the number of programmes on organic farming certification (49.17%), giving priority to latest visuals, visual effects and sound effects in the programmes for increasing farmers interest (44.58%), focusing on demonstration mode of presentation to improve the skills of farmers (40.83%), incorporation of cost benefit related information for creating interest among farmers (37.92%), use of more local experts or progressive farmers/ farm women (35.00%), strict adherence to seasonality in the programme broadcasts (32.92%), incorporating visuals of pest and disease symptoms during discussion (30.00%), announcing address and phone numbers of the experts at the beginning as well as after end of the programme (25.83%), giving emphasis on programmes related to rural and agro-based industries to attract youth in agriculture (24.17%), uploading of information on social media for future reference (20.83%), repeat important programmes at weekends (19.17%), avoid too much use of English words and technical Jargons (15.83%), improving picture and audio quality

(14.58%), dramatizes presentation of farmer's field experiences and success stories (12.08%), broadcast phone-in live programmes specific to different areas to solve local problems (10.00%) and priority should be given to latest technologies like terrace gardening, kitechen gardening, hydroponics and aquaponics others., (9.17%) respectively.

Anita Deshmukh *et al.* (2021) studied on constraints faced by orange growers about production and marketing orange revealed that majority of the orange growers suggested that Government should emphasize the development of irrigation facility (92.00%), followed by assured power supply (84.00%), fertilizers be made available in time at the nearest market (75.60%), adequate literature and technical guidance on orange cultivation should be available (59.60%), Half of them (50.00%) suggested to make availability of technical guidance from extension functionaries about use of growth regulators and plant protection chemicals, long term credit facility should be made available (31.20%) and 26.00 per cent of the respondents suggested organization of skill training for labourers, respectively.

## **2.7 Reviews related to reasons behind fruit drop and reasons behind removal of orchard**

Anita Deshmukh (2019) studied on reasons for decline of orange orchards in Amravati district revealed that majority of the respondents (67.34%) had high decline area under orange cultivation. The over one fourth respondents (29.33%) had moderate decline area under orange cultivation while, 3.33 per cent of the respondents had low declining area under orange cultivation. Also the reasons behind decline in the area under orange were undertaken. Among the reasons related to input supply, non-availability of chemical fertilizer at proper time was one of the major reasons expressed by 75.33 per cent of the respondents. Followed by 59.33 per cent of the respondents who reported delayed transplanting because no rains and 40.66 per cent of the respondents who reported non availability of insecticide at proper time, While 38.66 per cent of the respondents reported non-availability of plant protection measures and 33.33 per cent of respondents reported non-availability of improved seed at

proper time. Among the economical aspects high cost of insecticides and fertilizers was one of the major reasons expressed by the majority of the respondents (76.66%), followed by 66.00 per cent of the respondents who reported high cost of FYM and 51.33 per cent of the respondents reported non-supportive policies of government towards orange. As much as, 50.66 per cent of the respondents reported lack of money at the time of purchasing fertilizers and insecticides and 48.66 per cent of the respondents reported low prices in market, 36.66 per cent of the respondents reported inadequate credit facilities, 31.33 per cent of the respondents reported high cost of seedling. Among the information sources, lack of knowledge about the fertilizers doses was one of the major reasons expressed by majority of the respondents (82.00%), followed by 78.66 per cent of the respondents who reported lack of contact with extension personnel and inadequate guidance from the dealers. Among the reasons related to labours high wages rates was one of the major reasons expressed by majority of the respondents 68.00 per cent, followed 31.33 per cent of respondents who stated lack of labours during transplanting of seedling and harvesting of orange as the major reasons. Among the climatic conditions, lowering water table was one of the major reasons expressed by majority of the respondents (97.33%), followed by 92.66 per cent of the respondents mentioning long dry spell, 88.00 per cent of the respondents told high temperature as major reasons and 64.00 per cent of the respondents reported vagaries in monsoon as a major reason respectively.

Lalit (2019) studied citrus fruit drop in citrus farming: A possible cause and their management of citrus fruit drop a major threat to the Nepalese citrus farming community stated a major problems of Nepalese citrus farming are natural fruit drop, physiological fruit drop due to abscission formation because of stress at high temperature or water deficit, pathological fruit drop due to *Botryodiplodia*, *theobromae*, *collatotrichum* *gloeosporioides* and *alternaria citri* causes stem end rot in matured fruits, entomological fruit drop due to fruit sucking moth, bug and citrus bud mites which suck the juice from fruits and cause rotting and drop of fruits. Factors

leading to citrus decline were nutritional, soil factors, rootstock factors, insect pest and disease factors and orchard management practices respectively.

Ratanpal *et al.* (2019) studied on management of fruit drop in citrus reported that fruit drop loss comes in a series of waves, first wave of post bloom drop, second wave of summer or June drop consisting of about 10 per cent of total dropped fruits and third wave pre-mature and pre-harvest fruit drop due to physiological factors, pathological fruit drop is a major bottleneck causing reduction in yield and quality of fruits, entomological fruit drop due to fruit flies and fruit sucking moths were the major causes of fruit drop respectively.

Venugopalan *et al.* (2019) studied on application of PRA technique for field problem identification revealed that incidence of Tapioca mosaic was the first ranked constraint on the basis of village magnitude value (601.045) by using professional ranking technique followed by water scarcity (328.644), Incidence of Tapioca white fly (288.422), incidence of groundnut red hairy caterpillar (256.265), inadequate counseling (117.872) and incidence of groundnut leaf minor (107.419) were the agricultural field problems faced by villagers.

Anonymous (2020) in Nagpur orange prices plunge reported that the orange crop seen bumper crop with almost 1.5 lakh hectares under cultivation in Vidarbha region. The prices are a matter of worry as before farmers agitation they were Rs. 30 to 40 per kg and now they have dropped to Rs 20 to 25 per kg at farm gate. It is decline of almost Rs. 15 from the earlier rates.

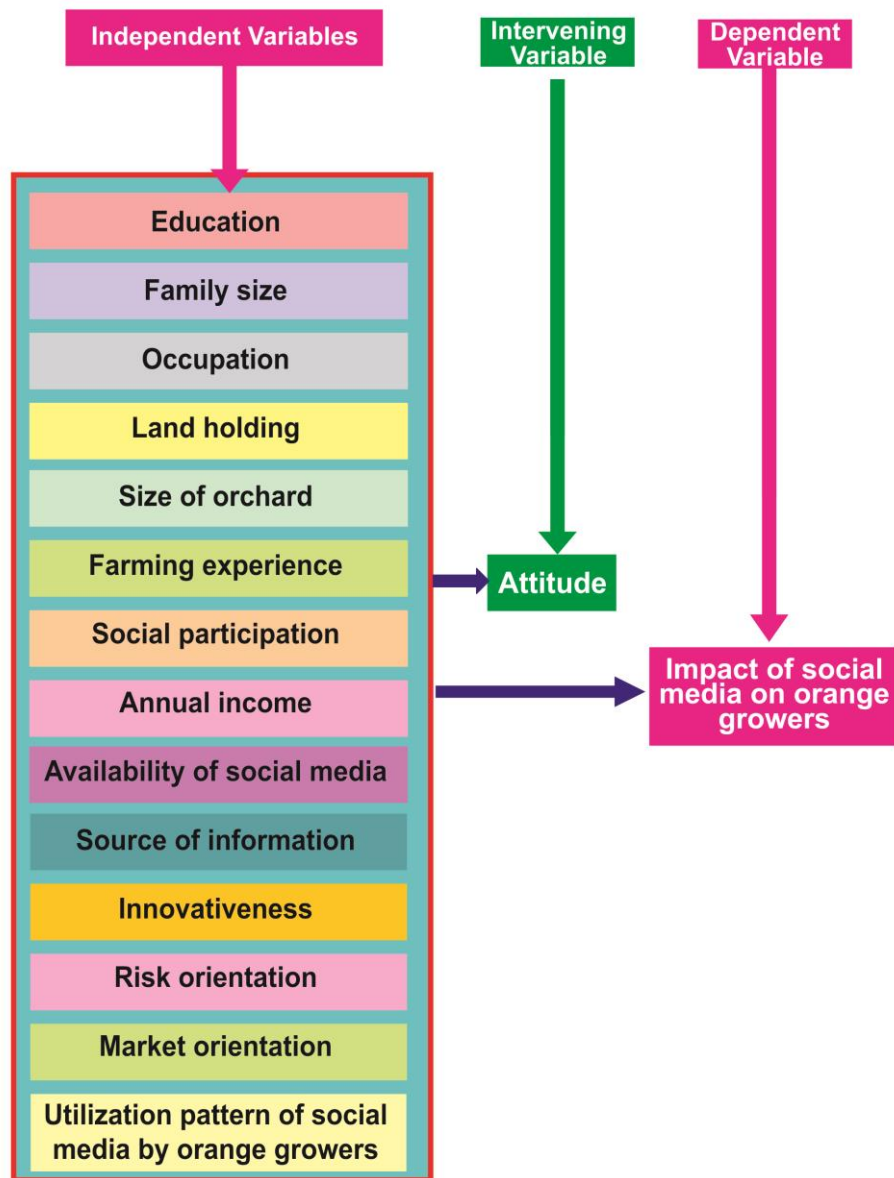


Fig. 1 Conceptual model of study

## CHAPTER III

### METHODOLOGY

Research methodology is the most important parameter to judge the worth of any research activity. A carefully planned and well documented methodology acts as a tool to help the researcher to carry forward the investigation process. Keeping this in view at the central place and after thoroughly studying the available literature, the present study was planned on the basis of suitable research methods and appropriate tools to measure the outcome. The purpose of this chapter is to describe the research methods and techniques followed in conducting this research.

The researcher during the course of investigation has to develop different measurements techniques, tools and procedures for research. The terms and concepts used need to be appropriately defined their measurements techniques and measured accurately. Appropriate tools for data collection have to be selected, developed and used. In present study to study the resource management behaviour of orange growers for production and marketing of oranges in Vidarbha; standard and detailed methodology was developed and used for studying various aspects concerning the resource management behaviour of orange growers. The same have been described in present chapter with relevant details under the following sub-section.

The sub-section of research methodology includes.

3.1 Research design

3.2 Locale of study and it's background

3.3 Sample and sampling technique

3.4 Development and standardization of scale

3.5 Preparation of interview schedule

3.6 Collection of data

3.7 Variables, their operational definitions, measurements and categorization

3.8 Constraints and Suggestions

3.9 Reasons behind fruit drop and removal of orchards

### 3.10 Statistical methods

#### **3.1 Research design used for the study**

The researcher has to make use of appropriate research design. An ex post-facto research design was used for the present investigation with a view to study the impact of social media on orange growers.

According to Kerlinger (1964) ex post facto research defines as: that research, in which the independent variable or variables have already occurred and in which the researchers start with the observation of a dependent variable or variables.

The term ex post facto means 'from what is done afterwards' where independent variable is not manipulated which has already occurred. It's a quasi-experimental study which explores how an independent variable, present earlier to the study in the participants, influence a dependent variable.

In the present study impact of social media on orange growers was studied as dependent variable. An attempt was made to find out influence of selected independent and intervening variables on dependent variable.

#### **3.2 Locale of the study and it's background**

The present research investigation was carried out in Amravati and Nagpur districts of Vidarbha region of Maharashtra state.

Maharashtra state has six revenue division viz., Mumbai, Pune, Nasik, Aurangabad, Amravati and Nagpur. Vidarbha area includes Amravati and Nagpur revenue divisions comprising eleven districts. In Amravati division, Buldhana, Akola, Washim, Amravati and Yavatmal districts, whereas in Nagpur division, Wardha, Nagpur, Bhandara, Gondia, Chandrapur and Gadchiroli districts were included. Washim and Gondia are newly formed districts bifurcating Akola and Bhandara districts respectively. Nagpur division includes Nagpur, Bhandara, Gondia, Chandrapur, Gadchiroli and Wardha are the eastern districts of Vidarbha. The Western districts are Buldhana, Akola, Amravati, Washim and part of

Yavatmal. Vidarbha as a whole contributes cotton, rice, jowar, millets, oilseeds, soybean, citrus, forest timber, others. The Vidarbha region is by and large a tract of dry land agriculture lies in between 17° 57' – 21° 46' N Latitude and 75° 57' – 80° 59' E Longitude. This region is having agrarian economy with around 70 per cent of population living in rural areas and 80 per cent of the rural population dependent on agriculture, either as cultivators or labourer. Out of 97.23 lakh ha of geographical area, Vidarbha has a net cultivated area of 49.98 lakh hectares with 10.29 lakh hectares being cultivated for more than once due to limited irrigation facilities. The average annual rainfall ranges from 700 mm at the West to 1700 mm at the East. Vidarbha region is divided into three agro-climatic zones based on rainfall, soil types and vegetation.

Western Vidarbha Zone : Rainfall 700 to 950 mm

Central Vidarbha Zone : Rainfall 950 to 1250 mm

Eastern Vidarbha Zone : More than 1250 mm.

### **3.2.1 Location of Amravati and Nagpur districts**

District Amravati, the soul of Vidarbha is located at 20.32 to 21.46 latitude and longitude of 76.37 to 78.27 with altitudes of 300 to 900 meters above mean sea level (MSL). Amravati district is surrounded by Wardha district towards East and North- East, Yavatmal district in the South and South West direction, Washim and Akola districts toward West and Baitul district of Madhya Pradesh in the North and North-East.

Nagpur district is situated on the eastern part of the State abutting Chindwada district of Madhya Pradesh in North. It is bounded by Wardha and Amravati districts in the West, Bhandara district in the East and Chandrapur district in the South. It lies between north latitudes 0°35' and 1°44' and east longitudes 78°15' and 79°40'. The district has a geographical area of 9892 sq. km. The district headquarters is located at Nagpur. For Administrative convenience, the district is divided in 14 talukas viz, Nagpur (Urban), Saoner, Parseoni, Ramtek, Mouda, Kamthi, Kuhi, Bhiwapur, Umrer, Nagpur (Rural), Hingna, Katol, Narkhed and Kalmeshwar. It has a total population of 40.51 lakh as per 2011 census. The district has 29 towns, 1562 inhabited villages and 312 uninhabited

villages. The district forms part of Godavari basin. Wainganga River is the main river flowing through the district.

### **3.2.2 Agro climatic conditions**

#### **Topography and soil**

The total geographical area of the Amravati district is 12,212 sq.km, which is 3.96 per cent of the total area of the state. The district is divided into 14 Tahsil (Blocks). Its district head quarter is Amravati. The district comprises of one corporation, ten municipal cities and 834 gram Panchyats working for rural development of the district. The total numbers of villages are 1996, out of which 315 are inhabited. The district has two tribal blocks, 1) Dharni and, 2) Chikhaldara. The “Korku” is dominating tribes. This area is commonly known as “Melghat”.

The major portion of the earth crust of the Amravati district has been synthesized from the rock “Basalt”, hence the majority soils of the district in general are black and fertile. However, these soil are divided in medium black (4.58 lakh ha), followed by coarse shallow (1.84 lakh ha) distributed in Dharni, Chikhaldara, Chandur (Rly) and Nandgaon (Kh) Tahsil. About 1.21 lakh ha soil are deep black and are spread over Daryapur, Anjangaon, Bhatkuli, Achalpur, Chandur (Bz) and Amravati Tahsil. Majority soils in Daryapur, Bhatkuli and some soils in Anjangaon, Achalpur and Amravati Tahsil are problematic.

Nagpur district forms part of Deccan Plateau having flat topped and terraced features. Eastward and northeastwards the landscape changes due to the change in the underlying rocks. The rocks of Gondwana series present a low rolling topography with a poor soil cover and vegetation. On the north the upland ranges are the extension of Satpuras which gradually narrows down towards West. South of these upland range stretches the Ambegad hills, the Western extremity of which is the Nagpur district. The Ramtek temple is on the spur of this range. The Girad hill range extends along the southeast and separates the valley of the Kar from that of Jamb upto Kondhali. Another main hill range runs northwards through Katol taluka from Kondhali to Kelod separating the Wardha and Wainganga valleys. The northeastern and east central

parts of the district are drained by the Wainganga and its tributaries. The central and Western portion is drained by the Wena which is a tributary of Wardha river.

There are six types of soils found in Nagpur district. Kali soils, Morand soils, Khardi soils, Bardi soils, Kachchar soil and Wardi soils.

### **Climate and rainfall**

Amravati district falls in assured rainfall zone hence, receives monsoon rains during June to October. The average annual rainfall of the district is 857.8 mm spread over 51 rainy days. The district is characterized by warm and humid climate in June to October and later on there is a gradual decline in the temperature from October onwards and December happens to be a coolest month of the year while cool and dry climate is observed during November till January, March, April and May are the hot and dry months. The average maximum and minimum temperature of the district is 44.4 C and 12.4 C, respectively.

The climate of Nagpur district is characterized by a hot summer and general dryness throughout the year except during the south-west monsoon season, i.e. June to September. The mean minimum temperatures is 12°C and mean maximum temperature is more than 45°C. The normal annual rainfall over the district ranges from about 1000 mm to 1200 mm. It is the minimum in the western parts around Katol (985.4mm) and increases in the eastern direction and reaches a maximum around Umrer (1213.6 mm). The average annual rainfall for the last 10 years ranges from 753.9 in Hingna to 1164.9 in Umrer. It is also observed that all stations have recorded average annual rainfall within the range of district normal annual rainfall except at Hingna, Katol, Narkhed, Bhiwapur and Kamleshwar where it is less than.

### **3.2.3 Cropping pattern of Amravati district.**

Data of cropping pattern of Amravati district revealed that cotton is a most important cash crop and occupies a leading position in the cropping pattern of Amravati district.

**Table 5. Cropping pattern of Amravati district (2020-21)**

Sl. No.	Crops	Area (ha.)	Production (tonnes)
<b>A.</b>	<b>Major Field Crops</b>		
1	Paddy	8900	3000
2	Jowar	18341	17500
3	Maize	8020	18800
4	Red gram	112300	111100
5	Green gram	22987	3450
6	Black gram	14800	1400
7	Ground nut	3366	4000
8	Soybean	287100	265200
9	Cotton	207457	380300 Bales*
10	Wheat	39300	69400
11	Gram	103900	130900
<b>B.</b>	<b>Horticulture crops – Fruits</b>		
1	Nagpur Mandarin/Orange	70660	570800
2	Lime and Lemon	715	5863
3	Mango	550	2500
4	Banana	847	23000
5	Sweet Orange/ Mosambi	2120	13462
<b>C.</b>	<b>Horticultural crops – Vegetables</b>		
1	Brinjal	200	2735
2	Green Chilli	789	9250
3	Onion	4267	64011
<b>D.</b>	<b>Flowers</b>		
1	Chrysanthemum	19	136
2	Marigold	33	225
3	Jasmine	18	82
<b>E.</b>	<b>Spices</b>		
1	Turmeric	273	3180

\*Cotton 1 Bale=170 Kg.

(Source:<http://aps.dac.gov.in> )

### 3.2.4 Cropping pattern of Nagpur District

Data of cropping pattern of Nagpur district is given as below.

**Table 6. Cropping pattern in Nagpur district (2020-21)**

Sl. No.	Crops	Area (ha.)	Production (tonnes)
<b>A.</b>	<b>Major Field Crops</b>		
1	Paddy	97275	183600
2	Jowar	2400	1714
3	Red gram	65973	73976
4	Ground nut	3592	4300
5	Soybean	151100	172400
6	Cotton	145168	347600 Bales*
7	Wheat	135203	244400
8	Gram	64400	74600
9	Sugarcane	4268	221900
<b>B.</b>	<b>Horticulture crops – Fruits</b>		
1	Nagpur Mandarin/Orange	19976	109873
2	Lime and Lemon	243	1653
3	Mango	757	1892
4	Sweet Orange/ Mosambi	6116	45870
<b>C.</b>	<b>Horticultural crops – Vegetables</b>		
1	Brinjal	1733	39859
2	Tomato	2011	48264
3	Cauliflower	371	8381
4	Green Chilli	9841	79265
5	Okra	259	2717
6	Beans	346	5605
7	Cabbage	339	7496
<b>D.</b>	<b>Flowers</b>		
1	Chrysanthemum	146	636
2	Marigold	451	4824
3	Tube Rose	161	3400
<b>E.</b>	<b>Spices</b>		
1	Coriander seed	113	226
2	Turmeric	512	7168

\*Cotton 1 Bale=170 Kg.

(Source:<http://aps.dac.gov.in>)

### 3.3 Sample and sampling technique

The methods, procedure and techniques proposed to be used in the present study are delineated on the following points.

#### 3.3.1 Selection of districts, tahsil, villages and respondents

##### 3.3.1.1 Selection of districts

The present research investigation was carried out in Amravati and Nagpur districts of Vidarbha region of Maharashtra state. The above districts were selected purposively on the basis of maximum area under orange cultivation in Vidarbha.

**Table 7. Area (ha.) and production (MT) of orange crop in Vidarbha region of Maharashtra (Year 2020-2021)**

Sl. NO.	Name of district	Area under orange crop (ha.)	Production of orange crop (MT)
1.	Amravati	70315.00	570800.00
2.	Akola	4582.00	54984.00
3.	Buldhana	1500.00	15091.50
4.	Washim	2000.00	22000.00
5.	Yavatmal	1489.70	12215.54
6.	Wardha	3700.00	23310.00
7.	Nagpur	19976.04	109873.00
8.	Bhandara	2.40	15.00
9.	Gondia	0.00	0.00
10.	Chandrapur	4.50	24.30
11.	Gadchiroli	0.00	0.00
<b>Total</b>		<b>103569.64</b>	<b>808313.34</b>

(Source: JDA, Amravati and JDA, Nagpur, Report 2020-21)

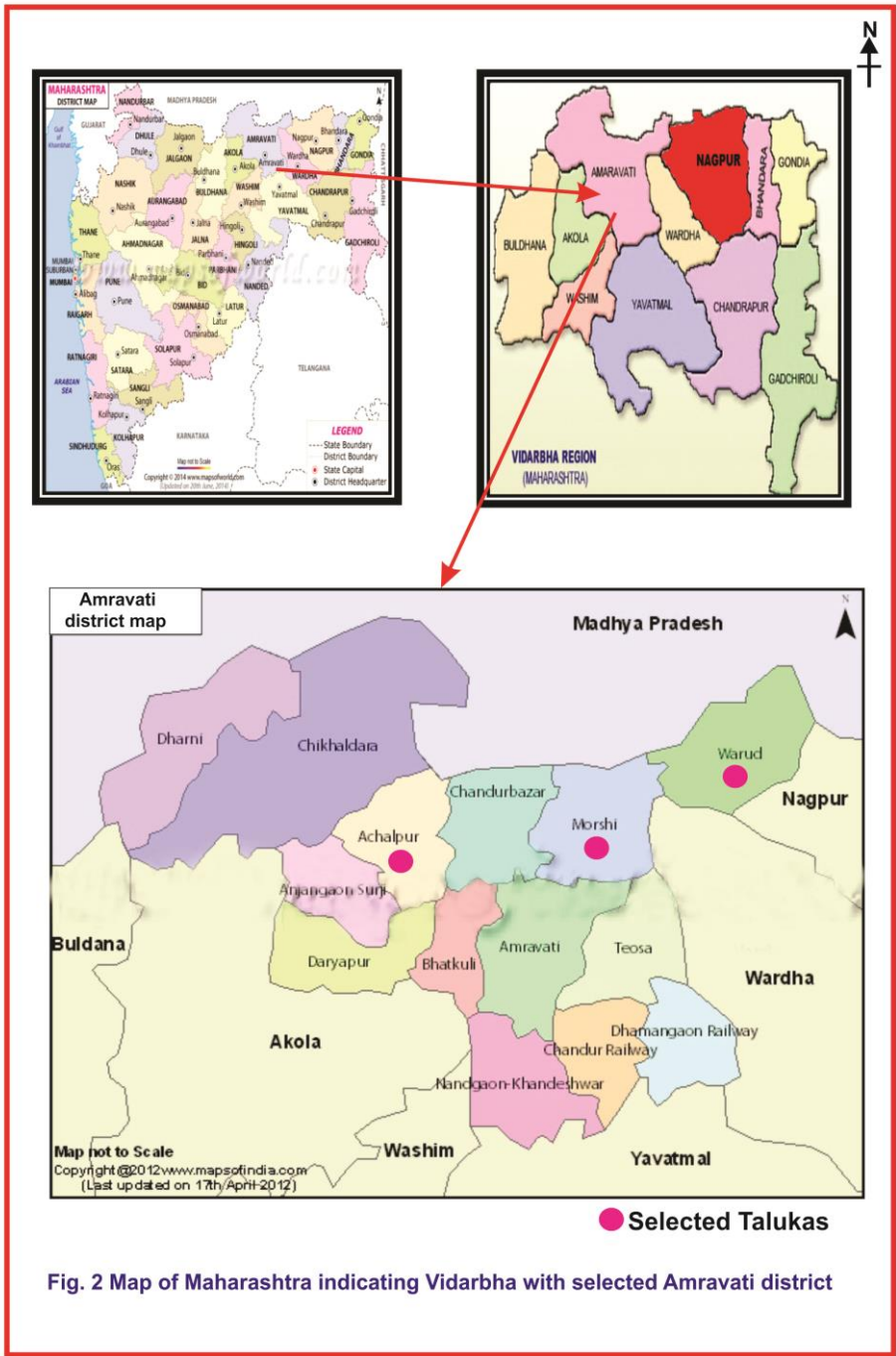


Fig. 2 Map of Maharashtra indicating Vidarbha with selected Amravati district

### 3.3.1.2 Selection of talukas

In Amravati district there were total 14 talukas, out of these, three talukas were selected purposively, namely, Warud, Morshi and Achalpur talukas on the basis of talukas having maximum area under orange cultivation. Similarly, from Nagpur district, out of 13 talukas, three talukas were selected purposively namely, Narkhed, Katol and Kalmeshwar, as these talukas having maximum area under orange cultivation.

### 3.3.1.3 Selection of villages

The five villages from each taluka were selected purposively, on the basis of villages having maximum number of orange growers for the purpose of study. Total 30 villages were selected purposively for study from selected six talukas of two districts.

**Table 8. Area under orange crop in Amravati and Nagpur district  
(Year 2020-2021)**

SI. NO.	District	Name of Taluka	Area under orange crop (ha.)
1	Amravati	Amravati	1455.00
		Bhatkuli	50.00
		Nandgaon(Khande)	1832.00
		Chandur Railway	2351.00
		Dhamangaon Railway	1063.00
		Warud	21346.00
		Morshi	11225.00
		Chandur Bazar	11196.00
		Tiwasa	3075.00
		Achalpur	11197.00
		Anjangaon(Su)	5412.00
		Daryapur	6.00
		Dharni	32.00
		Chikhaldara	75.00

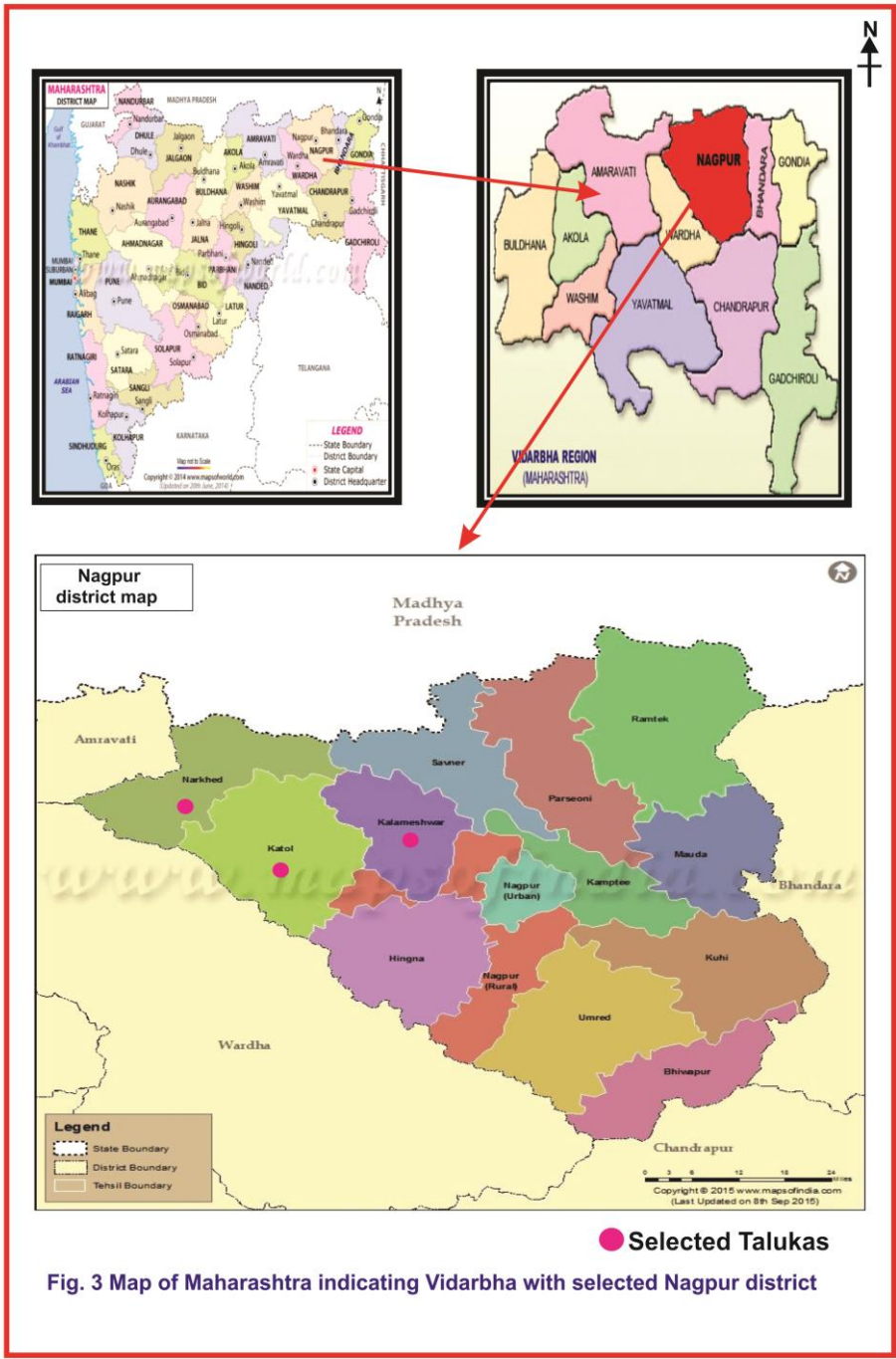
2	Nagpur	Bhiwapur	199.17
		Kamptee	130.59
		Mauda	14.95
		Parseoni	315.58
		Umred	119.84
		Hingna	539.77
		Katol	4840.81
		Nagpur	329.18
		Ramtek	1370.13
		Kalmeshwar	4603.93
		Kuhi	84.29
		Narkhed	6117.68
		Savner	1310.12

(Source: DSAO, Amravati and DSAO, Nagpur)

#### **3.3.1.4 Selection of respondents**

From each selected village, five orange growers who were taking benefits of social media for agriculture i. e. social media users and five social media non user orange growers were selected having same orchard size belonging to the same area with similar agro climatic conditions purposively by simple random sampling method and they were considered as respondents in the present study.

In the present study, 75 social media user and 75 social media non user orange growers were selected from each district. Thus, for the proposed study 150 orange growers from Amravati district and 150 orange growers from Nagpur district were selected. Total 300 orange growers were selected from 30 villages of six selected talukas of two districts of Vidarbha region by simple random sampling method. These 300 orange growers were considered as respondents in the present study.



**Table 9. Taluka wise list of selected villages and respondents from Amravati and Nagpur district**

Sl. No.	Selected district, taluka and villages	Respondents n=150	Selected district, taluka and villages	Respondents n=150
<b>A)</b>	<b>Amravati</b>		<b>B) Nagpur</b>	
	<b>a) Warud</b>		<b>d) Katol</b>	
1	Temburkheda	10	Ladgaon	10
2	Wathoda	10	Khandala	10
3	Jarud	10	Ambala	10
4	Shendurjanaghat	10	Katol	10
5	Pusla	10	Paradshinga	10
<b>Total</b>		<b>50</b>	<b>Total</b>	<b>50</b>
	<b>b) Morshi</b>		<b>e) Kalmeshwar</b>	
6	Morshi Gramin	10	Madasawangi	10
7	Hiwarkhed	10	Pipla Tinkhede	10
8	Pala	10	Budhala	10
9	Molwan	10	Mhasepathar	10
10	Dongaryawali	10	Kondhali	10
<b>Total</b>		<b>50</b>	<b>Total</b>	<b>50</b>
	<b>c) Achalpur</b>		<b>f) Narkhed</b>	
11	Pathrot	10	Mowad	10
12	Vadgaon Fattepur	10	Datewadi	10
13	Vadura	10	Mendhla	10
14	Ekhaspur	10	Khapari Kene	10
15	Dhamangaon Gadhi	10	Yerla	10
<b>Total</b>		<b>50</b>	<b>Total</b>	<b>50</b>
<b>Total (a+b+c)</b>		<b>150</b>	<b>Total (d+e+f)</b>	<b>150</b>
<b>Total respondents (a+b+c+d+e+f)</b>			<b>300</b>	



**Plate 1: Investigator interviewing orange growers about orange cultivation at Tembarkheda village of Warud taluka**



**Plate 2: Investigator interviewing orange growers at Shendurjanaght village of Warud taluka**

#### **3.3.1.4.1 Selection of respondents for reasons behind the fruit drop in orchards and removal of orchards**

For reasons behind fruit drop purpose same 300 respondents (similarly 150 social media user and 150 social media non user) were selected. The 43 orange growers were selected who removed orchard due to various reasons from Chandurbajar taluka of Amravati district from villages namely, Tondgaon, Jasapur, Madhan, Belaj and Talegaon Mohana and Mhasepathar, Budhala, Madasawangi villages from Kalmeshwar taluka and Yerla from Narkhed taluka from Nagpur district. These 43 orange growers were considered as respondents to identify reasons behind removal of orchard.

#### **3.4 Development and standardization of attitude scale**

Attitude can be defined as the degree of positive or negative affect associated with some psychological object (Thurstone, 1929). Thurstone defined “psychological object “as any symbol, phrase, slogan, idea, person or institution towards which people can differ with respect to positive or negative affect.

Allport (1967) defined attitude as “a mental and neural state of readiness, organized through experience, exerting directive or dynamic influence upon an individual's response to all objects and situations with which it is related”.

The attitude in this study is operationally defined as the degree of favourable or unfavourable feeling of orange grower towards social media.

Attitudes are imbibed through experiences and have a strong impact on the behaviour exerted by an individual. Further, it also assists the individual in exercising their decision-making skills efficiently. Attitude determines the outcome. Attitude is a multifaceted component of personality, beliefs, values, behaviours, and motivations. It play vital role in providing internal cognitions or beliefs and thoughts about people and objects and help us to behave in a particular way toward an object or person.

Social media are potential low cost tools that have the ability to increase the scope and coverage of agricultural extension.

Social media tools can be regarded as social communication technologies in which opportunities of farmers' feedback, interaction, and networking are much higher than other forms of extension information delivery. The number of social media (Whatsapp, YouTube, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others.) using farmer clientele is likely to increase substantially in near future. In order to utilize this tool for the benefit of farmers, it is necessary to know the attitude of the social media using farmers towards sharing of agricultural extension information through this tool.

To know about the attitude of orange grower towards social media, scale was developed and standardize and same was used for measuring attitude of orange growers towards social media.

The scale was developed on the basis of Likert's technique of summated rating scale. For systematic and accurate measurement of the attitude of orange growers towards social media and considering the need of development of instrument, same has been developed in following stages.

3.4.1 Collection and editing of items

3.4.2 Relevancy test

3.4.3 Item analysis and calculation of "t" value

3.4.4 Testing reliability of the scale

3.4.5 Testing validity of the scale

3.4.6 Final format of the attitude scale

3.4.7 Administration of the attitude scale

#### **3.4.1 Collection and editing of items**

The first step in developing scale is selection of statements or items. The items making up an attitude scale are known as statements. A statement may be defined as a sentence that says something about a psychological object. Here psychological object was social media. About 58 statements representing the attitude of orange growers towards social



**Plate 3: Investigator interviewing orange growers at Wathoda village of Warud taluka**



**Plate 4: Investigator interviewing orange growers at Jarud village of Warud taluka**

media were collected initially from various sources viz., relevant literature, discussion with experts, research guide and extension personnel. The statements, thus selected were edited on the basis of the criteria suggested by Thurston and Chave (1928), Likert (1932) and Edward (1969). At last, 45 statements were selected as they were found to be non ambiguous.

### **3.4.2 Relevancy test**

All the statements collected may not be relevant equally in measuring the attitude of orange growers towards social media. Hence, these statements were subjected to scrutiny by an expert panel to determine the relevancy and screening for inclusion in the final scale. For this, the list of scrutinised 45 statements were sent to a panel of 100 experts with request to critically evaluate each statement for its relevancy to measure attitude of orange growers towards social media.

The experts comprised Scientists of ICAR Research Stations and Institutions, Subject Matter Specialists and experts from State Agricultural Universities throughout the country for critical evaluation. The experts were requested to give their response on a three point continuum viz, most relevant, relevant and not relevant with scores 3, 2 and 1, respectively.

Out of 100 experts 92 responded in a time span of two months. The relevancy score of each item is ascertained by adding the scores on rating scale for all the 92 experts' responses. From this data, relevancy percentage, relevancy weightage and mean relevancy scores were worked out for all the statements by using the following formulae.

#### **3.4.2.1 Relevancy percentage (RP)**

Relevancy percentage was worked out by summing up the frequency score of most relevant, relevant, and not relevant categories i.e. number of judges who rated the statements most relevant, relevant, and not relevant, which were converted into percentage.

$$RP = \frac{FS}{MPS} \times 100$$

### 3.4.2.2 Relevancy weightage (RW)

Relevancy weightage is obtained by the formula

$$RW = \frac{MR+R+NR}{MPS}$$

### 3.4.2.3 Mean relevancy score (MRS)

This is obtained by the following formula

$$MRS = \frac{MR+R+NR}{N}$$

Where,

FS = Frequency score

MR = Most Relevant

R = Relevant

NR = Not Relevant

MPS = Maximum Possible Score (92 x 3 = 276)

N = Number of Judges (92)

Using these three criteria the statements were screened for their relevancy. Accordingly, statements having relevancy percentage >66 relevancy weightage >0.66 and mean relevancy score >2 were considered for final selection of statements. By this process, out of 45 statements, 32 statements have relevancy percentage >66, relevancy weightage >0.66 and mean relevancy score >2 were isolated in the first stage of screening, suitably modified and rewritten as per the comments of experts. Thus finally about 32 statements were selected after the relevancy test.

### 3.4.3 Item analysis and calculation of “t” value

The selected 32 statements were subjected to item analysis to demarcate the items based on the extent to which they can differentiate the orange growers with high attitude and low attitude towards social media. Thus scrutinized statements representing the attitude of orange



**Plate 5: Investigator interviewing orange growers at Shendurjanaghat village of Warud taluka**



**Plate 6: Investigator interacting with orange growers about adoption of modern agricultural practices at Pusla village of Warud taluka**

growers towards social media were administered to 42 (14% of total sample size) respondents from non sampling area.

The Akola district which is nearer to headquarter and exhibiting similar socio-economic features like study area was selected as non sampling area. In Akola district there were total seven talukas under orange cultivation. Out of these, two talukas namely, Akot and Telhara were selected randomly. The three villages from each taluka were selected purposively, as these villages having orange growers using social media as like sample area. Amboda, Akolkhed and Akoli Jahagir villages were selected from Akot taluka and Adgaon, Hiwarkhed and Zari Bajar villages were selected from Telhara taluka, respectively. From each selected village, seven orange growers who are using social media for orange cultivation and farming activities were selected purposively and they were considered as respondents for measurement of attitude.

The orange growers were asked to indicate their degree of agreement or disagreement with each statement on a five- point continuum ranging from “strongly agree” to “strongly disagree”, the scoring given was 5 weightage to strongly agree responses, 4 to agree, 3 to undecided, 2 to disagree and 1 to strongly disagree responses for favourable statements.

For negative attitude statements the scoring pattern was reversed viz. strongly agree response with 1 weightage, agree with 2, undecided with 3, disagree with 4 and strongly disagree with 5 weightage in that order. The respondents’ responses were recorded and the summated score for the total statements of each respondent was obtained. For each respondent the maximum possible score for 32 statements was 160 and the minimum was 32. The scores of the respondents were then arranged in a descending order. The 25 per cent from highest scores (high group) i.e. ten orange growers and 25 per cent from lowest scores (low group) i.e. ten orange growers were taken for the item analysis. These responses were subjected to item analysis for selection of the items that constitute the final attitude scale.

The critical ratio i.e., t-value which is a measure of the extent to which a given statement differentiates between the high and low groups

of respondents for each statement was calculated by using the formula proposed by Edward.

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{S^2_H}{n_H} + \frac{S^2_L}{n_L}}}$$

Where,

$\bar{X}_H$  = The mean score on a given statement for the high group

$\bar{X}_L$  = The mean score on a given statement for the low group.

$S^2_H$  = The variance of the distribution of the responses of the high group to the statement

$S^2_L$  = The variance of the distribution of the responses of the low group to the statement

$n_H$  = The number of orange growers in the high group

$n_L$  = The number of orange growers in the low group

After calculating the t- values for all the items of the attitude scale using the formula, the values of the statements were arranged in descending order from the highest to the lowest and 24 statements were selected from the scale whose values were highest i.e., with t- values more than 1.75 @ 1 per cent level of significance, for both positive and negative statements. Thus finally 24 statements were selected. The same is enclosed at the end of this dissertation as an appendix V.

The scale developed was further standardized by establishing its reliability and validity.

#### **3.4.4 Testing reliability of the scale**

According to Kerlinger (1964) reliability is the accuracy or precision of a measuring instrument. A scale is reliable when it consistently produces the similar results when applied to the same sample. Reliability of the testing instrument is the ability to give consistent, stable and accurate measurement score in repeated testing with same instrument. It helps to assess the homogeneity of items in scale. Reliability of the present scale



**Plate 7: Investigator interviewing orange growers at Pusla village of Warud taluka**



**Plate 8: Investigator interviewing orange growers at Morshi Gramin village of Morshi taluka**

was calculated by using test-retest method. Final 24 statements were administered to a new group of 42 orange growers of non sample area twice to the same sample with 15 days interval. Reliability quotient “r” was worked out i.e. 0.97. Hence, the constructed scale is reliable as the reliability quotient is greater and significant at 0.01 level of probability indicating the scale was highly reliable for administration to the respondents as the scale was stable and dependable in its measurement.

#### **3.4.5 Testing validity of the scale**

Validity means ability of any instrument to measure what one intended to measure. The developed scale was tested for content validity. According to Kerlinger (1987) content validity of scale is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument.

The content validity of the scale was determined through a group of 92 experts. Since as many items covering the area as possible were selected by discussion with experts, reviewing the literature and adherence to the judges’ ratings, it was ensured that items covered the various aspects of attitude of the orange growers towards social media. The content validity method was applied to test whether the developed scale could discriminate between the individuals who have favourable attitude towards social media and those who do not. The pilot testing exposed that the scale could differentiate the individuals having favourable attitude from that of unfavourable attitude towards social media. As the scale value difference for almost all the statements included had a very high discriminating value, it seemed reasonable to accept the scale as valid measure of the attitude. Thus it ensured a fair degree of validity.

#### **3.4.6 Final format of the attitude scale**

The final format of the scale to measure attitude of orange growers towards social media consists of 24 statements. Out of these, 19 statements are positive statements while five are negative statements. The same was enclosed at the end of this dissertation as an appendix VI.

Sl. No.	Statements	't' value	SA	A	UD	DA	SDA
1	I am well aware about modern technologies in orange cultivation through social media	2.910					
2	Social media makes me aware about current happenings in agriculture	2.979					
3	Multimedia feature attracts the use of social media in farming	3.250					
4	Information provided by social media is at relatively high cost (-ve)	4.230					
5	Agricultural information received through social media is difficult to use at grass root level (-ve)	1.909					
6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.	2.049					
7	Internet connectivity is not a problem in use of social media (-ve)	2.049					
8	Social media provides information in regional/local languages	4.024					
9	It makes possible to collect agricultural data from different geographical areas	1.755					
10	It provides weather forecasting updates by single click	2.861					
11	There is no need of skill and expertise for using social media (-ve)	4.431					
12	Time management with quality output is possible	2.703					
13	Social media is easy to operate and tackle by farmers	3.579					
14	Through social media I can learn from other farmers and agricultural experts	3.464					

15	Social media immediately provides information about pest and disease management	2.928					
16	Social media contents are not authentic, complete and interactive (-ve)	2.928					
17	It helps to make group of farmers having common interest	2.060					
18	It is powerful tool for e-marketing of oranges	2.138					
19	Social status is increased due to use of social media by orange growers	3.160					
20	Direct selling of oranges is possible through social media without middleman	3.157					
21	It helps to get knowledge about orange export	2.529					
22	Product branding is possible due to social media	3.806					
23	Economic benefit is possible due to social media	4.365					
24	It increases confidence among the orange growers	2.449					

### 3.4.7 Administration of the attitude scale

The final scale which would measure the attitude of orange growers towards social media was consisted of 24 statements. The 24 statements selected for the final format of the attitude scale were randomly arranged to avoid response biases. The scale can be administered on a five point continuums viz., strongly agree, agree, undecided, disagree and strongly disagree with a score of 5,4,3,2 and 1, respectively for positive statements and reverse scoring for negative statements. Therefore, the overall possible attitude score of the individual orange grower towards social media could range from 24 to 120. The high score of scale



**Plate 9: Investigator interviewing orange growers at Dongaryawali village of Morshi taluka**



**Plate 10: Investigator interviewing orange growers at Molwan village of Morshi taluka**

represented the favourable attitude of orange growers towards social media.

### **3.5 Preparation of interview schedule**

A structured interview schedule was prepared in line with objectives of study. The schedule was finalized after reviewing the relevant literature, discussion with subject experts and members of the advisory committee. The first part of the interview schedule dealt with the general information and the selected personal, socio-economic, communicational and psychological characteristics of the orange growers. The second part of the interview schedule was devoted to the standardized scale pertaining to measure attitude of orange growers towards social media. The third part constituted eight impact parameters. The fourth and fifth part constitutes constraints faced by orange growers while using social media and suggestions to overcome these constraints and fifth part constituted respectively.

#### **3.5.1 Pre-testing of interview schedule**

The schedule was pre-tested by interviewing the 42 beneficiaries in a non-sampled area against ambiguity and redundancy, in the light of the pretested experience, the interview schedule was modified and used for the data collection after preparing number of requisite copies. The same schedule is enclosed at the end of this dissertation as an annexure VII.

### **3.6 Collection of data**

Data were collected by personal interview method. Interview was conducted at residence of respondent so as to review overall situation of the family by researcher. In most of the cases, interview was also conducted at the farm of orange growers. In addition to personal interview, observations and discussions with the neighbours, key informants were some important methods used for data collection. The obtained score of each variable was used for categorization and the relational analysis. The secondary data were collected from officials of state department of agriculture of Amravati and Nagpur districts.



**Plate 11: Investigator interviewing orange growers at Pala village of Morshi taluka**



**Plate 12: Investigator interviewing orange growers at Pala village of Morshi taluka**

### 3.7 Variables, their operational definitions, measurements and categorization

For the present study, three sets of variables, namely; independent, intervening and dependent variables were selected. The independent variables included were personal, socio-economic, communicational and psychological characteristics. Attitude studied as intervening variable. The dependent variable was Impact of social media on orange growers. Constraints faced by beneficiary farmers while using social media were also studied. Suggestions were invited from the orange growers to overcome constraints. The details about the independent and dependent variables and their empirical measures are shown in Table 10

**Table 10. List of variables and their measurements**

Sl. No.	Variables	Measurements
<b>A)Independent Variables</b>		
1	Education	The number of standards of formal education accomplished by the respondent was considered as his/her educational score.
2	Family size	It was measured as total number of members in respondent's family under common roof and itself considered as score.
3	Occupation	Schedule was developed.
4	Land holding	A total hectare of land possessed by individual was taken as score of that particular respondent.
5	Size of orchard	Actual area in hectare under orange crop grown by an individual orange grower
6	Farming experience	Number of years from which the respondent had actual experience in cultivation of

		different crops on their farm. Years of experience on farm was considered as his/her score.
7	Social participation	Schedule was developed. Numerical score of 1 was assigned for the membership of informal organization, whereas a score of 2 was assigned for the office bearer of informal organization. Similarly for formal organization, a score of 3 was assigned for the membership where as, a score of 4 was assigned for office bearer.
8	Annual income	The total income of respondent and their family members received in rupees from all the sources in a year was considered as score.
9	Availability of social media	It refers to number of social media's like Whatsapp, YouTube, Internet, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others. were available to orange grower on his own device or from other sources. In order to measure it, score 1 was given for each media available to orange grower. On the basis of equal interval method respondents were categorized.
10	Source of information	Schedule was developed. It was measured in terms of its frequency of use as regular, occasional and never by assigning score 2, 1, and 0, respectively.
11	Innovativeness	It was measured with the help of scale developed by Singh (1972) with slight modification.

12	Risk orientation	It was measured with the help of scale developed by Supe (1969) with slight modification.
13	Market orientation	The success of a productive enterprise depends to a greater extent on the ability of a farmer to make intelligent buying of inputs and selling of the produce. The scale developed by Samanta (1977) with slight modifications was used.
14	Utilization pattern of social media by orange growers	Schedule was developed for the study
<b>B) Intervening Variable</b>		
1	Attitude	Scale was developed.
<b>C) Dependent Variables</b>		
1	Impact of social media on orange growers	Schedule was developed for the study. The impact was measured by summing up per cent changes in the impact parameters under study, social media user and nonuser orange growers. Thus, the impact of social media was conceptualized as a composite measure of eight impact parameters namely change in knowledge, change in adoption, change in production, change in orchard management, change in annual income, change in family expenditure, change in material possession and change in self confidence. Schedule was developed for each parameter.

For any study to be undertaken in social science it is customary to explain precisely the variables selected with their connection.



**Plate 13: Investigator interviewing orange growers at Hiwarkhed village of Morshi taluka**



**Plate 14: Investigator interviewing orange growers at Eklasur village of Achalpur taluka**

The variables selected for this study along with its operational definitions and procedures employed to measure them are delineated as under.

### 3.7.1 Independent variables

Various independent variables under the study was operationally defined and categorized as below.

#### 3.7.1.1 Education

It is operationally defined as number of year of formal schooling completed by the respondent.

A numerical score of one was assigned to each standard passed by the respondent and following categories was formed on the basis of their educational qualification.

SI. No.	Category	Standard of education
1	Illiterate	Cannot read and write
2	Primary school	1 <sup>st</sup> to 4 <sup>th</sup>
3	Middle school	5 <sup>th</sup> to 7 <sup>th</sup>
4	Secondary school	8 <sup>th</sup> to 10 <sup>th</sup>
5	Higher Secondary school/Junior College	11 <sup>th</sup> to 12 <sup>th</sup>
6	Diploma or Technical education	Based on 10 <sup>th</sup> or 12 <sup>th</sup>
7	Under graduate	12+3/12+4/12+5
8	Post graduate	Post graduate courses (UG+2/3)

#### 3.7.1.2 Family size

It is operationally defined as total number of members residing together in the family of respondent under common roof having blood relations and sharing common food.

One score was assigned to each member and finally total score obtained was categorized into three classes, according to the present concept of the family size.



**Plate 15: Investigator interviewing orange growers at Pathrot and Vadgaon village of Achalpur taluka**



**Plate 16: Investigator interviewing orange growers at Pathrot village of Achalpur taluka**

SI. No.	Category	Family size (members)
1	Small	Up to 4
2	Medium	5 to 6
3	Large	7 and above

### 3.7.1.3 Occupation

It is operationally defined as the activities in which respondent and his family was regularly engaged and get major income out of them.

For its measurement schedule was developed and it was measured as follows.

SI. No.	Occupation	Score
1	Agriculture+ Horticulture +labour	1
2	Agriculture+ Horticulture	2
3	Agriculture+ Horticulture +allied occupation	3
4	Agriculture+ Horticulture +business	4
5	Agriculture + Horticulture +services	5

### 3.7.1.4 Land holding

It is operationally defined as the actual hectare of land possessed by the respondent at the time of investigation.

The categorization of the land holding was formed as per the five categories given in NCEUS (2008). Govt. of India

SI. No.	Land holding	Area (ha)
1	Marginal	Up to 1.00 ha.
2	Small	1.01 to 2.00 ha.
3	Semi medium	2.01 to 4.00 ha
4	Medium	4.01 to 10.00 ha
5	Large	Above 10.00 ha

### 3.7.1.5 Size of orchard

It is operationally defined as actual area in hectare under orange crop cultivation of orange growers. Actual land in hectares put by the individual orange grower for orange crop was considered as score. The categorization was done after obtaining the score on the basis of equal interval method.

On the basis of highest and lowest size of orchard, the respondents were grouped into three different categories by using equal interval method after investigation.

The highest obtained size of orchard was 5 ha and the lowest obtained size of orchard was 0.40 ha . The categorization of size of orchard on the basis of highest and lowest obtained size of orchard has been done in three categories, keeping an equal interval.

While preparing the categories for size of orchard, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned}\text{Interval} &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\ &= \frac{5-0.40}{3} \\ &= \frac{4.6}{3} \\ &= 1.53\end{aligned}$$

Sl. No.	Category	Size of orchard (ha)
1	Small	Up to 1.93
2	Medium	1.94 to 3.46
3	Large	Above 3.46



**Plate 17: Investigator interviewing orange growers at Vadura village of Achalpur taluka**



**Plate 18: Investigator interviewing orange growers at Dhamangaon Gadhi village of Achalpur taluka**

### 3.7.1.6 Farming experience

It is operationally defined as the number of years from which orange grower had actual experience in cultivation of different crops on their farm.

On the basis of highest and lowest farming experience, the respondents were grouped into three different categories by using equal interval method after investigation.

The highest obtained farming experience was 38 years and the lowest obtained farming experience was 4 years. The categorization of farming experience on the basis of highest and lowest obtained farming experience has been done in three categories, keeping an equal interval.

While preparing the categories for farming experience, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned}\text{Interval} &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\ &= \frac{38-4}{3} \\ &= \frac{34}{3} \\ &= 11.33\end{aligned}$$

Thus, by adding interval in lowest obtained farming experience first category was formed and subsequent categories were formed by adding interval in upcoming categories.

SI. No.	Category	Farming experience (years)
1	Low	Up to 15.33
2	Medium	15.34 to 26.66
3	High	Above 26.66

### 3.7.1.7 Social participation

It is operationally defined as an active participation and involvement of respondent in formal and informal social organizations, whether as member or office bearer.

The scoring on 4 and 3 was for office bearer and members, respectively in formal organization and 2 and 1 was for office bearer and members, respectively in informal organization. The sum total score was worked out for each respondent. The participation of respondent as office bearer or member in formal and informal organization was as certain and suitable score was assigned as given in following table.

Sl. No.	Social participation	Score
1	No social participation	0
2	Member of informal organization	1
3	Office bearer of informal organization	2
4	Member of formal organization	3
5	Office bearer of formal organization	4

On the basis of mean and standard deviation respondents were grouped in three categories as give below.

Sl. No.	Category	Score range
1	No social participation	0
2	Low	Up to 1
3	Medium	2 to 3
4	High	4 and Above

Mean=2.00

SD=1.29

### 3.7.1.8 Annual income

It is operationally defined as gross income in rupees derived from all sources in year by orange growers and their family members.



**Plate 19: Investigator interviewing orange growers at Vadgaon village of Achalpur taluka**



**Plate 20: Investigator interviewing orange growers at Ambala village of Katol taluka**

On the basis of highest and lowest annual income, the respondents were grouped into five different categories by using equal interval method after investigation.

The highest obtained annual income was Rs. 32,00,000/- and the lowest obtained annual income was Rs. 1,95,000/-. The categorization of annual income on the basis of highest and lowest obtained annual income has been done in five categories, keeping an equal interval.

While preparing the categories for annual income, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned} \text{Interval} &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\ &= \frac{3200000 - 195000}{5} \\ &= \frac{3005000}{5} \\ &= 601000 \end{aligned}$$

Thus, by adding interval in lowest obtained annual income first category was formed and subsequent categories were formed by adding interval in upcoming categories.

Sl. No.	Annual income (Rs.)
1	Up to Rs. 7,96,000/-
2	Rs. 7,96,001 to 13,97,000/-
3	Rs. 13,97,001 to 19,98,000/-
4	Rs. 19,98,001 to 25,99,000/-
5	Above Rs. 25,99,000/-

### 3.7.1.8.1 Annual income from orange cultivation

It is operationally defined as gross income in rupees derived from orange cultivation in year by orange growers and their family members.

On the basis of highest and lowest annual income from orange cultivation, the respondents were grouped into five different categories by using equal interval method after investigation.

The highest obtained annual income was Rs. 14,00,000/- and the lowest obtained annual income was Rs. 1,95,000/-. The categorization of annual income on the basis of highest and lowest obtained annual income from orange cultivation has been done in five categories, keeping an equal interval.

While preparing the categories for annual income from orange cultivation, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned}\text{Interval} &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\ &= \frac{1400000 - 195000}{5} \\ &= \frac{1205000}{5} \\ &= 241000\end{aligned}$$

Thus, by adding interval in lowest obtained annual income first category was formed and subsequent categories were formed by adding interval in upcoming categories.

Sl. No.	Annual income (Rs.)
1	Up to Rs. 4,36,000/-
2	Rs. 4,36,001 to 6,77,000/-
3	Rs. 6,77,001 to 9,18,000/-
4	Rs. 9,18,001 to 11,59,000/-
5	Above Rs. 11,59,000/-



**Plate 21: Investigator interviewing orange growers at Ladgaon village of Katol taluka**



**Plate 22: Investigator interviewing orange growers about utilization of different social media**

### 3.7.1.9 Availability of social media

It refers to number of social media's like Whatsapp, YouTube, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others. are available to orange grower on his own device or from other sources. Frequency and percentage for each social media by orange grower was worked out for interpretation.

On the basis of highest and lowest availability of social media, the respondents were grouped into three different categories by using equal interval method after investigation.

The highest obtained availability of social media was 9 and the lowest obtained availability of social media was 0. The categorization of availability of social media on the basis of highest and lowest obtained availability of social media has been done in three categories, keeping an equal interval.

While preparing the categories for availability of social media, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned}\text{Interval} &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\ &= \frac{9-0}{3} \\ &= \frac{9}{3} \\ &= 3\end{aligned}$$

The respondents were grouped into different categories by using equal interval method after investigation.

SI. No.	Category	Score range
1	Low	Up to 3
2	Medium	4 to 6
3	High	Above 6

### 3.7.1.10 Source of information

It is operationally defined as frequency with which the sources are consulted by orange grower in order to seek information.

The orange growers were asked to state their frequency of use in terms of regular, occasional and never and scored as 3, 2 and 1, respectively. For its measurement schedule was developed.

Sl. No.	Sources of information	Frequency of Contact		
		Regular (3)	Occasional (2)	Never (1)
<b>A)</b>	<b>Localite sources</b>			
1	Sarpanch			
2	Friends/relatives			
3	Neighbours			
4	Progressive farmer			
5	Other (Localite leaders)			
<b>B)</b>	<b>Cosmopolite sources</b>			
1	Gramsevak			
2	Talathi			
3	Agricultural Assistant			
4	Agricultural Supervisor			
5	Mandal Agriculture Officer			
6	Taluka Agriculture Officer			
7	Sub Divisional Agriculture Officer			
8	District Superintendent Agriculture Officer			
9	University scientist			
10	KVK scientist			
11	Representatives of NGO's			
12	Technology Resources (NRCC, Dr. PDKV, Akola)			
13	Regional Fruit Research Station, Katol, Dist- Nagpur			

14	Research Station, Achalpur, Dist- Amravati			
<b>C)</b>	<b>Mass media</b>			
1	Radio			
2	Television			
3	Newspaper			
4	Farm magazine			
5	Smartphone			
6	Computer with internet			
7	Technology Resources (NRCC, Dr. PDKV, Akola)			
8	Regional Fruit Research Station, Katol, Dist- Nagpur			
9	Research Station, Achalpur, Dist- Amravati			

Score of all the information sources were added together and on the basis of mean and standard deviation the respondents were grouped into following categories.

Sl. No.	Category	Score range
1	Low	Up to 47.83
2	Medium	47.84 to 54.39
3	High	Above 54.39

Mean= 51.11

SD= 3.28

### 3.7.1.11 Innovativeness

It is defined as the degree to which an individual adopts new ideas, relatively earlier than others in his social system (Rogers and Svenning, 1969).

It is operationally defined as the degree to which an individual orange grower is relatively earlier in adopting various social medias than other farmers of that area.



**Plate 23: Investigator collecting data from orange growers about online marketing of oranges**



**Plate 24: Investigator interviewing orange growers at Paradshinga village of Katol taluka**

A scale developed by Singh (1972) was used with slight modification to measure the innovativeness. The responses were rated on three point continuum namely, agree, undecided and disagree. The positive statements were assigned the scores of 3, 2, and 1 for response categories namely agree, undecided and disagree, respectively and reverse procedure of scoring was done for negative statements. The scores earned on all statements of the scale were summed up and this sum total was indication of innovativeness score for that individual respondent.

Further three categories of innovativeness were formed on the basis of mean and standard deviation.

Sl. No.	Category	Score range
1	Low	Up to 11.36
2	Medium	11.37 to 15.48
3	High	Above 15.48

Mean=13.42

SD=2.06

### 3.7.1.12 Risk orientation

It is operationally defined as the degree to which orange grower is oriented towards risk and has courage to face the problems and uncertainty in adoption of different social media. It was measured with the help of scale developed by Supe (1969) with slight modification.

There were six statements, out of these, statement number 1, 2, 3, 4 and were positive, while statement number 5 and 6 were negative. The response to each statement was rated on a five point continuum as strongly agree, agree, undecided, disagree, and strongly disagree against each statement. A score of 5, 4, 3, 2, and 1 was assigned to the above response categories in case of positive statements and the scoring pattern was reversed for negative statements. The risk preference score was the summated score of overall six statements in the scale.

Further, the respondents were categorized into three categories by taking the mean and standard deviation as measures of check.



**Plate 25: Investigator visiting Taluka Agriculture office, Kalmeshwar, Narkhed and Katol taluka**



**Plate 26: Investigator visiting Regional Fruit Research Station, Katol, Dist- Nagpur**

Sl. No.	Category	Score range
1	Low	Up to 18.91
2	Medium	18.92 to 25.00
3	High	Above 25.00

Mean= 21.87

SD=3.13

### 3.7.1.13 Market orientation

It refers to degree to which an individual respondent is oriented towards efficient marketing of product as major component of farm management. Marketing orientation is an important component for sustained progress. The success of a productive enterprise depends to a greater extent on the ability of a farmer to make intelligent buying of inputs and selling of the produce.

It is operationally defined as ability of orange grower to make intelligent buying of inputs and selling of produce through social media services.

Though orange growers depend mostly on local resources, they have to have knowledge on market to sell their products. So, marketing orientation is an important component for sustained progress. This was measured with the help of the component of marketing orientation of management orientation scale developed by Samanta (1977) with slight modifications. The scale consists of six items of which three are positive and three are negative items. The items were rated on a five- point continuum ranging from strongly agree to strongly disagree with the respective scores of 5,4,3,2, and 1.

Sl. No.	Category	Score range
1	Strongly agree	5
2	Agree	4
3	Undecided	3
4	Disagree	2
5	Strongly disagree	1

The respondents were classified as low, medium and high categories using mean and standard deviation as follows.

Sl. No.	Category	Score range
1	Low	Up to 18.74
2	Medium	18.75 to 25
3	High	Above 25

Mean= 21.87

SD= 3.13

### **3.7.1.14 Utilization pattern of social media**

In the present study, the extent of utilization was referred as the degree to which social media services were utilized by the orange growers. An index of extent of utilization was developed for this purpose.

It is well known fact that efforts with all the possible media of communication are being made in order to reach rural mass specifically in the field of agriculture with the varied features. Social media plays a vital role in making the farmers to realize the need for adopting new practices and technology with new skills and promote attitude of mind conducive to economic growth. Social media have due importance in agricultural development, but very few researchers are available on utilization pattern of different social medias by the orange growers.

Although there has been tremendous development and expansion of social medias, we still do not know to what extent orange growers utilize available social medias with them. Thus in this study, efforts were made to access the utilization pattern of social media by the orange growers in the study area. Utilization pattern of social media was measured on the basis of three parameters, frequency of use, extent of reach and perceived satisfaction.

#### **3.7.1.14.1 Frequency of use of the social media**

It is operationally defined as the frequency with which the particular social media were used by the respondent. The schedule was prepared enlisting the social medias namely Whatsapp, YouTube, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others. and they were



**Plate 27: Investigator visiting District Superintendent Agriculture Office, Nagpur**



**Plate 28: Investigator interviewing orange growers at Ambala village of Katol taluka**

asked to respond over the frequency with which they were availing the social medias viz., daily, more than two times a week, once a week, once a fortnight, occasionally and rarely. A weighted score of 6,5,4,3,2 and 1 was given respectively as follows.

SI. No.	Category	Score Range
1	Daily	6
2	More than two times a week	5
3	Once a week	4
4	Once a fortnight	3
5	Occasionally	2
6	Rarely	1

On the basis of mean and standard deviation of index of frequency of use of social media respondents were grouped in three categories as given below.

SI. No.	Category	Score range
1	Low	Up to 50.77
2	Medium	50.78 to 71.73
3	High	Above 71.73

Mean= 61.25

SD= 10.48

#### 3.7.1.14.2 Extent of reach

It is operationally defined as the ratio between the number of messages were received by the orange growers to the number of messages used/adopted by them. The orange growers were asked about the number of messages delivered per day by the social media, number of messages accessed by the orange grower, no of messages utilized/adopted by the orange grower, no. of phone calls made, no. of quiz programmes participated and no. of call back facilities availed. The number of help line services availed also were taken.

SI. No.	Category	Score range
1	Per Day	4
2	Per Week	3
3	Per fortnight	2
4	Per Annum	1

On the basis of mean and standard deviation of index of extent of reach of social media of respondents were grouped in three categories as give below.

SI. No.	Category	Score range
1	Low	Up to 52.53
2	Medium	52.54 to 69.53
3	High	Above 69.53

Mean= 61.03

SD= 8.50

### 3.7.1.14.3 Perceived satisfaction

It is operationally defined as fulfillment of needs and expectations to orange growers from social media services. For it's measurement schedule was developed. The schedule consisted of statements to be rated on a five-point continuum with the score of 4,3,2,1, and 0 for highly satisfied, satisfied, undecided, unsatisfactory to the highly unsatisfactory, respectively.

SI. No.	Category	Score range
1	Highly Satisfied	4
2	Satisfied	3
3	Undecided	2
4	Unsatisfactory	1
5	Highly Unsatisfactory	0



**Plate 29: Investigator interviewing orange growers at Khandala village of Katol taluka**



**Plate 30: Investigator visiting Taluka Agriculture office of Warud, Achalpur, Morshi and Chandurbajar Taluka of Amravati district**

On the basis of mean and standard deviation of index of perceived satisfaction of respondents were grouped in three categories as give below.

SI. No.	Category	Score range
1	Low	Up to 27.71
2	Medium	27.72 to 72.43
3	High	Above 72.43

Mean= 50.07

SD= 22.36

The summation of average index scores of those selected sub indicators was chosen for composite index of extent of utilization using the following formula.

Extent of Utilization Index =

$$\frac{\sum Si}{n} = \frac{SI_1+SI_2+SI_3}{3}$$

Where,

SI<sub>1</sub> = Sub index value of frequency of use of social media services

SI<sub>2</sub> = Sub index value of extent of reach

SI<sub>3</sub> = Sub index value of perceived satisfaction over the services provided by the social media services

n = number of sub-indicators

The obtained index values were categorised into five groups viz., very low, low, medium, high and very high based on the equal interval method.

On the basis of highest and lowest utilization pattern index, the respondents were grouped into 5 different categories by using equal interval method after investigation.

The highest obtained utilization pattern index was 79.81 and the lowest obtained utilization pattern index was 37.64. The categorization of utilization pattern index on the basis of highest and lowest obtained

score of utilization pattern index has been done in five categories, keeping an equal interval.

While preparing the categories for utilization pattern index, the equal interval between highest and lowest obtained score was computed as follows,

$$\begin{aligned}
 Interval &= \frac{\text{Highest obtained score} - \text{Lowest obtained score}}{\text{No. of categories}} \\
 &= \frac{79.81 - 37.64}{5} \\
 &= \frac{42.17}{5} \\
 &= 8.43
 \end{aligned}$$

Further correlation analysis was done to find the correlation between the personal, socio-economic, communicational and psychological characteristics of the orange growers with their extent of utilization.

The respondents were categorized on the basis of the equal interval method as follows.

SI No.	Category	Score range
1	Very low	Up to 46.07
2	Low	46.08 to 54.5
3	Medium	54.6 to 62.93
4	High	62.94 to 71.36
5	Very high	Above 71.36

Mean= 57.45

SD= 10.64

### 3.7.2 Intervening variable

#### 3.7.2.1 Attitude

Aiken (1982) refers attitude as a tendency to react positively or negatively to some person, object, situation, institution or event.

In present study it is operationally defined as the degree of favourable or unfavourable feeling of orange growers towards social media.



**Plate 31: Investigator visiting Ariculture Research Station, Achalpur, Dist- Amravati**



**Plate 32: Investigator interviewing orange growers about attitude towards social media in non sampling area**

To measure attitude of orange growers towards social media, scale was developed and standardized and same was used in the present study for measuring attitude of orange growers towards social media.

The scale consists of 24 statements, out of these, 5 statements were negative viz. statement number 4, 5, 7, 11 and 16, while, remaining 19 statements were positive. The response to each statement was rated on a five point continuum as strongly agree, agree, undecided, disagree and strongly disagree against each statement. A score of 5, 4, 3, 2 and 1 was assigned to the above response categories in case of positive statements and the scoring pattern was reversed for negative statements. The respondents responses were recorded and the summated score for the total statements of each respondent was obtained. For each respondent the maximum possible score for 24 statements was 120 and the minimum was 24.

<b>Sl. No.</b>	<b>Category</b>	<b>Score range</b>
1	Strongly agree	5
2	Agree	4
3	Undecided	3
4	Disagree	2
5	Strongly disagree	1

Further attitude score of orange growers was calculated by adding all scores and on the basis of obtained individual attitude score was converted into attitude index as below

$$\text{Attitude index} = \frac{\text{Sum of attitude score obtained by respondent}}{\text{Sum of obtainable score}} \times 100$$

On the basis of obtained attitude index score, respondents were grouped into three categories by equal interval method as given below.

<b>Sl. No.</b>	<b>Category</b>	<b>Score range</b>
1	Less favourable	Up to 33.33
2	Moderately Favourable	33.34 to 66.66
3	Highly favourable	Above 66.66

### **3.7.3 Dependent variable**

#### **3.7.3.1 Impact of social media**

Rogers and Shoemaker (1984) defined impact as the change that occurs to an individual or to a social system as a result of the adoption or rejection of an innovation.

The dictionary meaning of the term impact is a strong impression or effect. Impression is the effect on mind or feeling and effect is a result or outcome. Thus, impact means the effect or mental awareness and behavioural outcome as the changes occurred at the respondent as the result of implementation of social media.

Impact of social media on orange grower is operationally defined as the effect of social media on orange growers in the study area. The effect was ascertained in terms of parameters change in knowledge, change in adoption, change in production, change in orchard management, change in annual income, change in family expenditure, change in material possession and change in self confidence were covered under impact.

The impact of social media was computed by summing up the values of means per cent change in knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence of social media user and non user orange growers.

For computation of impact mean values change in percentage with regard to the aforesaid eight impact parameters were summed up.

##### **3.7.3.1.1 Change in Knowledge**

English and English (1961) defined knowledge as a body of understood information by an individual.



**Plate 33: Investigator interviewing orange growers at Budhala and Mhasepathar village of Kalmeshwar taluka**



**Plate 34: Investigator interviewing orange growers at Pipla Tinkhede village of Kalmeshwar taluka**

The change in knowledge is operationalized as the difference between the knowledge of social media user and non user orange grower about improved orange cultivation practices, marketing and other farming activities. These changes were measured through the orange growers' agreement or disagreement on a set of statements relating to improved orange cultivation, marketing practices and other farming activities. It was measured on two point continuum i. e., Yes or No by assigning score 1 and 0, respectively. The per cent change in knowledge was calculated by using following formula.

$$\Delta Kn = \frac{Ksm - Knsm}{Knsm} \times 100$$

Where,

$\Delta Kn$  = Per cent change in knowledge

$Ksm$  = Knowledge social media user respondents

$Knsm$  = Knowledge of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 14.72
2	Medium	14.73 to 72.5
3	High	Above 72.5

Mean=43.61

SD=28.89

### 3.7.3.1.2 Change in Adoption

Adoption is a decision to make full use of an innovation as the best course of action available.

The change in adoption is operationalized as the difference between adoption of improved orange cultivation practices, marketing and other farming activities by social media user and non user orange grower. It was measured on three point continuum as orange growers' full, partial and no adoption by assigning score 2, 1 and 0, respectively on a set of statements relating to improved orange cultivation, marketing practices and other farming activities.

The per cent change in adoption was calculated by using following formula.

$$\Delta Ad = \frac{Asm - Ansm}{Ansm} \times 100$$

Where,

$\Delta Ad$  = Per cent change in adoption

Asm = Adoption of social media user respondents

Ansm = Adoption of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 12.95
2	Medium	12.96 to 46.07
3	High	Above 46.07

Mean=29.51

SD=16.56

### 3.7.3.1.3 Change in Production

The production refers to total potential in terms of biological and economic yield of crop.

The change in production is operationalized as difference between orange production of social media user and non user orange grower.

In present study economic yield of orange crop was measured as production in terms of tonnes by the orange grower.

The per cent change in production was calculated by using following formula.

$$\Delta Pn = \frac{Psm - Pnsm}{Pnsm} \times 100$$

Where,

$\Delta Pn$  =Per cent change in production



**Plate 35: Investigator interviewing orange growers about reasons behind fruit drop in oranges**



**Plate 36: Investigator interviewing orange growers at Kondhali village of Kalmeshwar Taluka**

Psm =Production of social media user respondents

Pnsm = Production of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 6.15
2	Medium	6.16 to 17.67
3	High	Above 17.67

Mean=11.91

SD=5.76

#### 3.7.3.1.4 Change in Orchard management

Orchard management refers to the management of different fruit crops in such a way that fruit trees give higher yield of quality fruits in successive years for sustainable economic returns. In the present study orchard management was considered as management of orange fruit crops in such way that higher yield of quality fruits. For it's measurements different orchard management practices was considered. It was measured on three point continuum as orange growers' full, partial and no adoption by assigning score 2, 1 and 0, respectively on a set of statements relating to orchard management practices.

The change in orchard management is operationalized as difference between practices followed for orchard management by social media user and non user orange growers.

The per cent change in orchard management was worked out with the help of following formula.

$$\Delta Om = \frac{Omsm - Omnsm}{Omnsm} \times 100$$

Where,

$\Delta Om$  = Per cent change in orchard management

Omsm = Orchard management by social media user respondents

Omnsm = Orchard management by non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 8.60
2	Medium	8.61 to 16.20
3	High	Above 16.20

Mean= 12.40

SD= 3.80

### 3.7.3.1.5 Change in Annual income

Annual income refers to the gross income in rupees derived from all sources in year by the individual and their family members. The annual income of social media user and non user orange growers was measured on equal interval basis.

The change in income means Increase or decrease in the income of an individual and their family members.

In the present study the change in annual income is operationalized as the difference between annual income of social media user and non user orange grower.

The per cent change in annual income was worked out with the help of following formula.

$$\Delta Ai = \frac{Aism - Ainsm}{Ainsm} \times 100$$

Where,

$\Delta Ai$ = Per cent change in annual income

Aism = Annual income of social media user respondents

Ainsm = Annual income of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.



**Plate 37: Investigator interviewing orange growers at Madasawangi village of Kalmeshwar taluka**



**Plate 38: Investigator interviewing orange growers at Yerla village of Narkhed taluka**

Sl. No.	Category	Score range
1	Low	Up to 6.06
2	Medium	6.07 to 19.72
3	High	Above 19.72

Mean= 12.89

SD=6.83

### 3.7.3.1.6 Change in Family expenditure

Family expenditure refers to the total expenditure in rupee of the individual and his family during a calendar year. An expense incurred for whatever is used or kept for use in the family whether necessities or luxuries. The expense incurred by orange grower and his family for food, housing, education, clothing, health, travel, electricity, foot wares, purchase of farm inputs and management of farm, religious function, and on other luxuries items, others. was considered under family expenditure. It was measured by considering different expenditure areas of orange grower and his family members for fulfillment of necessary wants, on farming and for purchase of luxuries items. The actual expenditure incurred on these areas by the social media user and non user orange grower was considered.

In the present study the change in family expenditure is operationalized as the difference between family expenditure on different things by social media user and non user orange growers.

The per cent change in family expenditure was calculated by using following formula.

$$\Delta Fe = \frac{Fesm - Fensm}{Fensm} \times 100$$

Where,

$\Delta Fe$  = Per cent change in family expenditure

$Fesm$  = Family expenditure of social media user respondents

$Fensm$  = Family expenditure of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 9.44
2	Medium	9.45 to 31.82
3	High	Above 31.82

Mean= 20.63

SD=11.19

### 3.7.3.1.7 Change in Material possession

Material possession refers to the materials possessed by an individual farmer for household use and for farming purposes.

The change in material possession is operationalized as difference between possession of various household, farming and other materials by the social media user and non user orange growers.

The household goods and material possessed by the respondent namely furniture, transport vehicle, communication material, kitchen material, storage structure, farm mechanization equipments and other was taken into consideration.

The per cent change in material possession was worked with the help of following formula.

$$\Delta Mp = \frac{Mpsm - Mpns}{Mpns} \times 100$$

Where,

$\Delta Mp$ = Per cent change in material possession

$Mpsm$  = Material possession of social media user respondents

$Mpns$  = Material possession of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 10.91
2	Medium	10.92 to 28.37
3	High	Above 28.37

Mean=19.64

SD=8.73



**Plate 39: Investigator interviewing orange growers at Khapari Kene village of Narkhed taluka**



**Plate 40: Investigator interviewing orange growers at Khapari Kene village of Narkhed taluka**

### 3.7.3.1.8 Change in Self confidence

Self confidence means the feelings or respondent's ability, initiative and deal to achieve the goal or aim.

It indicates the extent of faith one exhibits in one's own capabilities and abilities in finding solutions to confronting problems.

Self confidence of respondent was measured on the basis of scale developed by Basavanna (1974) with slight modifications. The scale consist of eight statements of which, four are positive and four are negative. The statements in the scale was rated on a five- point continuum. The positive statements was assigned the scores of 5,4,3,2, and 1 for response categories namely strongly agree, agree, undecided, do not agree and strongly disagree, respectively and reverse score was assigned for negative statements.

In this study, the change in self confidence is operationalized as difference between the ability to achieve the goals or aim by social media user and non user orange growers.

The per cent change was calculated by using following formula.

$$\Delta Sc = \frac{Scsm - Scnsm}{Scnsm} \times 100$$

Where,

$\Delta Sc$  = Per cent change in self confidence

Scsm = Self confidence of social media user respondents

Scnsm = Self confidence of non social media user respondents

On the basis of mean and standard deviation, the respondents were grouped into three categories as follows.

SI. No.	Category	Score range
1	Low	Up to 34.86
2	Medium	34.87 to 65.92
3	High	Above 65.92

Mean=50.39

SD=15.53

### Overall impact of social media on orange growers

The impact score of social media on orange growers was computed by summing up the mean values of change in percentage of selected eight impact parameter change in knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence as follows.

$$\text{Impact Score} = \frac{\Delta\text{Kn} + \Delta\text{Ad} + \Delta\text{Pn} + \Delta\text{Om} + \Delta\text{Ai} + \Delta\text{Fe} + \Delta\text{Mp} + \Delta\text{Sc}}{8}$$

Where,

- $\Delta\text{Kn}$  = Per cent change in Knowledge
- $\Delta\text{Ad}$  = Per cent change in Adoption
- $\Delta\text{Pn}$  = Per cent change in Production
- $\Delta\text{Om}$  = Per cent change in Orchard management
- $\Delta\text{Ai}$  = Per cent change in Annual income
- $\Delta\text{Fe}$  = Per cent change in Family expenditure
- $\Delta\text{Mp}$  = Per cent change in Material possession
- $\Delta\text{Sc}$  = Per cent change in Self confidence

The overall impact of orange growers was categorized on the basis of the mean and standard deviation as follows.

SI No.	Category	Score range
1	Low	Up to 19.51
2	Medium	19.52 to 30.73
3	High	Above 30.73

Mean= 25.12

SD=5.61

### 3.8 Constraints

Reading (1971) defined constraints as use of force to influence or prevent an action or quality or state of being completed to do or not to do something.



**Plate 41: Investigator interviewing orange growers at Mendhala village of Narkhed taluka**



**Plate 42: Investigator interviewing orange growers at Datewadi village of Narkhed taluka**

In the present study, constraint is operationally defined as the problems or difficulties faced by social media user and non user orange growers in use of social media.

Constraints were measured on the basis of Garret's ranking and were ranked accordingly.

### **3.8.1 Suggestions**

The Oxford dictionary meaning of the word suggestion is an idea or plan put forward for consideration.

In the present study, suggestion is operationally defined as an idea or plan put forward by respondent orange grower about what action should be taken for use of more Social media in agriculture development.

The frequency and percentage of each suggestion was worked out for interpretation.

### **3.9 Reasons behind fruit drop and removal of orchard**

The Oxford dictionary meaning of word reason is cause, explanation, or justification for an action or event.

In present study, reasons behind fruit drop was operationally defined as logical formation of judgements by thinking and understanding by orange grower about cause of fruit drop and removal of orchard.

The frequency and percentage of each reason was worked out for interpretation.

### **3.10 Statistical method**

The data collected through personal interview were checked out for completeness and correction. Both qualitative and quantitative classes were formed. In some case of variables, accepted standard classification was adopted and in still others, the mean and standard deviation were considered. The data were then tabulated and the frequencies and percentages of the orange growers in each category were worked out.

Following statistical techniques were used in the present study for analysis of data:

- Frequency, Percentages and Mean
- Standard Deviation
- Coefficient of correlation
- Multiple regression analysis
- Z test
- 't' Test

### 3.9.1 Arithmetic mean ( $\bar{X}$ )

Arithmetic mean is calculated by summing of all individual score and dividing it by total number of respondents.

The formula is,

$$\bar{X} = \frac{\sum X}{n}$$

Where,

$\bar{X}$  = Arithmetic mean

$\sum X$  = Sum of respondents score

N = Number of respondents

### 3.9.2 Standard deviation

It is the most stable index of variability which will employ in research studies. It is the measure of variability calculated around mean.

Standard deviation usually denoted by Greek word ( $\sigma$ ) i.e. sigma and the formula can be denoted as follows,

$$\sigma = \frac{\sqrt{\sum (X_i - \bar{X})^2}}{n}$$

Where,

$\sigma$  = Standard deviation

$X_i$  = Score of each respondent

$\bar{X}$  = Mean

n = Number of respondents

### 3.9.3 Coefficient of correlation

Correlation analysis deals with the association between two or more variables.



**Plate 43: Investigator interviewing orange growers at Datewadi village of Narkhed taluka**



**Plate 44: Investigator interviewing orange growers at Mowad village of Narkhed taluka**

### 3.9.3.1 Karl Pearson's coefficient of correlation

Karl Pearson's correlation method is widely used method for calculating correlation. It reflects the degree of linear relationship between two variables. It is denoted by r. It is used for quantitative data i.e. for quantitative independent variables. In the present study, relationship of education, family size, land holding, size of orchard, farming experience, and annual income with dependent variable was calculated by this method.

The following formula was used for computation of 'r' value

$$r = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$$

Where,

- r = Correlation coefficient
- X = Score of independent variable
- Y = Score of dependent variable
- $\bar{X}$  = Mean of independent variable
- $\bar{Y}$  = Mean of dependent variable

If 'r' calculated is more than the table value at 0.01 and 0.05 level of probability at (n-2) degree of freedom, the relationship was considered to be significant and if less than table value then the relationship was considered to be non-significant.

### 3.9.4 Multiple linear regression

The multiple linear regression was done to find out relative contribution of independent variables to each of the dependent variables. Only those independent variables of all orange growers together showing significant correlation with dependent variables were selected for regression analysis.

The multiple linear regression equation fitted was,

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n$$

Where,

Y = Dependent variables

$x_i$  = Independent variables  $i = 1, 2, 3, 4, \dots, n$

$b_i$  = Partial regression coefficient  $i = 1, 2, 3, 4, \dots, n$

a = Constant

n = Total number of independent variables

The significance of the regression coefficient (b) was tested using the 't' test. The calculated t-value was tested against the table value of t at (n-2) degrees of freedom. It was considered to be significant, if the calculated value of 't' was greater than the table value at either 0.01 or 0.05 level of probability.

### 3.9.5 Z- test

Z test was used for knowing significance of difference between the means of two groups i.e. social media user and non user orange growers.

The following formula was used

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where,

$\bar{X}_1$  = Mean of first sample

$\bar{X}_2$  = Mean of second sample

$\sigma_1^2$  = Variance of first sample

$\sigma_2^2$  = Variance of second sample

$n_1$  = Size of first sample

$n_2$  = Size of second sample

If 'Z' calculated is more than the table value at 0.01 and 0.05 level of probability at (n-2) degree of freedom, the relationship was considered to be significant and if less than table value then the relationship was considered to be non-significant.



**Plate 45: Researcher observing disease and pest attack symptoms in orange nursery and orchards**

### 3.9.5 't' Test

The significance level of independent variable was calculated by using 't' test.

Formula for 't' test.

$$t = \frac{X_H - X_L}{\sqrt{\frac{S_H^2}{n_H} + \frac{S_L^2}{n_L}}}$$

Where,

$X_H$  = the mean score on a given statement for the high group

$X_L$  = the mean score on the same statement for the low group

$S_H^2$  = the variance of the distribution of responses of high group to the statement

$S_L^2$  = the variance of the distribution of responses of low group to the statement

$n_H$  = number of respondents in the high group

$n_L$  = number of respondents in the low group

If 't' calculated value was more than table value at 0.05 and 0.01 level of probability at (N-2) degree of freedom, the relationship was considered to be significant and if it was less than table value relationship was non-significant.

The data were analyzed on computer at ARIS center of University, Department of Computer and Statistics, PGI, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

## CHAPTER IV

### RESULTS AND DISCUSSION

The results section is a section containing a description about the main findings of a research, whereas the discussion section interprets the results. The data collected by adopting the procedure presented earlier in the methodology chapter. The present chapter deals with the results pertaining to “Impact of Social Media on Orange Growers” was undertaken with the specific objective and discussion thereon. The data were collected from 300 orange growers spread over 30 villages across the 6 tahsils of two districts of Vidarbha namely, Amravati and Nagpur.

The data obtained from the orange growers were suitably organized, scored and classified into qualitative and quantitative classes taking into account the objectives of the study. The data were also subjected to the statistical treatment and analysis with the help of appropriate statistical techniques and tests. The results obtained from the analysis of data were presented in this chapter. The results were discussed appropriately with the logical reasoning, in light of the findings of previous research studies on the topic. The results along with the discussion are described under the following subheads.

- 4.1 Personal, socio-economic, communicational and psychological characteristics of the orange growers
- 4.2 Utilization pattern of social media by orange growers
- 4.3 Attitude of orange growers towards social media
- 4.4 Impact of social media on orange growers
  - 4.4.1 Per cent change in knowledge
  - 4.4.2 Per cent change in adoption
  - 4.4.3 Per cent change in production
  - 4.4.4 Per cent change in orchard management
  - 4.4.5 Per cent change in annual income
  - 4.4.6 Per cent change in family expenditure

- 4.4.7 Per cent change in material possession
- 4.4.8 Per cent change in self confidence
- 4.5.1 Relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with utilization pattern
- 4.5.2 Relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with attitude
- 4.5.3 Relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with impact of social media on orange growers
- 4.6 Constraints faced by orange growers in use of social media
- 4.7 Suggestions obtained from orange growers to overcome the constraints
- 4.8 Reasons behind fruit drop in oranges and reasons behind removal of orchards as perceived by orange growers
- 4.9 Empirical model of research

#### **4.1 Personal, socio-economic, communicational and psychological characteristics of the orange growers**

##### **4.1.1 Education**

Education brings desirable changes in human behaviour such as knowledge, attitude and skills.

The distribution of the respondents according to education has been presented in Table 11.

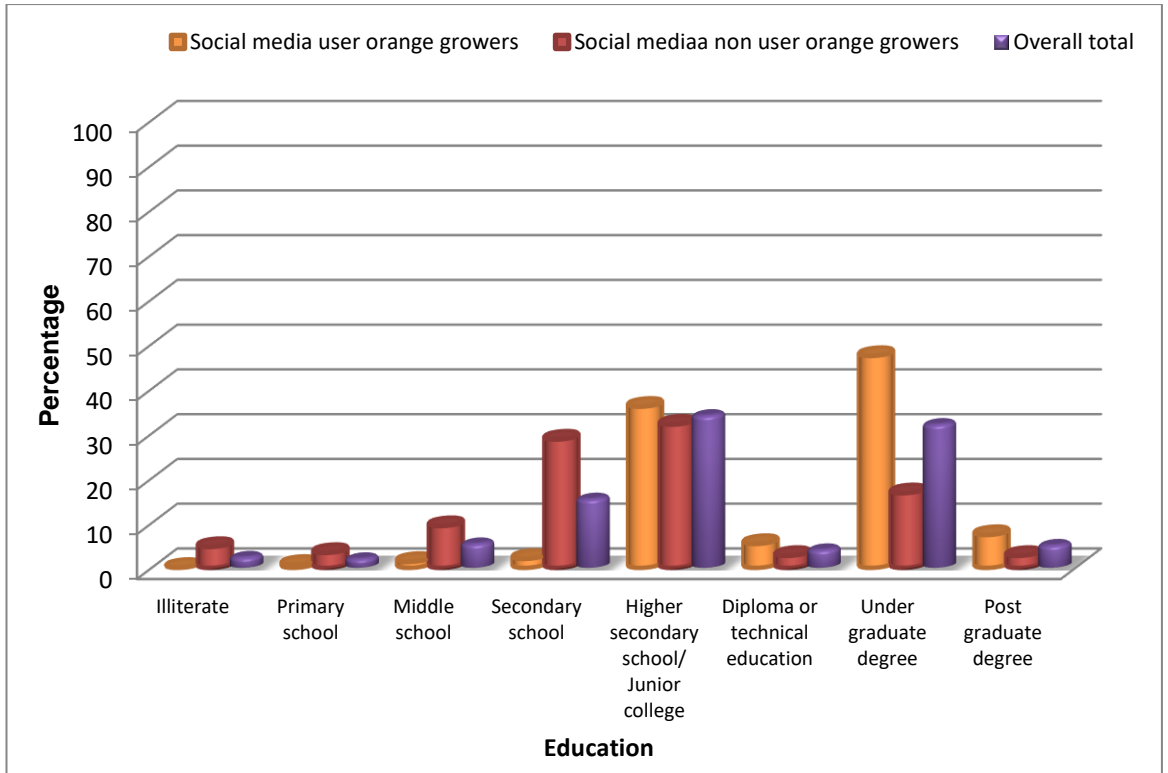
The data depicted in the Table 11 indicated that nearly half (47.34%) of the social media user respondents had under graduate degree, followed by 36.00 per cent of social media user respondents had education up to higher secondary school, whereas 7.33 per cent of social media user respondents had post graduate degree. The 5.33 per cent of social media user respondents had diploma or technical education, followed by 2.00 per cent of social media user respondents had education up to secondary school, while 1.33 per cent of social media user respondents had education

up to middle school level and only 0.67 per cent of social media user respondents had education up to primary school level, respectively.

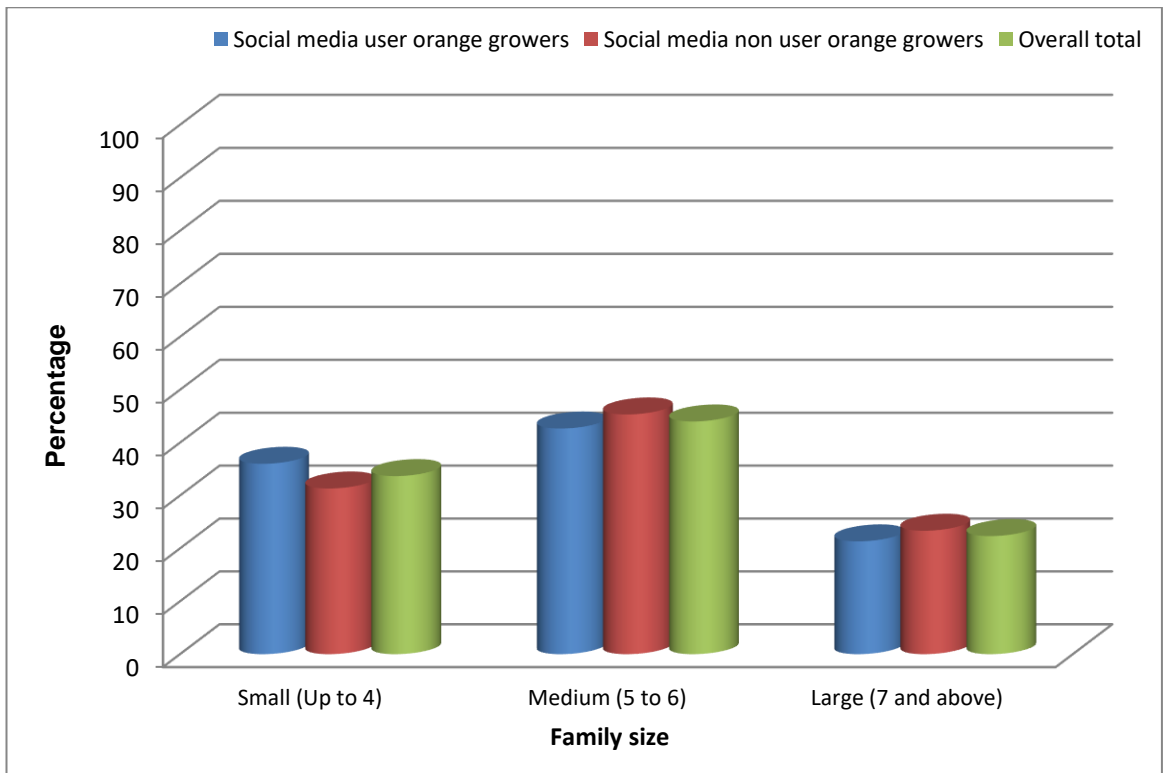
**Table 11. Distribution of the respondents according to education**

Sl. No.	Education	Social Media User		Non Social Media User		Overall Total (n=300)	
		Respondents (n=150)		Respondents (n=150)			
		Freq.	%	Freq.	%	Freq.	%
1	Illiterate	00	00.00	07	04.66	07	2.33
2	Primary school	01	0.67	05	03.33	06	2.00
3	Middle school	02	1.33	14	09.33	16	5.33
4	Secondary school	03	2.00	43	28.66	46	15.34
5	Higher secondary school/Junior college	54	36.00	48	32.00	102	34.00
6	Diploma or technical education	08	05.33	04	02.67	12	4.00
7	Under graduate degree	71	47.34	25	16.67	96	32.00
8	Post graduate degree	11	07.33	04	02.67	15	05.00
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

It is apparent from Table 11 that nearly one third (32.00%) of the social media non user respondents had education up to higher secondary school, followed by 28.67 per cent of social media non user respondents had education up to secondary school, 16.67 per cent of social media non user respondents had under graduate, whereas 9.33 per cent of social media non user respondents had education up to middle school. The 4.66 per cent of social media non user respondents were illiterate, followed by 3.33 per cent of the social media non user respondents had education up to primary school, while 2.67 per cent of social media non user respondents had diploma or technical education and



**Fig. 4 Distribution of respondents according to education**



**Fig. 5 Distribution of respondents according to family size**

only 2.67 per cent of social media non user respondents had post graduate degree, respectively.

Thus from the data in Table 11, it is concluded that more than one third (34.00%) of the respondents had higher secondary school education, followed by 32.00 per cent of the respondents had under graduate degree. The 15.34 per cent of the respondents had education up to secondary school, 5.33 per cent of them had middle school education, 5.00 per cent of the respondents were had up to post graduate degree, followed by 4.00 per cent of the respondents had diploma or technical education, whereas 2.33 per cent of the respondents were illiterate and only 2.00 per cent of the respondents had education up to primary school, respectively.

Overall educational status of the respondents has been seen to be better. There are so many online training programmes organized by the facilitators about orange cultivation and other farming related topics for farmers. Since post independence era government has launched various educational campaigns to make people literate. Many efforts have been taken to provide educational facilities at reach of rural people with good institutional arrangements. Impartial level of awareness among respondents through social media about importance of education and thereby opportunities for benefits in adoption of farming practices and business deals might be the reason behind this result.

Similar results have been reported by Tekale and Mano (2016) and Kumar and Kumar (2018b) that higher proportion of the respondents had education up to higher secondary school.

#### **4.1.2 Family size**

Family size plays important role in availability of household labour in farming.

The data pertaining to the family size of the respondents has been presented in the Table 12.

**Table 12. Distribution of the respondents according to family size**

Sl. No.	Family size	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Small (Up to 4)	54	36.00	47	31.33	101	33.67
2	Medium (5 to 6)	64	42.67	68	45.33	132	44.00
3	Large (7 and above)	32	21.33	35	23.34	67	22.33
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

The bird eye view of Table 12 shows that less than half (42.67%) of the social media user respondents had medium family size, followed by 36.00 per cent of them had small family size and 21.33 per cent of social media user respondents had large family size respectively.

Table 12 shows that nearly half (45.33%) of the social media non user respondents had medium family size, followed by 31.33 per cent of them had small family size and 23.34 per cent of social media non user respondents had large family size, respectively.

Thus, it can be concluded from Table 12 shows that nearly half (44.00%) of the respondents had medium family size, followed by 33.67 per cent of the respondents had small family size and 22.33 per cent of the respondents had large family size, respectively.

Having medium families would help to maintain a good quality of life. Children get better access to education. Minimize expenses and increases saving. Importance of medium families among the respondents might be the reason behind having less number of members in family.

Sonal Gupta (2015) and Kumar *et al.* (2019) observed similar result as respondents had medium family size.

#### **4.1.3 Occupation**

The occupational pattern reveals the source of livelihoods of the family.

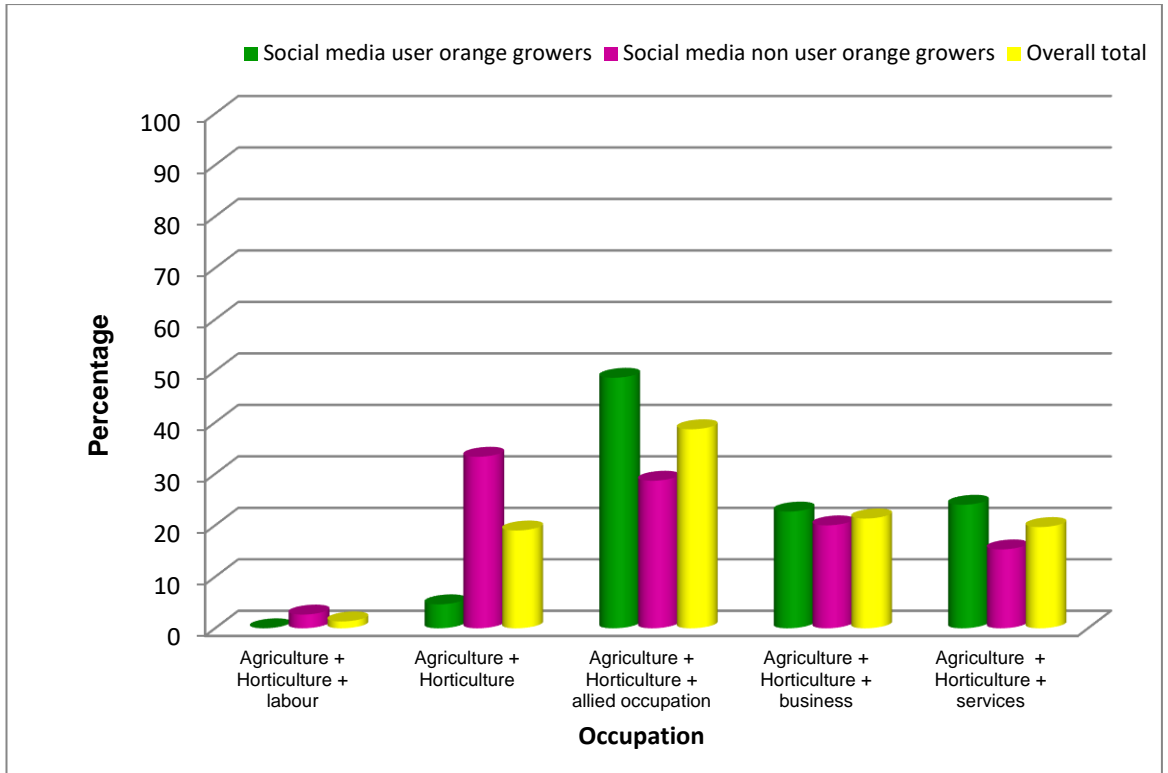
The distribution of the respondents according to occupation has been presented in Table 13.

**Table 13. Distribution of the respondents according to occupation**

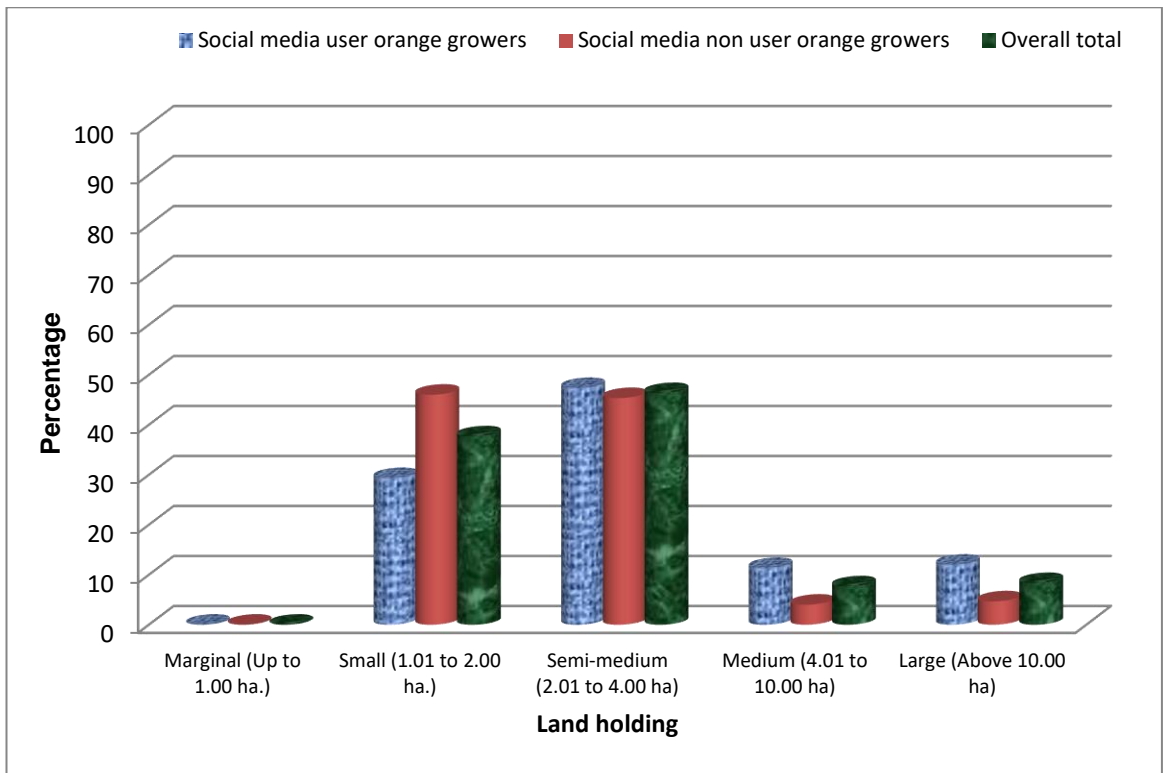
Sl. No.	Occupation	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq	%	Freq	%
1	Agriculture+Horticulture+labour	00	00.00	04	02.67	04	01.33
2	Agriculture+Horticulture	07	04.66	50	33.33	57	19.00
3	Agriculture+ Horticulture +allied occupation	73	48.67	43	28.67	116	38.67
4	Agriculture+ Horticulture + business	34	22.67	30	20.00	64	21.33
5	Agriculture +Horticulture+services	36	24.00	23	15.33	59	19.67
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

From Table 13, it is observed that nearly half (48.67%) of the social media user respondents had agriculture and horticulture along with allied occupation as occupation, followed by 24.00 per cent of social media user respondents had agriculture and services as occupation, followed by 22.67 per cent of social media user respondents were engaged in agriculture and horticulture with business as occupation and 4.66 per cent of social media user respondents had agriculture and horticulture as occupation respectively. As majority of the respondents got exposure to social media due to which they are aware about gaining more profit because of their activeness on social media henceforth they fall under the category agriculture+horticulture+allied occupation.

Table 13 shows that one third (33.33%) of the social media non user respondents were engaged in agriculture and horticulture as occupation, followed by 28.67 per cent of social media non user respondents had agriculture and horticulture with allied occupation as occupation, followed by 20.00 per cent of social media non user



**Fig. 6 Distribution of respondents according to Occupation**



**Fig. 7 Distribution of respondents according to land holding**

respondents had agriculture, horticulture and business as occupation, followed by 15.33 per cent of them were engaged in agriculture, horticulture and services and 2.67 per cent of social media non user respondents had agriculture, horticulture and labour as occupation, respectively. In case of social media non user, exposure to social media was less due to which they were less aware about gaining profit from other occupations as a result, the majority of them had Agriculture+horticulture as a major occupation.

Thus, it can be concluded from Table 13 that more than one third (38.67%) of the respondents were engaged in agriculture, horticulture and allied occupation, followed by 21.33 per cent of respondents were engaged in agriculture, horticulture and business as occupation, followed by 19.67 per cent of respondents had agriculture and horticulture with services as occupation, followed by 19.00 percent of respondents were engaged in agriculture and horticulture and 1.33 per cent of respondents were engaged in agriculture and labour as occupation respectively.

Subsidiary occupation in collaboration with agriculture and horticulture minimizes the risk of earning benefit from crop production due to natural calamities. Hence most of the orange growers may be gaining profit from allied occupation related to agriculture itself like plant nursery, custom hiring like bolwer, orchard tractor others., orange processing units, some had plastic crates manufacturing plant, their own mandai, dairy business and krishi seva kendra others., therefore majority of the orange growers were under the category of agriculture+ horticulture+ allied occupation and it was reflected in case of annual income also.

Similar findings were also reported by Darshan (2017) and Vishakha Bansal and Vandana Joshi (2019).

#### **4.1.4 Land holding**

Land holding is observed as an important variable of the farming occupation. Farmers with larger land holdings possess good source of capital than marginal and small farmers.

The distribution of the respondents according to land holding has been presented in Table 14.

**Table 14. Distribution of the respondents according to land holding**

Sl. No.	Land holding	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Marginal (Up to 1.00 ha.)	00	00.00	00	00.00	00	00.00
2	Small (1.01 to 2.00 ha.)	44	29.33	69	46.00	113	37.67
3	Semi-medium (2.01 to 4.00 ha)	71	47.34	68	45.33	139	46.33
4	Medium (4.01 to 10.00 ha)	17	11.33	06	04.00	23	07.67
5	Large (Above 10.00 ha)	18	12.00	07	04.67	25	08.33
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

It is seen from Table 14 that nearly half (47.34%) of the social media user respondents had semi medium land holding, followed by 29.33 per cent of social media user respondents had small land holding, The 12.00 per cent of social media users had large land holding and 11.33 per cent of them had medium land holding, respectively.

Table 14 shows that nearly equal, 46.00 per cent and 45.33 per cent of the social media non user respondents had small land holding and semi medium land holding followed by 4.67 per cent of social media non user respondents had large land holding respectively.

Thus, it can be concluded from Table 14 that nearly half (46.33%) of the respondents had semi medium land holding, followed by 37.67 per cent of the respondents had small land holding, 8.33 per cent of the respondents had large land holding and 7.67 per cent of them had medium land holding, respectively.

Around 50.00 per cent of the social media user respondents had semi-medium land holding but in case of social media non users, maximum respondents come under small land holdings. From the above

results, it was clearly reflected that social media user respondents had more education up to graduation, involved in subsidiary occupation and possessing semi-medium land holding. The major section of the respondents lies in the category of land comparatively more. They might have put their efforts to go for new exposure through social media which may alternatively leads to their own possession.

Land is the inherited property. In each family when new members added by marriage or birth the land gets sub divided making land holdings smaller after every generation by fragmentation. In the present study majority of the respondents concentrated into medium to small size of family i.e. having nuclear family after separation from joint family. Gradual decrease in size of land holdings after separation might be the reason behind these results. Henceforth it can be concluded that most of the orange growing farmers had semi medium land holdings.

Similar findings were also reported by Kanchan Kadu (2016), Dhumale (2017), Yogita Wankhede (2017), Singh *et al.* (2019) and Ghadge (2021) respectively.

#### **4.1.5 Size of orchard**

The size of orchard was assumed as an important variable that influence impact of social media on orange growers. Actual land in hectares put by the individual orange grower for orange crop was considered as score. The categorization was done after obtaining the score on the basis of equal interval method.

The results obtained have been presented in Table 15 as follows.

Table 15 reveals that majority (60.67%) of the social media user and non user respondents had small size of orchard (Up to 1.33 ha), followed by 28.00 per cent of social media user and non user respondents had medium size of orchard (1.94 to 3.46 ha) and also equal 11.33 per cent of social media user and non user respondents had large size of orchard respectively.

**Table 15. Distribution of the orange growers according to their size of orchard**

Sl. No	Size of orchard	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Small (Up to 1.93 ha)	91	60.67	91	60.67	182	60.67
2	Medium (1.94 to 3.46 ha)	42	28.00	42	28.00	84	28.00
3	Large (Above 3.46 ha)	17	11.33	17	11.33	34	11.33
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

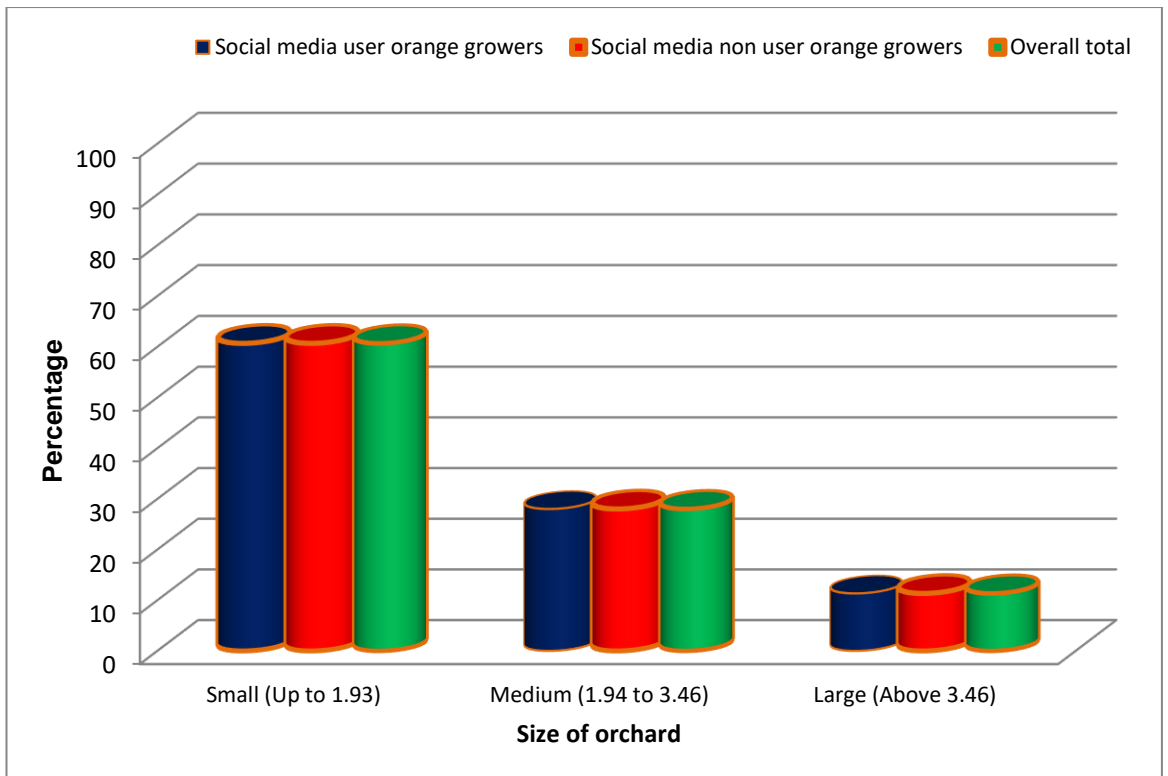
Thus, from Table 15 it can be concluded that majority of the respondents (60.67%) had small size of orchard (1.93 ha), followed by 28.00 per cent of the respondents had medium size of orchard and 11.33 per cent of the respondents had large size of orchard, respectively.

In the study area orchard size depends on the land holdings of the orange growers. The majority of the respondents possessed small size of orchard. In this study, size of orchard was considered same for social media user and non users. Therefore it can be concluded that majority of the orange growers had only orange orchard as a main crop on their lands due to suitability of land for better management of orchard and earning maximum profit and size of orchard was according to the criteria for selection of the respondents as having same size of orchard.

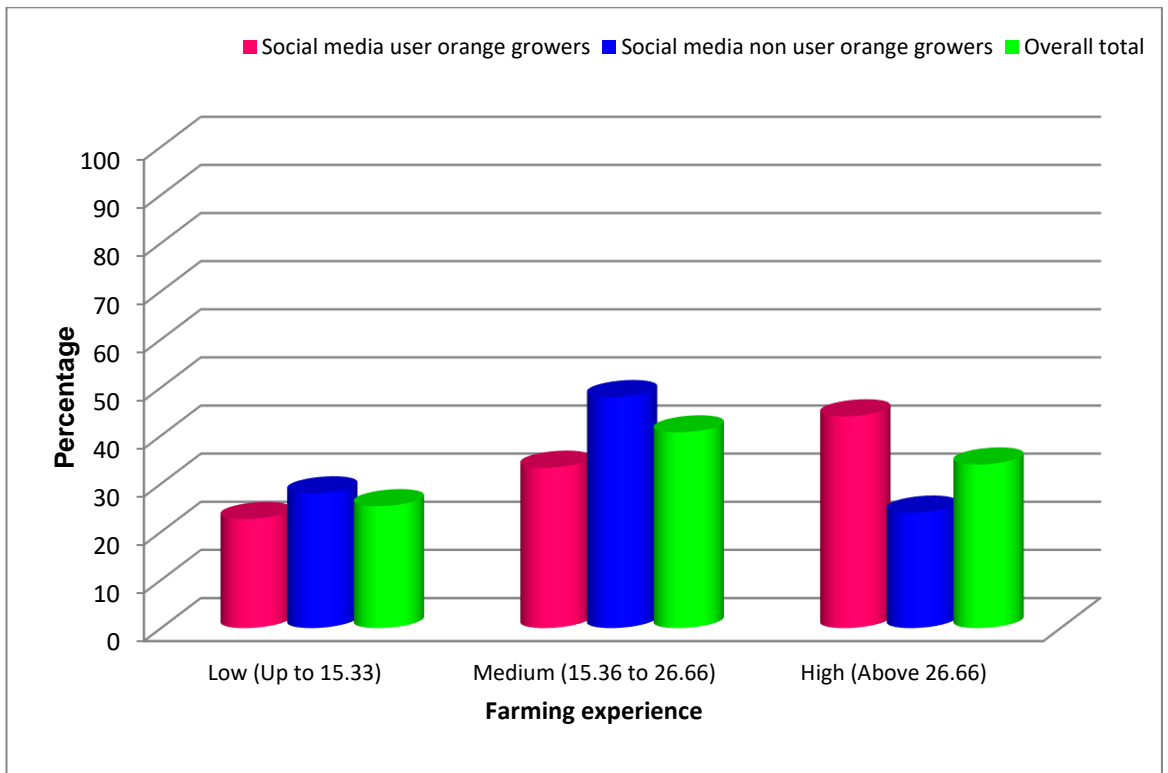
These findings are in consistent with the findings of Kadu (2016), Dhumale (2017), Yogita Wankhede (2017) and Ghadge (2021).

#### **4.1.6 Farming experience**

Higher the farming experience less is the adoption of new technology. Farmer develops feeling that they knows everything and reluctant to acquire latest technology. They don't have enough confidence in taking decisions.



**Fig. 8 Distribution of respondents according to size of orchard**



**Fig. 9 Distribution of respondents according to farming experience**

The distribution of the respondents according to farming experience has been presented in Table 16.

Table 16 present the distribution of the respondents according to experience in orange cultivation.

**Table 16. Distribution of orange growers according to their experience in orange cultivation**

Sl. No	Experience in orange cultivation	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Low (Up to 15.33)	34	22.67	42	28.00	76	25.33
2	Medium (15.34 to 26.66)	50	33.33	72	48.00	122	40.67
3	High (Above 26.66)	66	44.00	36	24.00	102	34.00
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

The data depicted in the Table 16 indicated that higher proportion (44.00%) of the social media user respondents had high experience in orange cultivation, followed by 33.33 per cent of social media user respondents had medium experience in orange cultivation and 22.67 per cent of them had low experience in orange cultivation respectively.

Table 16 clearly depicts that nearly half (48.00%) of the social media non user respondents had medium experience in orange cultivation, followed by 28.00 per cent of social media non user respondents had low experience in orange cultivation whereas, 24.00 per cent of social media non users had high experience in orange cultivation respectively.

Thus, from Table 16 it can be concluded that more than two fifth (40.67%) of the respondents had medium experience in orange cultivation, followed by 34.00 per cent of the respondents had high experience in orange cultivation and 25.33 per cent of the respondents had low experience in orange cultivation, respectively.

Agriculture+ horticulture+ allied occupation was a main occupation for livelihood of majority of the respondents from study area. They were practicing orange cultivation and farming from generation to generation by taking opinions from their forefather they are modifying the old cultivation practices. It is concluded that, higher proportion of the orange growers had medium experience (15.36 to 26.66 years) in orange cultivation. The finding of the study concluded that, the respondent orange growers were moderately experienced orange growers.

After attaining certain age they might understood the importance of social media in the field of agriculture hence, this might be the reason behind higher experience of social media user respondents

The present findings are in consonance with findings reported by Kachave (2012), Anushree Baruah (2018) and Kumar and Kumar (2018b).

#### 4.1.7 Social participation

The voluntary participation of farmers in person or group as member or office bearer in social organizations has many social benefits beyond household benefits.

The distribution of the respondents according to social participation has been presented in Table 17.

**Table 17. Distribution of the respondents according to social participation**

Sl. No	Social participation	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	No participation (0)	03	02.00	27	18.00	30	10.00
2	Low (Up to 1)	22	14.67	48	32.00	70	23.33
3	Medium (2 to 3)	110	73.33	62	41.33	172	57.33
4	High (4 and above)	15	10.00	13	08.67	28	09.34
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

**Mean=2**

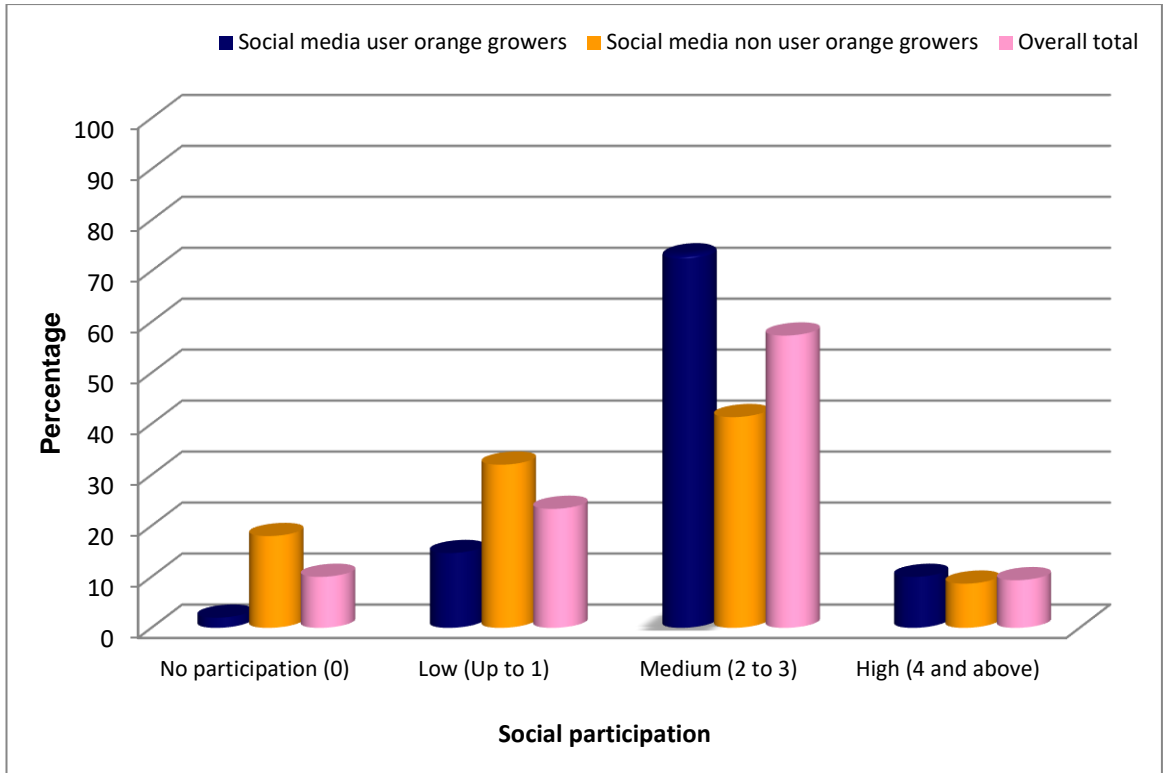
**SD=1.29**

The bird eye view of Table 17 shows that majority (73.33%) of the social media user respondents had medium level of social participation followed by 14.67 per cent of social media user respondents had low level of social participation and 10.00 per cent of social media user respondents had high level of social participation and 2.00 per cent of social media user respondents had no social participation, respectively.

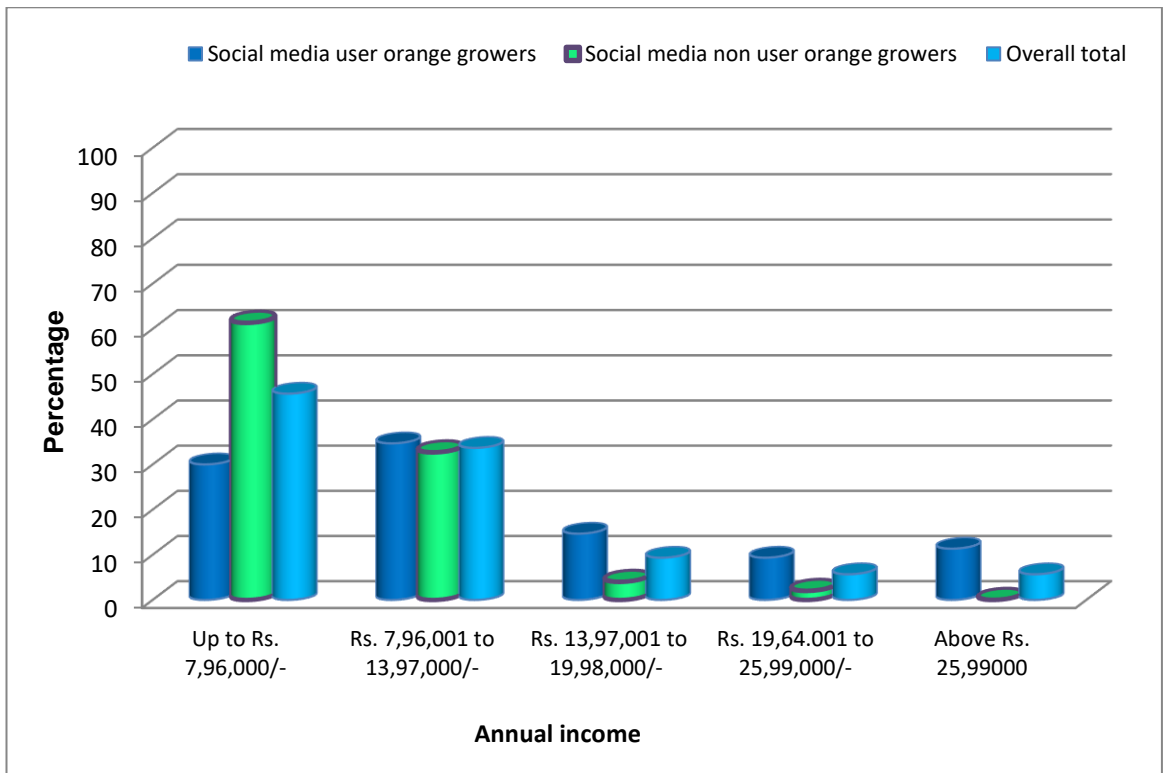
Table 17 shows that over two fifth (41.33%) of the social media non user respondents had medium level of social participation, followed by 32.00 per cent of social media non user respondents had low level of social participation, It is interesting to note that, 18.00 per cent of social media non user respondents had no social participation. Only 8.67 per cent of social media non user respondents had high level of social participation, respectively.

Thus, it can be concluded from Table 17 showed that majority (57.33%) of the respondents had medium level of social participation, followed by 23.33 per cent of the respondents had low level of social participation, and 10.00 per cent of the respondents had no social participation, whereas, 9.33 per cent of the respondents had high level of social participation, respectively.

Use of social media might have introduced the users to the different social groups which ultimately lead to more social participation in voluntary organizations and cooperatives. Most of the respondents also having more social participation treat as the symbol of social status. The majority of the respondents from study area were engaged in agriculture + agriculture related business like orchard nursery, orange processing units, dairy business and agriculture service centers, others. To acquire information about orange cultivation and related practices and advertising and marketing of their business produce, orange growers many had joined farming groups, as well as considerable amount of orange growers had participation in different farmer's organization and cooperatives. This might be the probable reason behind result. Similar, results were also found by Mano (2016).



**Fig. 10 Distribution of respondents according to social participation**



**Fig. 11 Distribution of respondents according to annual income**

#### 4.1.8 Annual income

Annual income provides the availability of the capital for farming. The distribution of the respondents according to annual income has been presented in Table 18.

The data depicted in the Table 18 indicated that 34.66 per cent of social media user respondents had annual income between Rs. 7,96,001 to 13,97,000/- followed by 30.00 per cent of the social media user respondents had annual income Up to Rs. 7,96,000/-, and 14.66 per cent of social media user respondents had annual income between Rs. 13,97,001 to 19,98,000/-. The 11.34 per cent of social media user respondents had annual income above Rs. 25,99,000 and 9.34 per cent of them had annual income between Rs. 19,64,001 to 25,99,000/-, respectively. One sixth of the respondents had annual income about more than 25 lakh. This may be due to their earnings from the other sources along with orchard like services and business.

**Table 18. Distribution of the respondents according to annual income**

Sl. No.	Annual income	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Up to Rs. 7,96,000/-	45	30.00	92	61.33	137	45.67
2	Rs. 7,96,001 to 13,97,000/-	52	34.66	49	32.67	101	33.66
3	Rs. 13,97,001 to 19,98,000/-	22	14.66	06	4.00	28	09.33
4	Rs. 19,64,001 to 25,99,000/-	14	09.34	03	2.00	17	05.67
5	Above Rs. 25,99,000	17	11.34	00	00.00	17	05.67
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

Table 18 clearly depicts that majority of the social media non user respondents (63.33%) had their annual income Up to Rs. 7,96,000/-, followed by 32.67 per cent of social media non user respondents came under annual income group between Rs. 7,96,001 to 13,97,000/-. The 4.00 per cent of social media non user respondents had annual income between Rs. 13,97,001 to 19,98,000/- and 2.00 per cent of them had annual income between Rs. 19,64,001 to 25,99,000/- respectively.

Thus, from Table 18 it can be concluded that nearly half (45.67%) of the respondents had annual income up to Rs. 7,96,000/-, followed by 33.66 per cent of the respondents had annual income between Rs. 7,96,001 to 13,97,000/-. The 9.33 per cent of the respondents had annual income between Rs. 13,97,001 to 19,98,000/- and equal per cent of the respondents (5.67%) had annual income between Rs. 19,64,001 to 25,99,000/- and above Rs. 25,99,000, respectively.

Social media user respondents possessed more land as compared to non users. The annual income incomposes, income received from all the sources including subsidiary occupation. This might have resulted in more annual income in case of social media users

In the present study, Morshi, Warud and Achalpur tahsils in Amravati district and Katol, Narkhed and Kalmeshwar tahsils in Nagpur district popularly known as orange growing tract. Orange growers from these areas possessed orange orchard on large area. It was yearlong practice of orange cultivation. Oranges from these areas fetches remunerative prices because of its unique quality parameters. Also majority of the orange growers from the study area had allied occupation with agriculture and horticulture as their main occupation. This might be the probable reason that majority of the respondents had better annual income.

The above findings are in conformity with the observation of previous researcher Sorate (2011)

#### **4.1.8.1 Annual income from orange cultivation**

The annual income from orange was defined as the income received from orange orchard of Mrug Bahar or Ambiya Bahar in the year.

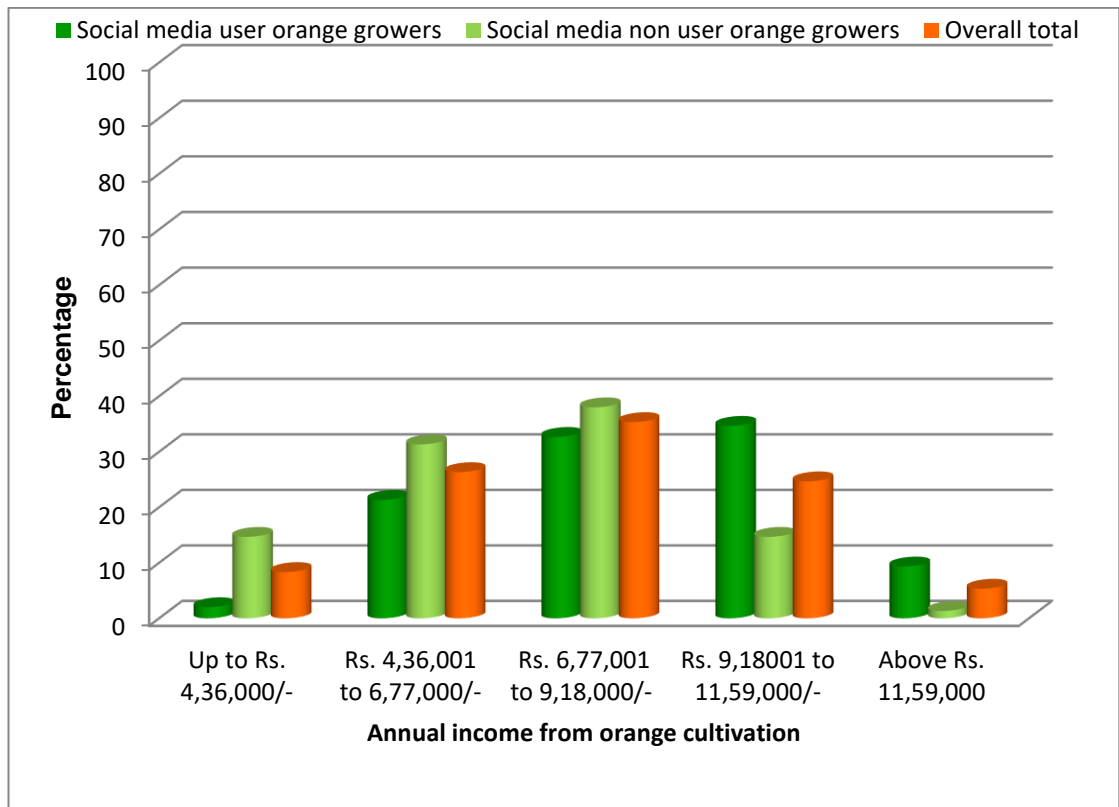
From Table 19 it is apparent that, in case of social media user respondents, 34.67 per cent of the respondents had annual income from Rs. 9,18,001/- to 11,59,000/-, followed by 32.67 per cent, 21.33 per cent and 9.33 per cent of them had annual income from Rs. 6,77,001/- to 9,18,000/-, Rs. 4,36,001/- to 6,77,000/-, above Rs. 11,59,000/- and only 2.00 per cent of the respondents had annual income from orange upto to Rs. 4,36,000/-, respectively. 38.00 per cent of social media non user respondents had annual income from Rs. 6,77,001/- to Rs. 9,18,000/-

**Table 19. Distribution of the respondents according to annual income from orange**

Sl. No	Annual income from orange	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Up to Rs. 4,36,000/-	03	02.00	22	14.67	25	08.33
2	Rs. 4,36,001 to 6,77,000/-	32	21.33	47	31.33	79	26.33
3	Rs. 6,77,001 to 9,18,000/-	49	32.67	57	38.00	106	35.34
4	Rs. 9,18001 to 11,59,000/-	52	34.67	22	14.67	74	24.67
5	Above Rs. 11,59,000	14	09.33	02	1.33	16	05.33
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

followed by 31.33 per cent of them had annual income Rs 4,36,001/- to 6,77,000/-. The equal per cent of social media non user respondents (14.67%) had annual income Rs. 9,18001 to 11,59,000/-, respectively. Only 1.33 per cent of the social media non user respondents had annual income above Rs. 11,59,000/-. In case of overall annual income from orange 35.34 per cent of them had annual income from Rs. 6,77,001 to 9,18,000/- followed by nearly equal per cent of the respondents 26.33 per cent and 24.67 per cent had annual income Rs. 4,36,001 to 6,77,000/- and Rs. 9,18001 to 11,59,000/-, respectively. The merger per cent (8.33%) and 5.33 per cent of them had annual income up to Rs. 4,36,000/- and Above Rs. 11,59,000/- ,respectively.

Overall income from orange cultivation for the study year was comparatively low as a reason of fruit drop due to various factors and lowers market rates might be the reason behind it. Selling of oranges is long term process, many ups and down in prices might have taken place at the time of marketing. On the part of users, their alertness to the different markets might have fothershed the more remunerative prices to the orange which was not seen in case of non users.



**Fig. 12 Distribution of respondents according to annual income from orange cultivation**

#### **4.1.9 Availability of social media**

It refers to number of social media's like Whatsapp, YouTube, Kisan SMS portal, Facebook, Twitter, Telegram, Snapchat, others are available to orange grower on his own device or from other sources. Frequency and percentage for each social media by orange grower was worked out for interpretation and presented in Table 20.

The bird eye view of Table 20 shows that 97.33 per cent of the social media user respondents had availability of whatsapp followed by YouTube (90.66%), Facebook (74.66%), Telegram (69.33%), Kisan SMS portal (59.33%), Snapchat (48.00%), availability of other social media applications related to agriculture like (Bharat Agri, Kastakar, Agrovan, PM Kisan, Krishi Network, Nutri clinic, NRCC, Plantix, e-Krishi and Krushik) was 44.00 per cent followed by Twitter (24.00%) and various search engines (22.00%) respectively.

Table 20 shows that 12.00 per of social media non user orange growers had availability of YouTube followed by 10.66 per of social media non users had availability of Whatsapp, 3.33 per of social media non users had availability of search engines and 0.66 per of social media non users had availability of Facebook respectively.

Thus, it could be concluded from Table 20 that majority of orange growers had availability of Whatsapp (54.00%) followed by 51.33 per of the orange growers had availability of Youtube, 37.66 per of orange growers had availability of Facebook, 34.66 per of orange growers had availability of Telegram, 29.66 per of orange growers had availability of Kisan SMS portal, 24.00 per of orange growers had availability of Snapchat, 22.00 per cent of the orange growers had availability of other agriculture related social media applications . The 12.66 per of orange growers had availability of various search engines also.

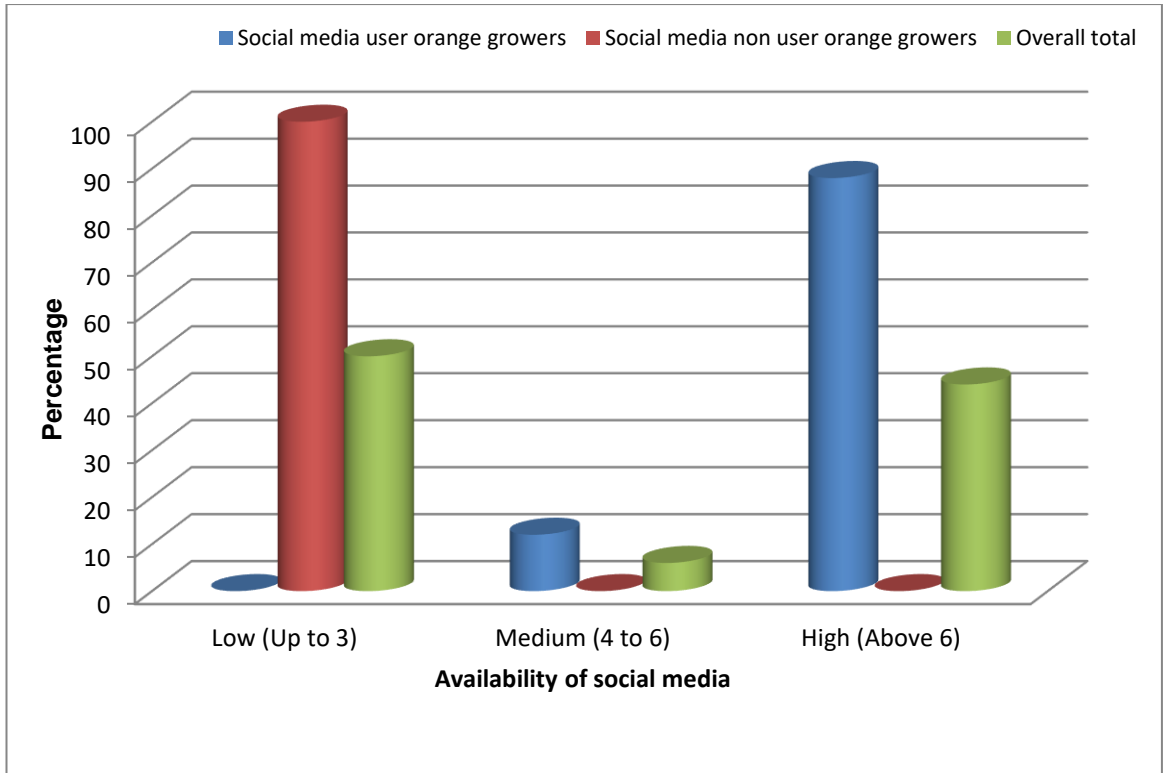
**Table 20. Distribution of the respondents according to availability of social media**

Sl. No.	Availability of social media	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	WhatsApp	146	97.33	16	10.66	162	54.00
2	YouTube	136	90.66	18	12.00	154	51.33
3	Search engines	33	22.00	5	3.33	38	12.66
4	Kisan SMS portal	89	59.33	00	00.00	89	29.66
5	Facebook	112	74.66	01	0.66	113	37.66
6	Twitter	36	24.00	00	00.00	36	12.00
7	Telegram	104	69.33	00	00.00	104	34.66
8	Snapchat	72	48.00	00	00.00	72	24.00
9	Other	66	44.00	00	00.00	66	22.00

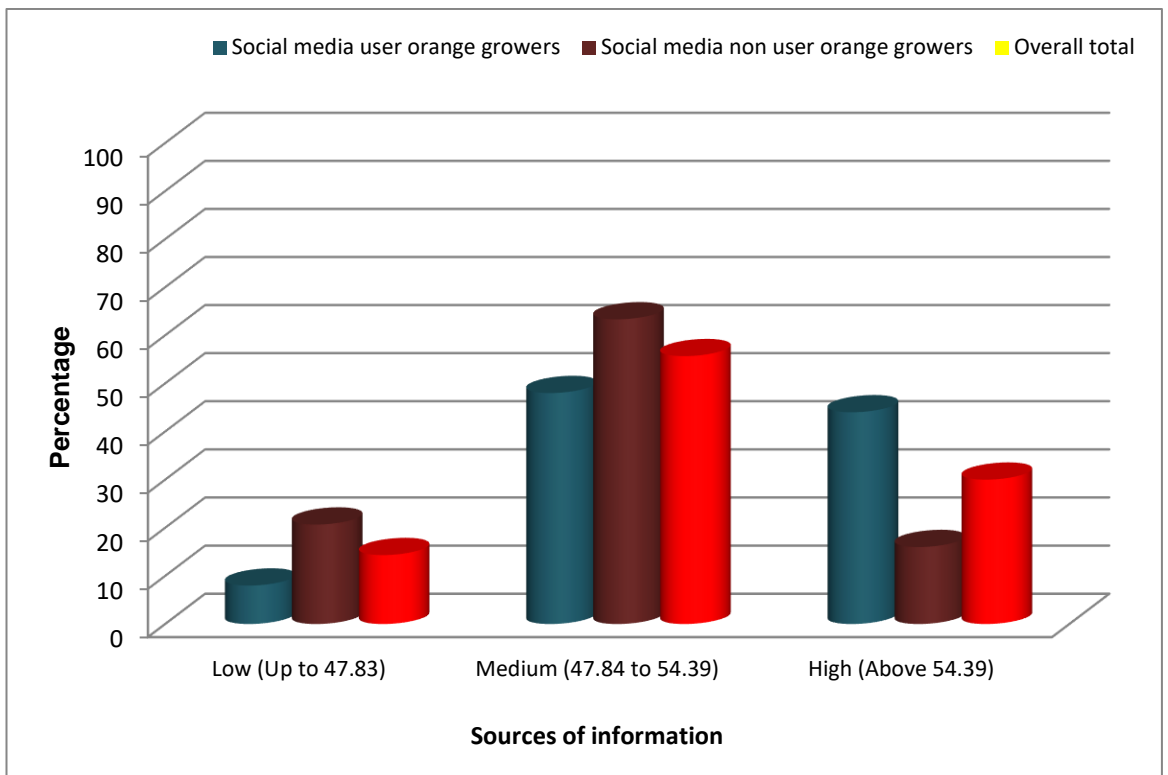
Table 21 revealed that 88 per cent of social media users had high availability of social media followed by 12.00 per cent of social media users had medium availability of social media whereas cent per cent of social media non users had low availability of social media. Thus, it could be concluded that less than half (44.00%) of the respondents had high availability of social media followed by 50.00 per cent had low availability of social media and 6.00 per cent of respondents had medium availability of social media.

**Table 21: Distribution of orange growers according to overall availability of social media**

Sl. No	Availability of social media	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Low (Up to 3)	00	00.00	150	100.00	150	50.00
2	Medium (4 to 6)	18	12.00	00	00.00	18	06.00
3	High (Above 6)	132	88.00	00	00.00	132	44.00
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>



**Fig.13 Distribution of respondents according to availability of social media**



**Fig. 14 Distribution of respondents according to Source of information**

In today's era, the social media became one of the essential need of everyone due to changing lifestyle of the people. Therefore, it may be concluded that the orange growers who were utilizing social media for orange production and also up to somewhat per cent who are not using it for orange cultivation. But few of the respondents had social media but they were using it for their other purpose. This might be the reason behind the result.

The finding of the study is nearly similar to the findings of Darshan (2017) and Kumar *et al.*, (2017)

#### **4.1.10 Source of information**

Sources of information are important in case of orange growers to derive information related to agriculture.

The finding on use of source of information by the respondents has been presented in Table 22.

Table 22 clearly depicts that among localite sources, 77.33 per cent of the social media user orange growers regularly contact with friends and relatives for information followed by neighbours (76.00%), progressive farmer (46.00%), sarpanch (44.00%) and local leaders (11.33%) respectively. In case of cosmopolite sources, 92.67 per cent of the social media user orange growers regularly visit the agricultural supervisor for information followed by similar percentage to NRCC, Dr. PDKV, Akola and Achalpur research station (82.67%), Agricultural Assistant (82.00%), Taluka Agriculture Officer (80%) Regional Fruit Research Station, Katol, Dist. Nagpur (69.33%), University scientist (66.66%), KVK scientist (64.00%), Gramsevak (58.66%) respectively. In case of mass media 87.33 per cent of the social media user respondents regularly preferred smartphone followed by television (81.33%), Radio (66.66%), newspaper (42.00%), computer with internet (37.33%) and farm magazine (2.00%) respectively.

**Table 22. Distribution of the respondents according to source of information**

Sl. No.	Source of information	Social media user respondents (n=150)			Social media non user respondents (n=150)			Overall Total (n=300)		
		Regular (3)	Occasional (2)	Never (1)	Regular (3)	Occasional (2)	Never (1)	Regular (3)	Occasional (2)	Never (1)
<b>A) Localite sources</b>										
1	Sarpanch	66 (44.00)	73 (48.67)	11 (7.33)	30 (20.00)	98 (65.33)	22 (14.67)	96 (32.00)	171 (57.00)	33 (11.00)
2	Friends/ Relatives	116 (77.33)	33 (22.00)	01 (0.67)	15 (10.00)	98 (65.33)	37 (24.67)	131 (43.67)	131 (43.67)	38 (12.66)
3	Neighbours	114 (76.00)	36 (24.00)	00 (00.00)	43 (28.67)	87 (58.00)	20 (13.33)	157 (52.33)	123 (41.00)	20 (6.67)
4	Progressive farmer/ krishimitra	69 (46.00)	79 (52.67)	02 (1.33)	33 (22.00)	103 (68.67)	14 (9.33)	102 (34.00)	182 (60.67)	16 (5.33)
5	Other(Local leaders)	17 (11.33)	108 (72.00)	25 (16.67)	09 (6.00)	105 (70.00)	36 (24.00)	26 (8.67)	213 (71.00)	61 (20.33)
<b>B) Cosmopolite sources</b>										
1	Gramsevak	88 (58.67)	62 (41.33)	00 (00.00)	37 (24.67)	99 (66.00)	14 (9.33)	125 (41.67)	161 (53.67)	14 (4.66)
2	Talathi	38 (25.33)	96 (64.00)	16 (10.67)	27 (18.00)	99 (66.00)	24 (16.00)	65 (21.67)	195 (65.00)	40 (13.33)
3	Agricultural Assistant	123 (82.00)	22 (14.67)	05 (3.33)	30 (20.00)	23 (15.33)	97 (64.67)	153 (51.00)	45 (15.00)	102 (34.00)
4	Agricultural Supervisor	139 (92.67)	07 (4.66)	04 (2.67)	14 (9.33)	82 (54.67)	54 (36.00)	153 (51.00)	89 (29.67)	58 (19.33)
5	Mandal Agriculture Officer	27 (18.00)	118 (78.67)	05 (3.33)	15 (10.00)	99 (66.00)	36 (24.00)	42 (14.00)	217 (72.33)	41 (13.67)

6	Taluka Agriculture Officer	120 (80.00)	27 (18.00)	03 (2.00)	34 (22.67)	22 (14.66)	94 (62.67)	154 (51.34)	49 (16.33)	97 (32.33)
7	Sub Divisional Agriculture Officer	11 (7.33)	94 (62.67)	45 (30.00)	01 (0.67)	65 (43.33)	84 (56.00)	12 (04.00)	159 (53.00)	129 (43.00)
8	District Superintendent Agriculture Officer	24 (16.00)	91 (60.67)	35 (23.33)	04 (2.67)	71 (47.33)	75 (50.00)	28 (9.33)	162 (54.00)	110 (36.67)
9	University scientist	100 (66.67)	21 (14.00)	29 (19.33)	00 (00.00)	90 (60.00)	60 (40.00)	100 (33.33)	111 (37.00)	60 (20.00)
10	KVK scientist	96 (64.00)	36 (24.00)	18 (12.00)	28 (18.67)	92 (61.33)	30 (20.00)	124 (41.33)	128 (42.67)	48 (16.00)
11	Representatives of NGO's	46 (30.67)	90 (60.00)	14 (9.33)	01 (0.67)	84 (56.00)	65 (43.33)	47 (15.67)	174 (58.00)	79 (26.33)
12	Technology Resources (NRCC, Dr. PDKV, Akola)	124 (82.67)	23 (15.33)	03 (2.00)	06 (4.00)	93 (62.00)	51 (34.00)	130 (43.33)	116 (38.67)	54 (18.00)
13	Regional Fruit Research Station, Katol, Dist- Nagpur	104 (69.33)	43 (28.67)	03 (2.00)	23 (15.33)	57 (38.00)	70 (46.67)	127 (42.33)	100 (33.34)	73 (24.33)
14	Research Station, Achalpur, Dist- Amravati	124 (82.67)	08 (5.33)	18 (12.00)	07 (4.67)	69 (46.00)	74 (49.33)	131 (43.67)	77 (25.66)	92 (30.67)

<b>C)</b>	<b>Mass media</b>									
1	Radio	100 (66.67)	45 (30.00)	05 (3.33)	70 (46.66)	66 (44.00)	14 (9.33)	170 (56.67)	111 (37.00)	19 (6.33)
2	Television	122 (81.33)	28 (18.67)	00 (00.00)	22 (14.66)	111 (74.00)	17 (11.33)	144 (48.00)	139 (46.33)	17 (5.67)
3	Newspaper	63 (42.00)	81 (54.00)	06 (4.00)	14 (9.33)	12 (8.00)	124 (82.66)	77 (25.67)	93 (31.00)	130 (43.33)
4	Farm magazine	03 (02.00)	128 (85.33)	19 (12.67)	01 (0.66)	104 (69.33)	45 (30.00)	04 (1.33)	232 (77.33)	64 (21.33)
5	Smart phone	131 (87.33)	19 (12.67)	00 (00.00)	7 (4.66)	11 (7.33)	132 (88.00)	138 (46.00)	30 (10.00)	132 (44.00)
6	Computer with internet	56 (37.33)	81 (54.00)	13 (8.67)	00 (00.00)	00 (00.00)	150 (100.00)	56 (18.67)	81 (27.00)	163 (54.33)

*Figures in parentheses indicate percentage*

Table 22 revealed that Among the localite sources, nearly three fourth (72.00%) of the social media user orange growers visit the local leaders for sources of information and 52.66 per cent of the social media user orange growers occasionally visit the progressive farmer followed by sarpanch (48.66%), neighbours (24.00%) and friends and relatives (22.00%). In case of cosmopolite sources, 78.66 per cent of the social media user orange growers occasionally visited mandal agriculture officer followed by Talathi (64.00%), Sub Divisional Agriculture Officer (62.66%), District Superintendent Agriculture Officer (60.00%), representatives of NGO's (60.00%) and 41.33 per cent of gramsevak respectively. Among the mass media sources, 85.33 per cent of the social media user orange growers occasionally prefer the farm magazine for sources of information while 54.00 per cent of them prefer newspaper occasionally for information followed by computer with internet (54.00%) and radio (30.00%) respectively.

It is shown from Table 22 that, amongst the localite sources 16.67 per cent of the social media user orange grower never visit the localite leader for information followed by sarpanch (7.33%), progressive farmers (1.33%) and friends and relatives (0.66%), respectively. Among the cosmopolite sources of information 30.00 per cent of the respondents never contacted sub divisional agriculture officer followed by district superintendent agriculture officer (23.33%) and university scientist (19.33%), respectively. In case of mass media sources, 12.67 per cent of the social media user orange growers never had magazine for information followed by computer with internet (8.67%), respectively.

From the above findings, it is concluded that friends/relatives and neighbours were regularly used localite sources of information by majority of the social media user orange growers, whereas from cosmopolite sources agricultural supervisor, technology resources, NRCC, Dr. PDKV, Akola, Achalpur Research Station and Agricultural Assistant were commonly used source of information and from mass media sources, smart phone and television were commonly used by majority of the respondents as source of information.

Table 22 revealed that In case of social media non user respondents, among the localite sources, 28.66 per cent of the respondents regularly contact with neighbours for information followed by progressive farmers (22.00%), sarpanch (20.00%), friends (10.00%) and local leaders (6.00%) respectively. In case of cosmopolite sources, 24.66 per cent of the social media non user respondents regularly visited gramsevak followed by Taluka Agriculture Officer (22.66%), Agricultural Assistant (20%), KVK scientist (18.66%) and Talathi (18.00%) respectively.

From Table 22 it is apparent that, among the localite sources 70.00 per cent of the social media non user respondents occasionally visit the local leader for information followed by progressive farmer (68.66%), sarpanch (65.33%), friends (65.33%) and neighbours (58.00%) respectively. In case of cosmopolite sources 66.00 per cent of the social media non user respondents occasionally visit the gramsevak followed by similar (66.00%) in case of Talathi and Mandal Agriculture Officer, and technology resources, NRCC, Dr. PDKV, Akola (62.00%), respectively. 61.33 per cent of the social media non user respondents occasionally visit the KVK scientist followed by university scientist (60.00%), respectively. In case of mass media sources 74.00 per cent of the social media non user respondents occasionally prefer the television for information followed by farm magazine (69.33%) and radio (44.00%), respectively. In case of social media non user respondents who never visited the sources of information, among the localite sources, 24.66 per cent of the social media non user never visit friends or relatives for information, 24.00 per cent of the social media non users never visit local leaders for information, 14.66 per cent of the social media non users never visit sarpanch followed by neighbours (13.33%) and progressive farmer (9.33%) for information. Among cosmopolite sources, 64.66 per cent of the social media non users never visit agricultural assistant for information while 62.66 cent of the social media non users never visited Taluka Agriculture Officer followed by Sub Divisional Agriculture Officer (56.00%), respectively. Among the mass media sources, 88.00 per cent of the social media non users never use

computer for for information followed by newspaper (82.66%) and smart phone (78.66%), respectively.

From the above findings, it is concluded that localite leaders and progressive farmers were commonly used localite sources of information by majority of the social media non user orange growers, whereas from cosmopolite sources gramsevak and taluka agriculture officer were commonly used source of information and from mass media sources radio and television were commonly used by majority of the respondents as source of information. Localite sources provide first hand information received as a practical approach. New technological innovation can be well explained by demonstrations and presentations through agriculture scientists. Orange growers are always interested to know different government sponsored schemes framed for orchard growers and always prone to take benefit of different schemes for orange cultivation.

**Table 23. Distribution of the respondents according to their overall source of information**

Sl. No.	Source of information	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Low (Up to 47.83)	12	8.00	31	20.67	43	14.33
2	Medium (47.84 to 54.39)	72	48.00	95	63.33	167	55.67
3	High (Above 54.39)	66	44.00	24	16.00	90	30.00
<b>Total</b>		<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

**Mean=51.11**

**SD= 3.28**

The data depicted in the Table 23 indicated that nearly half (48.00%) of the social media user respondents had medium sources of information, followed by 44.00 per cent of social media user respondents had high sources of information. Only 8.00 per cent of social media user respondents had low sources of information respectively.

Table 23 clearly depicts that majority (63.33%) of the social media non user respondents had medium sources of information followed by 20.67 per cent of social media non user respondents had low sources of information and 16.00 per cent of social media non user respondents had high sources of information respectively.

Thus, from Table 23 it is concluded that majority (55.67%) of the respondents had medium sources of information followed by 30.00 per cent of the respondents had high sources of information and 14.33 per cent of the respondents had low sources of information, respectively.

Friends, relatives and neighbours are also playing important role as a sources of different information and solve the problems of each other. On the contrary, officers who are working at ground level have major role in taking the new technology upto farmers by effective way. Localite leaders, progressive farmers and Agriculture assistant has good rapport with villagers because of their regular communication with them either in person or virtually. Modernization in mass media brought people more closely in information world. Social media, television and newspaper are easily available at efficient rates. Related authorities take advantage of it for diffusion of new information and mainstream education. This might be the probable reason as majority of the respondents using medium level of sources of information regularly which are easily available at their social system.

The finding of present study is similar with findings reported by the researcher Bharti Patel (2015), Reddy *et al.* (2020) and Saryam and jirli (2020).

#### **4.1.11 Innovativeness**

Innovative farmers are always earlier in adopting promising technologies.

The result regarding innovativeness of the respondents has been depicted in Table 24.

**Table 24. Distribution of the respondents according to innovativeness**

Sl. No	Innovativeness	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Low (Up to 11.36)	16	10.67	30	20.00	46	15.33
2	Medium (11.37 to 15.48)	86	57.33	93	62.00	179	59.67
3	High (High 15.48)	48	32.00	27	18.00	75	25.00
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

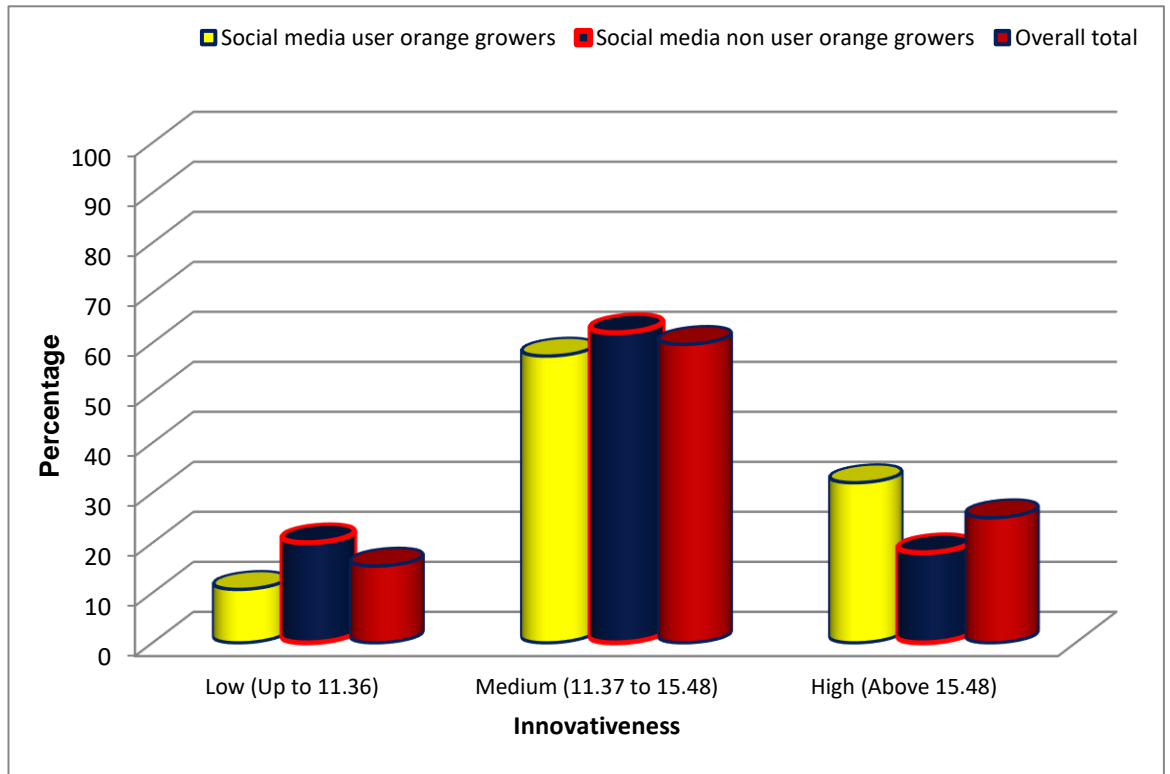
**Mean= 13.42****SD= 2.06**

The data given in the Table 24 found that majority (57.33%) of the social media user respondents had medium innovativeness, followed by 32.00 per cent of social media user respondents had high innovativeness and 10.66 per cent of social media user respondents had low innovativeness respectively.

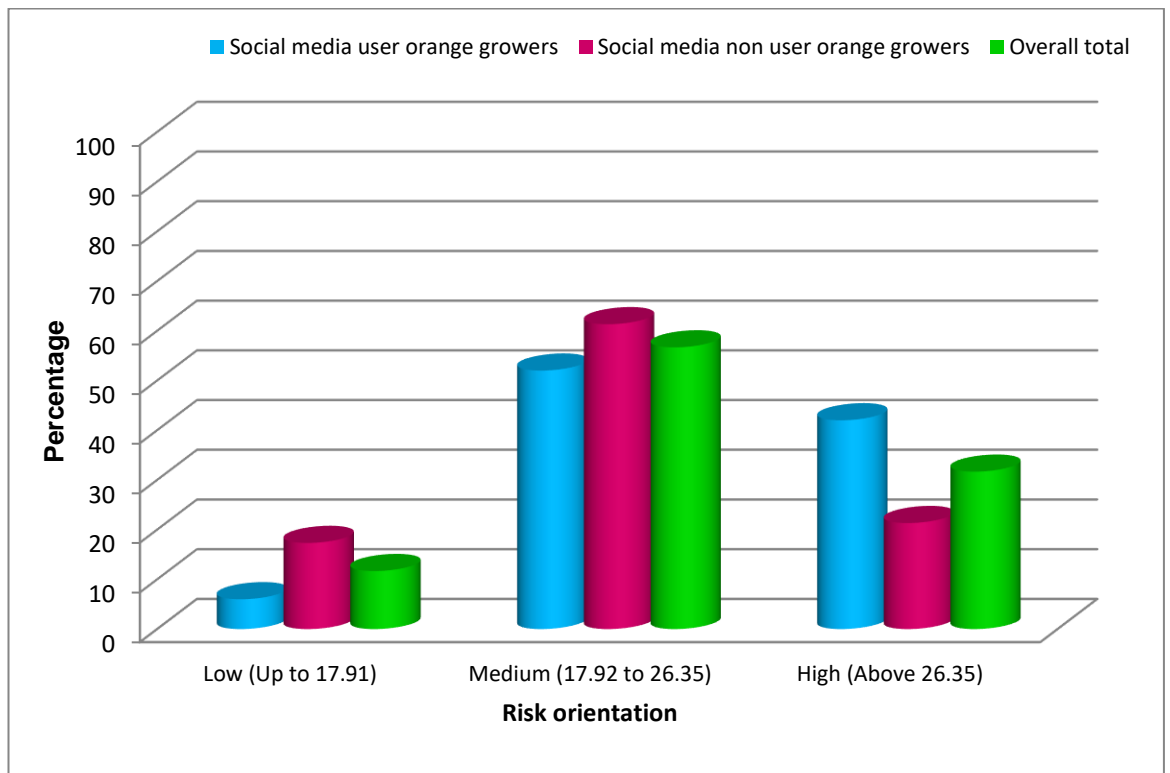
Table 24 clearly revealed that majority (62.00%) of the social media non user respondents had medium innovativeness followed by 20.00 per cent of social media non user respondents had low innovativeness and 18.00 per cent of social media non user respondents had high innovativeness respectively.

Thus, from Table 24 it can be concluded that majority (59.67%) of the respondents had medium innovativeness, followed by 25.00 per cent of the respondents had high innovativeness and 15.33 per cent of the respondents had low innovativeness respectively.

The presumed reason for medium to high innovativeness might be due to significant amount of knowledge about innovative agricultural practices through social media, as a result they might have shown enthusiasm in adopting activities earlier and bring maximum benefits through orange production. Basically orange is commercial cash crop hence it require technical information for growing this crop. Without technical skill of orange cultivation they may not be able to get better production and remunerative price hence orange growers found innovative though half of them were social media non users.



**Fig.15 Distribution of respondents according to innovativeness**



**Fig.16 Distribution of respondents according to risk orientation**

The above findings are in conformity with the observation of previous researcher Kanchan Kadu (2016), Jijina (2016) and Ghadge (2021).

#### 4.1.12 Risk orientation

Risk orientation ability guides orange grower in making decisions in the farm management process.

The term risk commonly refers to all outcomes, which lead to losses due to which a orange grower was oriented towards encountering risk and uncertainty in the application of new ideas in his/her farming.

The result regarding risk orientation of the respondents has been presented in Table 25.

**Table 25. Distribution of the respondents according to risk orientation**

Sl. No.	Risk orientation	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq.	%	Freq.	%
1	Low (Up to 17.91)	09	06.00	26	17.33	35	11.67
2	Medium (17.92 to 26.35)	78	52.00	92	61.33	170	56.67
3	High (Above 26.35)	63	42.00	32	21.33	95	31.66
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

**Mean= 22.13**

**SD= 4.22**

The data revealed in the Table 25 indicated that majority (52.00%) of the social media user respondents had medium risk orientation, followed by 42.00 per cent of social media user respondents had high risk orientation and only 6.00 per cent of social media user respondents had low risk orientation respectively.

Table 25 clearly shows that majority (61.33%) of the social media non user respondents had medium risk orientation and 21.33 per cent of social media non user respondents had high risk orientation followed by 17.33 per cent low risk orientation respectively.

Thus, from Table 25 it can be concluded that more than half (56.67%) of the respondents had medium risk orientation, followed by 31.66 per cent of the respondents had high risk orientation and 11.67 per cent of the respondents had low risk orientation respectively.

Risk taking ability of an individual depends upon personal, socio- economic communicational and psychological circumstances of farmers. The individual with higher education with knowledge, higher farming experience, better social participation, medium to large land holding and sound economic background implement medium to high risk orientation. In addition to this the reason may be that, confidence of the respondents about innovative practices they adopt and assurance of good production, and annual income. Being commercial crop, orange growers put full efforts to the input of money for getting better prices. This might be the reason behind medium to high risk orientation of the respondents.

The findings favours the findings of Kanchan Kadu (2016) and Ghadge (2021).

#### 4.1.13 Market orientation

Though orange growers depend mostly on local resources, they have to have knowledge on market to sell their products. So, marketing orientation is an important component for sustained progress.

The result regarding market orientation of the respondents has been presented in Table 26.

**Table 26. Distribution of the respondents according to market orientation**

Sl. No	Market orientation	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq.	%	Freq	%	Freq.	%
1	Low (Up to 18.74)	04	2.67	22	14.67	26	8.67
2	Medium (18.75 to 25.00)	79	52.66	101	67.33	180	60.00
3	High (Above 25.00)	67	44.67	27	18.00	94	31.33
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

**Mean= 21.87**

**SD= 3.13**

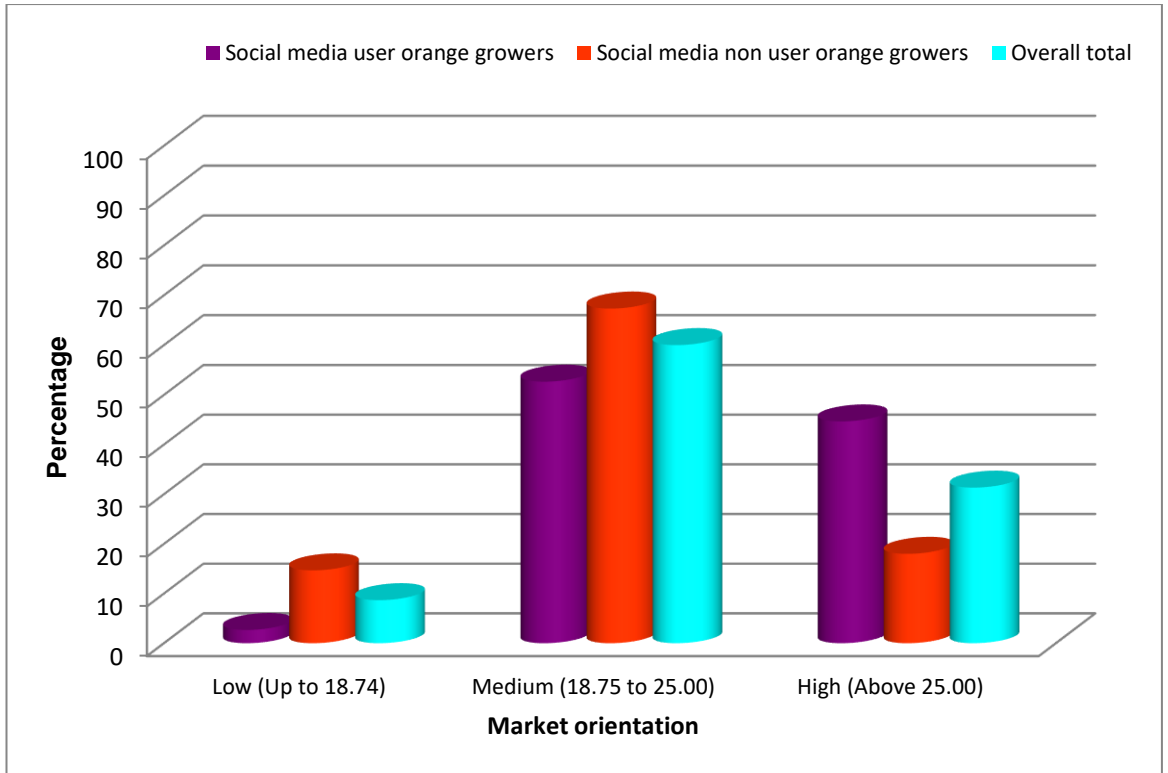
The data depicted in the Table 26 indicated that majority (52.66%) of the social media user respondents had medium market orientation, followed by 44.67 per cent of social media user respondents had high market orientation and 2.67 per cent of social media user respondents had low market orientation respectively.

Table 26 clearly depicts that majority (67.33%) of the social media non user respondents had medium market orientation, followed by 18.00 per cent of social media non user respondents had high market orientation and 14.67 per cent of social media non user respondents had low market orientation, respectively.

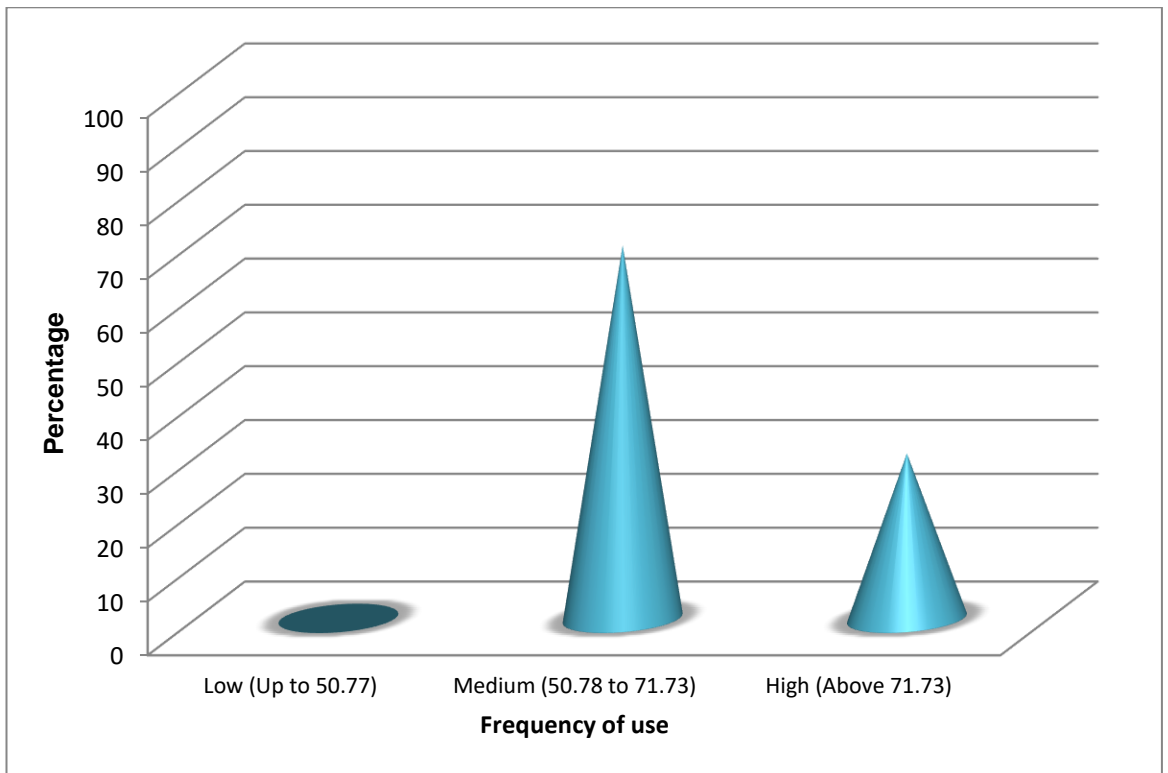
Thus, from Table 26 it can be concluded that majority (60.00%) of the respondents had medium market orientation, followed by 31.33 per cent of the respondents had high market orientation and 8.67 per cent of the respondents had low market orientation, respectively.

Many progressive farmers were able to sell their products directly to the retailers and consumers by using preferred social media platforms. The reason for the result may be the orange grower from study area had a higher urge to increase his orchard cultivation and management efficiency by reducing inputs cost and deriving biggest profits. The orange growers who had higher availability of social media and highest extent of sources of information were motivated towards getting quality with higher yield and profit through marketing their produce at different geographical area where orange is not produced by available technologies. Orange is sold predominantly with traditional methods of traders and middleman. Therefore, there was no significant difference between the social media users and social media non users orange growers but users had more alertness regarding the different markets throughout the country accordingly they try to develop their strategies of marketing.

Due to use of social media some of the orange growers got awareness about quality parameters of the orange which are required in other countries like organic produce and they were putting their efforts to grow the orange to match those quality parameters which ultimately let them to produce export quality oranges.



**Fig. 17 Distribution of respondents according to market orientation**



**Fig. 18 Distribution of respondents according to frequency of use**

Findings were nearly matched with findings of Naik (2014) and Ghadge (2021).

## **4.2 Utilization pattern of social media by orange growers**

In the present study, the extent of utilization was referred as the degree to which social media services were utilized by the orange growers. An index of extent of utilization was developed for this purpose.

It is well known fact that efforts with all the possible media of communication are being made in order to reach rural mass specifically in the field of agriculture with the varied features. Social media plays a vital role in making the farmers to realize the need for adopting new practices and technology with new skills and promote attitude of mind conducive to economic growth. Social media have due importance in agricultural development, but very few researches are available on utilization pattern of different social medias by the orange growers.

Although there has been tremendous development and expansion of social medias, we still do not know to what extent orange growers utilize available social medias with them. Thus in this study, efforts was made to access the utilization pattern of social media by the orange growers in the study area. Utilization pattern of social media was measured on the basis of three parameters, frequency of use, extent of reach and perceived satisfaction.

### **4.2.1 Frequency of use of the social media**

The data in the table 27 showed that 53.33 per cent of the social media user orange growers utilized the WhatsApp on daily basis while 35.33 percent respondents were using WhatsApp with frequency more than two times a week, 8.00 per cent of the respondents were using WhatsApp once in a week, 0.67 per cent of the respondents were using WhatsApp once a fortnight and 00.00 per cent, 00.00 per cent of the respondents uses WhatsApp with the frequency of occasionally and rarely respectively.

In case of You Tube, proportionately high per cent of social media user orange growers utilized the social media with the frequency of daily (45.33%) followed by 36.00 per cent of them utilizing it more than two

times a week while 7.33 per cent of them utilizing YouTube with frequency of once a week. Only 2.00 per cent of the social media user orange growers utilized the YouTube with frequency of once a fortnight, respectively. In case of search engines, 8.66 per cent, 5.33 per cent, 3.33 per cent, 3.33 per cent, and 1.33 per cent of the social media user respondents utilized the social media with the frequency of more than two times a week, once a week, once a fortnight, rarely and occasionally, respectively. Majority of the respondents (24.67%) were utilizing the Kisan SMS portal with the frequency once a fortnight, while 15.33 per cent, 11.33 per cent, 6.66 per cent and 1.33 per cent of the social media user respondents utilize with frequency of occasionally, once a week, more than two times a week and daily respectively. 30.66 per cent of the social media user respondents utilized the Facebook on daily basis, while 18.00 per cent, 14.66 per cent, and 11.33 per cent of the social media user orange growers had frequency to utilize social media, more than two times in a week, once a week and once a fortnight, respectively. In case of Twitter, 8.67 per cent, 6.67 per cent, 3.33 per cent, 2.67 per cent, 2.00 per cent and 0.66 per cent of the social media user orange growers had frequency of once a fortnight, once a week, daily, occasionally, more than two times a week and rarely respectively. Nearly one third of the respondents (25.33%) had utilized Telegram on daily basis while 18.66 per cent, 12.66 per cent, 8.66 per cent 2.66 per cent and 1.33 per cent of the social media user orange growers had frequency of use with more than two times a week, once a week, once a fortnight, occasionally and rarely respectively.

In Morshi and Warud tahsils of Amravati district there was Telegram groups of orange growers information from which they were using for orange cultivation and other agricultural practices. In case of Snapchat 20.00 per cent of the respondents utilizes social media once a fortnight while 10.67 per cent, 6.00 per cent, 5.33 per cent, 4.66 per cent and 1.33 per cent of the social media user orange growers had occasional, rarely, once a week, daily and more than two times a week, frequency of social media utilization respectively.

**Table 27. Distribution of the social media user respondents according to frequency of use of the social media**

Sl. No.	Statements	Availability of social media	Frequency of use of the social media (n=150)					
			Daily (6)	More than 2 times a week (5)	Once a week (4)	Once a fortnight (3)	Occasionally (2)	Rarely (1)
1	WhatsApp	146 (97.33)	80 (53.33)	53 (35.33)	12 (8.00)	01 (0.67)	00 (00.00)	00 (00.00)
2	YouTube	136 (90.66)	68 (45.33)	54 (36.00)	11 (7.33)	03 (2.00)	00 (00.00)	00 (00.00)
3	Search engines	33 (22.00)	00 (00.00)	13 (8.66)	08 (5.33)	05 (3.33)	02 (1.33)	05 (3.33)
4	Kisan SMS portal	89 (59.33)	02 (1.33)	10 (6.67)	17 (11.33)	37 (24.67)	23 (15.33)	00 (00.00)
5	Facebook	112 (74.66)	46 (30.67)	27 (18.00)	22 (14.66)	17 (11.33)	00 (00.00)	00 (00.00)
6	Twitter	36 (24.00)	05 (3.33)	03 (2.00)	10 (6.67)	13 (8.67)	04 (2.67)	01 (0.66)
7	Telegram	104 (69.33)	38 (25.33)	28 (18.67)	19 (12.66)	13 (8.66)	04 (2.66)	02 (1.33)
8	Snapchat	72 (48.00)	07 (4.67)	02 (1.33)	08 (5.33)	30 (20.00)	16 (10.67)	09 (6.00)
9	Other	66 (44.00)	00 (00.00)	04 (2.67)	12 (8.00)	22 (14.67)	20 (13.33)	08 (5.33)

In case of other applications like (Bharat Agri, Kastakar, Agrovan, PM Kisan, Krishi Network, Nutri clinic, NRCC, Plantix, e-Krishi, Agrostar and Krushik) frequency of use of social media was 14.67 per cent, 13.33 per cent, 8.00 per cent, 5.33 per cent and 2.67 per cent had once a fortnight, occasionally, once a week, rarely and more than two times a week, respectively.

It is concluded that majority of the information in audio-visual form attracts the individual towards frequent use of it. Facts regarding orange cultivation and other farm related queries are shared through social media which are interesting and easily accessible and affordable to social media user orange growers through YouTube, WhatsApp and Facebook.

**Table 28. Distribution of the respondents according to overall index of frequency of use of social media**

Sl. No.	Index of frequency of use of social media	Social media user respondents (n=150)	
		Frequency	Percentage
2	Low (Up to 50.77)	00	00.00
3	Medium (50.78 to 71.73)	104	69.33
4	High (Above 71.73)	46	30.67
<b>Total</b>		<b>150</b>	<b>100.00</b>

**Mean= 61.25**

**SD=10.48**

From Table 28 it is found that majority of the social media user respondents (69.33%) had medium frequency to utilize the social media. Whereas, 30.66 per cent of them had high social media utilization. None of them had low social media use frequency.

It is concluded that, the reason behind the result was the awareness about the availability of good quality and practical utility of literature and messages on social media regarding agriculture.

#### **4.2.2 Extent of reach of social media**

From table 29 it is concluded that, higher proportion of the social media user respondents received per day by message delivered in the form of text, audio and video and also messages received by orange

growers were 37.33 per cent followed by per day message utilized by orange growers (21.33%), number of helpline services availed (15.33%), number of phone calls made (9.33%), number of call back facilities availed (3.33%) and number of online programmes/ workshops participated per day was 2.00 per cent, respectively.

**Table 29. Distribution of the social media user respondents according to extent of reach**

Sl. No.	Statements	Extent of reach of social media (n=150)			
		Per day (4)	Per week (3)	Per fortnight (2)	Per month (1)
1	Messages delivered in the form of text, audio and video	56 (37.33)	29 (19.33)	44 (29.33)	21 (14.00)
2	Messages received by orange grower	56 (37.33)	26 (17.33)	42 (28.00)	20 (13.33)
3	Messages utilized by the orange grower	32 (21.33)	21 (14.00)	38 (25.33)	13 (8.67)
4	No of phone calls made	14 (9.33)	38 (25.33)	46 (30.66)	79 (52.66)
5	No of online programmes/ workshops participated	03 (02.00)	37 (24.66)	38 (25.33)	72 (48.00)
6	No of call back facilities availed	05 (3.33)	20 (13.33)	28 (18.66)	70 (46.66)
7	No of help line services availed	05 (15.33)	40 (26.66)	41 (15.33)	64 (42.66)

From Table 29 in case of per week messages received found that, 26.66 per cent of the social media user respondents availed the number of helpline services followed by number of phone calls made (25.33%), number of online programmes/ workshops participated (24.66%), message delivered in the form of text, audio and video (19.33%), messages received per week (17.33%), messages utilized by them (14.00%) and number of call back facilities availed per week was 13.33 per cent respectively.

From Table 29 it is also concluded that 30.66 per cent of the respondents per fortnightly made the phone calls, followed by 29.33 per cent of them had reached messages delivery in the form of text, audios and videos per fortnightly. In case of per fortnightly messages received to social

media users were messages received (28.00%) followed by messages utilized (25.33%), no of online programme/ workshop participated (25.33%), no of call back facility availed (18.66%) and no of helpline services per fortnightly (15.33%), respectively.

From Table 29 it is showed that 52.66 per cent of the social media user orange growers were making number of phone calls per month followed by number of online programmes/ workshops participated (48.00%), number of call back facilities availed (46.66%), number of help line services availed (42.66%), messages delivered (14.00%), messages received by orange growers (13.33%) and messages utilized by orange growers per month was 8.67 per cent respectively. There was organization of online session by RAMETI (Regional Agriculture Extension Management Training Institute, Nagpur) on first Friday of every month for orange growers on the subjects related to month wise orange cultivation practices and standard operating procedure were shared by experts and farmers discussion with question answer session. Orange growers from both Amravati and Nagpur districts were taking benefit of this online session.

Therefore, it may be revealed that, the extent of reach through message delivery per day, number of help line services availed per week, no of phone calls made per fortnight and number of phone calls made per month was more in case of most of the social media user orange growers as they are actively using social media by searching on their own doubts in concern to the orange production. Though, it needs to be focused by the authorities regarding provision of better services for agriculture purpose.

From Table 30, It is concluded that majority of the social media user orange growers (64.00%) had medium extent of reach of social media, followed by 22.00 per cent of the respondents had high level of extent of reach of social media. Only 14.00 per cent respondents had low level of extent of reach of social media, respectively.

**Table 30. Distribution of the respondents according to overall index of extent of reach of social media**

Sl. No.	Index of extent of reach of social media	Social media user respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 52.53)	21	14.00
2	Medium (52.54 to 69.53)	96	64.00
3	High (Above 69.53)	33	22.00
	<b>Total</b>	<b>150</b>	<b>100.00</b>

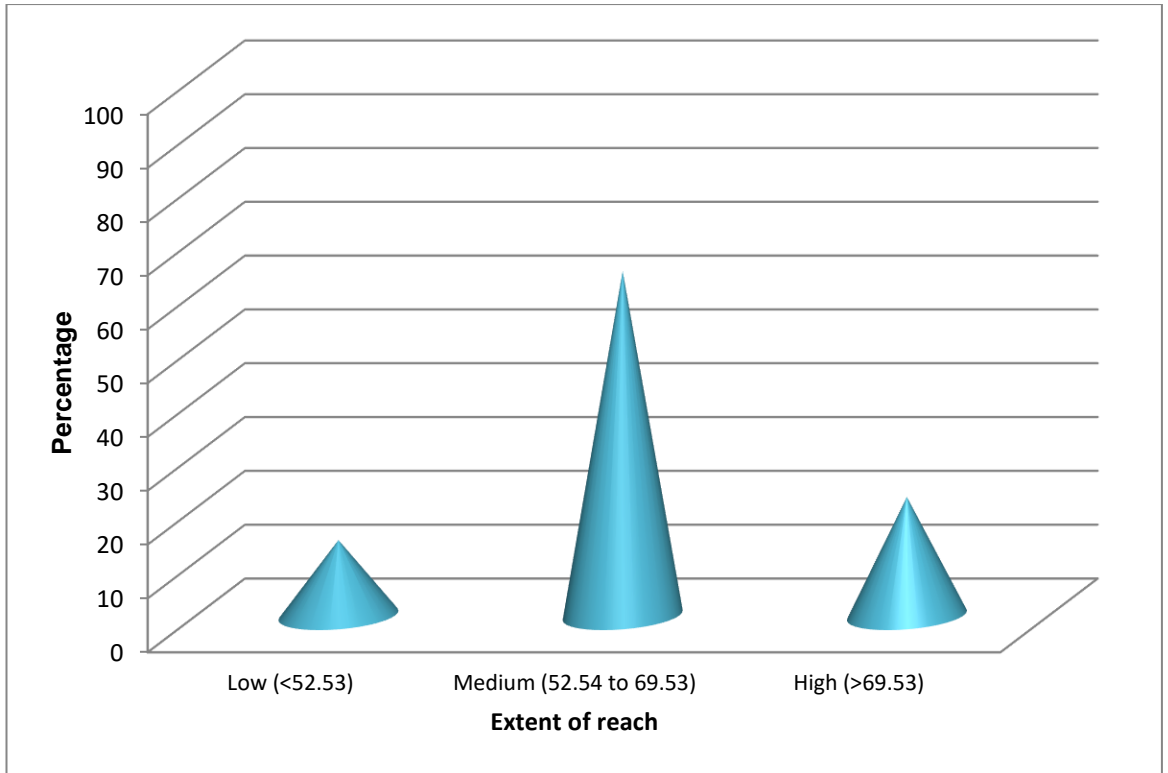
**Mean= 61.03**

**SD= 8.50**

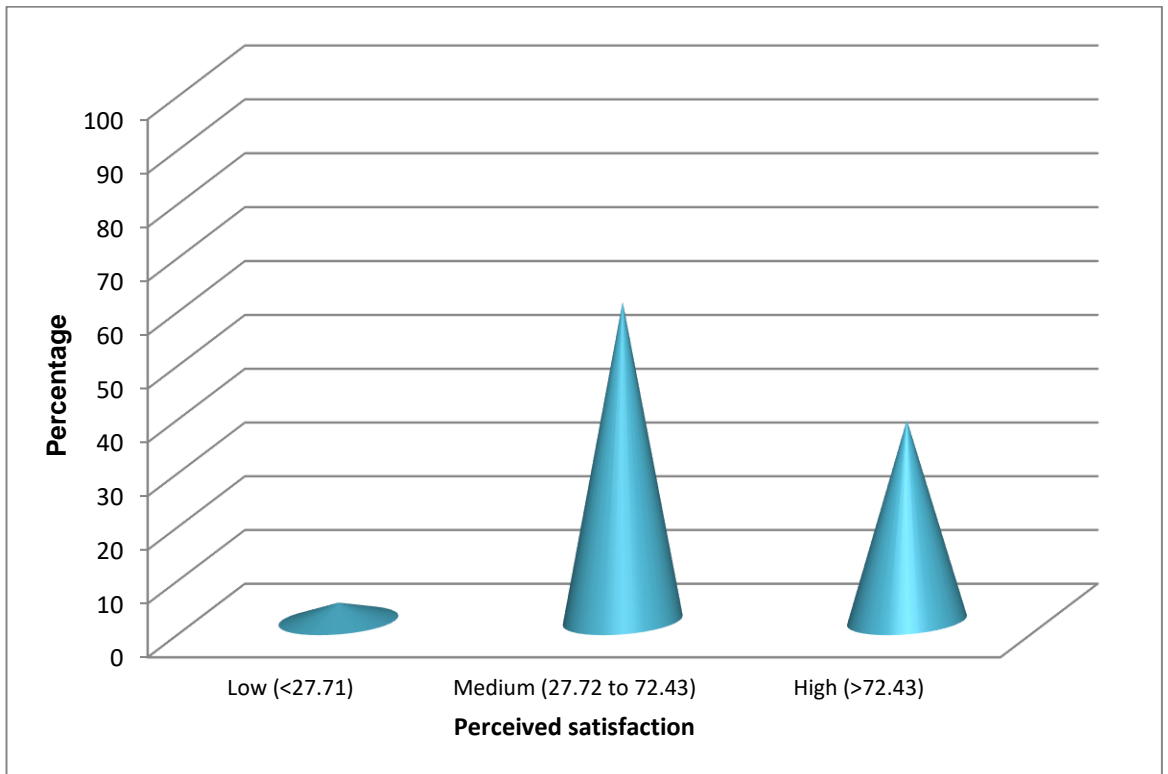
It is concluded from the results that, majority of the extent of reach of social media is from medium to high level. The probable reason behind this availability of social media near about with all of the orange growers.

#### **4.2.3 Perceived satisfaction**

From Table 31 It is found that in case of highly satisfaction, 46.67 per cent of the social media user respondents were highly satisfied with services provided by social media are timely, followed by services provided by social media are highly useful (42.00%), advices provided by social media are worth paying (38.66%), social media services provide all needed information (28.00%), social media provides problem specific advisories (24.00%), social media contain enough knowledge to solve field problems (20.66%) and advices provided by social media are highly relevant (18.00%), respectively. The majority of respondents (52.00%) were satisfied with the social media contains enough knowledge to solve field problems, followed by services provided by social media are highly useful (51.33%), social media services provide all needed information (50.00%), advices provided by social media are worth paying (49.33%), social media provides problem specific advisories (40.00%), advices provided by social media are highly relevant and 20.67 per cent were satisfied with services provided by social media are timely respectively.



**Fig. 19 Distribution of respondents according to extent of reach**



**Fig. 20 Distribution of respondents according to perceived satisfaction**

**Table 31. Distribution of the social media user respondents according to perceived satisfaction**

Sl. No.	Statements	Satisfaction Level (n=150)				
		HS (4)	S (3)	UD (2)	U (1)	HU (0)
1	Services provided by social media are timely	70 (46.67)	31 (20.67)	42 (28.00)	01 (0.66)	06 (4.00)
2	Social media services provide all the needed information	42 (28.00)	75 (50.00)	12 (08.00)	18 (12.00)	03 (2.00)
3	Services provided by social media are highly useful	63 (42.00)	77 (51.33)	08 (5.33)	00 (00.00)	02 (1.33)
4	The Social media contain enough knowledge to solve field problems	31 (20.66)	78 (52.00)	33 (22.00)	05 (3.33)	03 (2.00)
5	Social media provides problem specific advisories	36 (24.00)	60 (40.00)	36 (24.00)	18 (12.00)	00 (00.00)
6	Advices provided by social media are highly relevant	27 (18.00)	58 (38.66)	48 (32.00)	15 (10.00)	02 (1.33)
7	The advices provided by social media are worth paying	58 (38.66)	74 (49.33)	16 (10.66)	01 (0.66)	01 (0.66)

*Figures in parentheses indicate percentage*

**HS-** Highly satisfied, **S-** Satisfied, **UD-** Undecided, **U-**Unsatisfied, **HU-** Highly Unsatisfied

The respondents were undecided about the social media messages, 32.00 per cent of the social media user orange growers were undecided about social media advices are highly relevant followed by services provided by social media are timely (28.00%), social media provides problem specific advisories (24.00%), it contain enough knowledge to solve field problems (22.00%), advices provided by social media are worth paying (10.66%), social media services provide all needed information (8.00%) and services provided by social media are highly useful (5.33%), respectively.

In these cases user respondents were undecided. Whereas, 12.00 per cent of the respondents were unsatisfied as social media

services provide all the needed information followed by the social media provides problem specific advisories (12.00%), advices provided by social media are highly relevant (10.00%), social media contains enough knowledge to solve field problems (3.33%), services provided by social media are timely (0.66%) and the advices provided by social media are worth paying (0.66%) and 4.00 per cent of them were highly unsatisfied with statement services provided by social media are timely, respectively.

Due to usefulness, timely availability and affordability of the social media, social media user respondents are highly satisfied while satisfied with social media contains enough knowledge to solve field problems. It might be due to active use of social media content in the field and regular access to the social media information.

**Table 32. Distribution of the respondents according to overall index of perceived satisfaction**

Sl. No.	Index of perceived satisfaction	Social media user respondents (n=150)	
		Frequency	Percentage
1	Low (<27.71)	05	03.33
2	Medium (27.72 to 72.43)	89	59.34
3	High (>72.43)	56	37.33
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 50.07**

**SD= 22.36**

From Table 32. Majority of the social media user respondents (59.34%) had medium perceived satisfaction followed by 37.33 per cent respondents were perceived high level and only 0.33 per cent of respondents had low level of satisfaction, respectively.

As social media platforms are not only confined to transfer and sharing of agricultural information but also provide farmers with holistic knowledge about ongoing developments in their surroundings. It may be concluded from result that, medium to high level of perceived satisfaction in case of social media user respondent due to their purpose of use of social media.

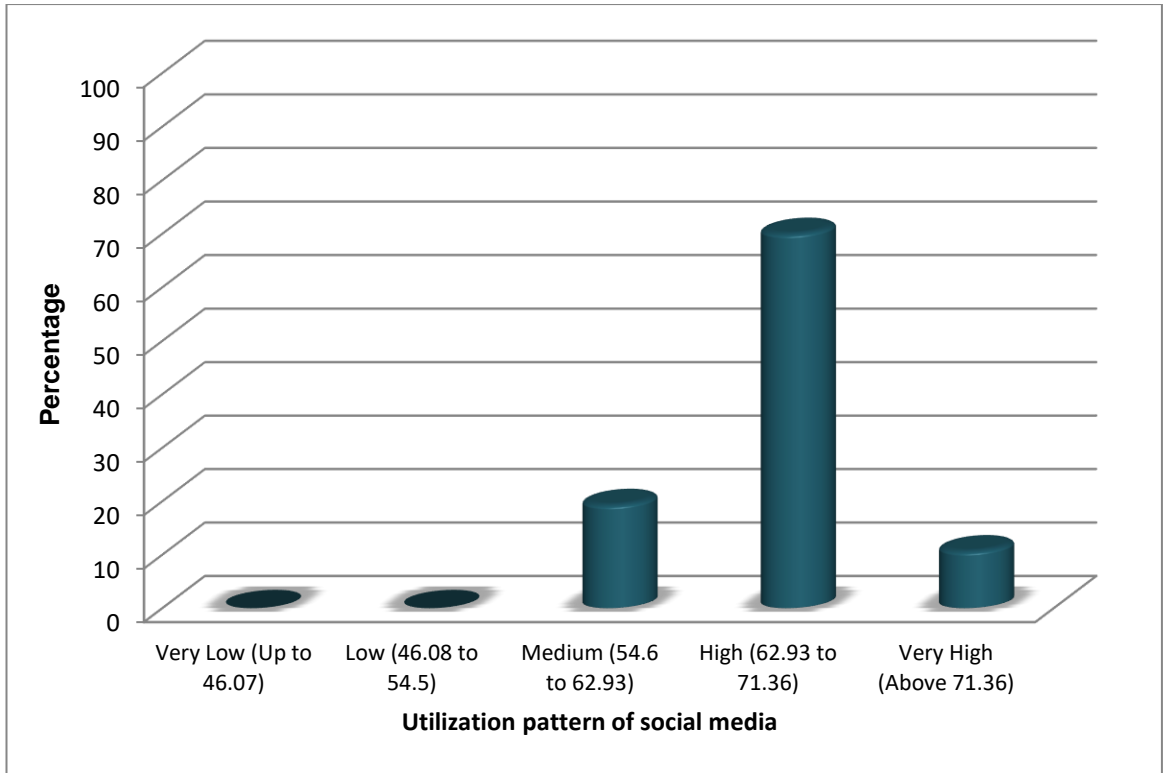
**Table 33. Distribution of the respondents according to overall utilization pattern index of social media**

Sl. No	Utilization pattern	Social media user respondents (n=150)	
		Freq.	%
1	Very Low (Up to 46.07)	00	00.00
2	Low (46.08 to 54.5)	00	00.00
3	Medium (54.6 to 62.93)	29	19.33
4	High (62.94 to 71.36)	105	70.00
5	Very High (Above 71.36)	16	10.67
	<b>Total</b>	<b>150</b>	<b>100.00</b>

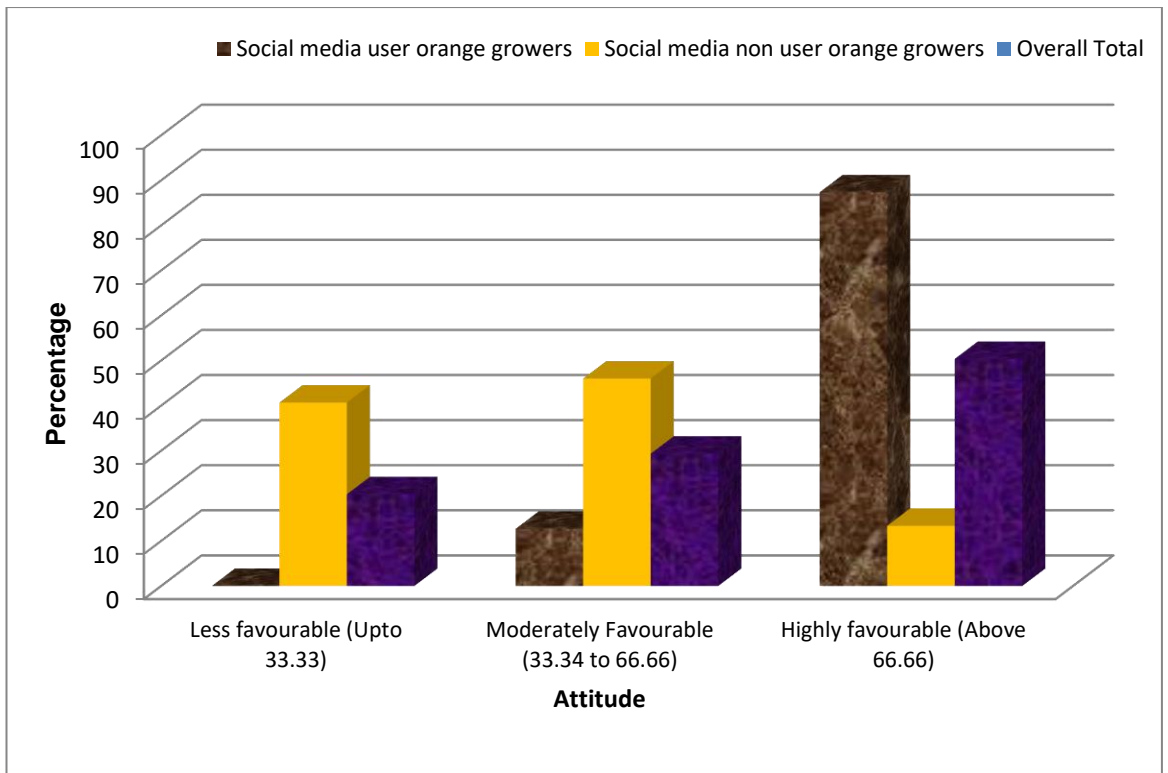
From Table 33 It is depicted that more than half of the social media user respondents (70.00%) had high index of utilization pattern of social media followed by 19.33 per cent had medium index of utilization pattern, 10.67 per cent of them had very high index of utilization pattern while none of them had very low and low index of utilization pattern respectively.

High level of utilization may be due to provision of agro based advisories in addition to other services as per their mandates and medium level of extent of utilization of social media by the orange growers could be due to the fact that their limitation in potential use of social media such as call back facilities (which involves cost on part of the individuals), help line facilities and quiz programmes provided by the social media applications which limits the extent of utilization of social media. Many times it is experienced that the practices which have been advised by social media sources may not be practicable in the part of orange grower in specific area which inhibits the proper utilization of those advices like high cost machineries, inputs others,.

The findings are supported by the results reported by Meshram (2014), Naik (2014) and Sonal Gupta (2015).



**Fig. 21 Distribution of respondents according to utilization pattern of social media**



**Fig. 22 Distribution of respondents according to attitude towards social media**

### 4.3 Attitude of orange growers towards social media

Attitude is the degree of positive or negative affect associated with some psychological object (Thurstone, 1946). An individual who has associated positive affect or feeling with some psychological object is said to like that object or to have a favourable attitude towards the object. An individual who has associated negative affect with the same psychological object would be said to dislike that object or to have an unfavourable attitude towards the object (Edwards, 1969). Here psychological object was social media. Social media are potential low cost tools that have the ability to increase the scope and coverage of agricultural extension.

Attitude is learned and enduring which means it is acquired as a result of socialization and not subject to easy change. It is a good predictor of human behaviour. Therefore, it becomes essential to study the attitude of orange growers towards social media as it involves both belief and emotional component of human personality.

The results regarding attitude of the attitude of orange growers towards social media has been presented in Table 34.

**Table 34. Distribution of the social media user respondents according to their statement wise attitude towards social media**

Sl. No.	Statements	Agreements (n=150)				
		SA	A	UD	D	SD
1	I am well aware about modern technologies in orange cultivation through social media	103 (68.67)	41 (27.33)	6 (4.00)	00 (00.00)	00 (00.00)
2	Social media makes me aware about current happenings in agriculture	98 (65.33)	29 (19.33)	16 (10.67)	07 (4.67)	00 (00.00)
3	Multimedia feature attracts the use of social media in farming	109 (72.67)	25 (16.67)	10 (6.66)	6 (04.00)	00 (00.00)

4	Information provided by social media is at relatively high cost (*)	00 (00.00)	00 (00.00)	05 (3.33)	29 (19.33)	116 (77.34)
5	Agricultural information received through social media is difficult to use at grass root level	00 (00.00)	23 (15.33)	11 (7.33)	91 (60.66)	25 (16.66)
6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.	129 (86.00)	21 (14.00)	00 (00.00)	00 (00.00)	00 (00.00)
7	Internet connectivity is not a problem in use of social media (*)	00 (00.00)	03 (2.00)	12 (8.00)	122 (81.33)	13 (8.67)
8	Social media provides information in regional/local languages	109 (72.67)	33 (22.00)	06 (4.00)	00 (00.00)	02 (1.33)
9	It makes possible to collect agricultural data from different geographical areas	18 (12.00)	96 (64.00)	20 (13.33)	15 (10.00)	01 (0.67)
10	It provides weather forecasting updates by single click	137 (91.33)	13 (8.67)	00 (00.00)	00 (00.00)	00 (00.00)
11	There is no need of skill and expertise for using social media (*)	05 (3.33)	33 (22.00)	12 (8.00)	91 (60.67)	09 (6.00)
12	Time management with quality output is possible	12 (8.00)	61 (40.67)	24 (16.00)	48 (32.00)	05 (3.33)
13	Social media is easy to operate and tackle by farmers	07 (4.67)	57 (38.00)	48 (32.00)	27 (18.00)	11 (7.33)
14	Through social media I can learn from other farmers and agricultural experts	108 (72.00)	36 (24.00)	05 (3.33)	01 (0.67)	00 (00.00)
15	Social media immediately	37	101	06	05	01

	provides information about pest and disease management	(24.67)	(67.33)	(4.00)	(3.33)	(0.67)
16	Social media contents are not authentic, complete and interactive (*)	24 (16.00)	26 (17.33)	07 (4.67)	02 (1.33)	91 (60.67)
17	It helps to make group of farmers having common interest	44 (29.33)	102 (68.00)	04 (2.67)	00 (00.00)	00 (00.00)
18	It is powerful tool for e-marketing of oranges	32 (21.33)	58 (38.67)	32 (21.33)	15 (10.00)	13 (8.67)
19	Social status is increased due to use of social media by orange growers	18 (12.00)	111 (74.00)	21 (14.00)	00 (00.00)	00 (00.00)
20	Direct selling of oranges is possible through social media without middleman	91 (60.67)	28 (18.67)	12 (8.00)	19 (12.66)	00 (00.00)
21	It helps to get knowledge about orange export	26 (17.33)	78 (52.00)	15 (10.00)	25 (16.67)	06 (4.00)
22	Product branding is possible due to social media	04 (2.67)	32 (21.33)	90 (60.00)	23 (15.33)	01 (0.67)
23	Economic benefit is possible due to social media	03 (2.00)	48 (32.00)	43 (28.66)	52 (34.67)	04 (2.67)
24	It increases confidence among the orange growers.	58 (38.67)	75 (50.00)	16 (10.67)	01 (0.66)	00 (00.00)

*Figures in parentheses indicate percentage.*

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

Regarding attitude of social media user towards social media From Table 34 observed that, the great majority of user of social media (91.33%) were strongly agree with it provides weather forecasting updates by single click, followed by 86.00 per cent were strongly agree that, audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form, 72.67 per cent were

strongly agree that, social media provides information in regional/local languages and similar percentage of respondents had highly favourable attitude towards multimedia features of social media attracts its use in farming, followed by 72.00 per cent were strongly agree that, through social media I can learn from other farmers and agricultural experts, I am well aware about modern technologies in orange cultivation through social media (68.66%), followed by 65.33 per cent respondents were strongly agree with social media makes me aware about current happenings in agriculture whereas 60.67 per cent were strongly agree that, direct selling of oranges is possible through social media without middleman. The 38.67 per cent of social media user respondents were strongly agree that, It increases confidence among the orange growers, followed by it helps to make group of farmers having common interest (29.33%), followed by 24.67 per cent were strongly agree with social media immediately provides information about pest and disease management, followed by 21.33 per cent were strongly agree that it is powerful tool for e-marketing of oranges, 17.33 per cent were strongly agree that it helps to get knowledge about orange export, 16.00 per cent were strongly agree that social media contents are not authentic, complete and interactive , followed by 12.00 per cent were strongly agree that it makes possible to collect agricultural data from different geographical areas and social status is increased due to use of social media by orange growers. Only 8.00 per cent of user respondents were strongly agree that time management with quality output is possible, followed by 4.67 per cent were strongly agree that social media is easy to operate and tackle by farmers respectively.

The attitude of social media user towards social media found that nearly three fourth of the respondents (74.00%) were agree that social status is increased due to use of social media by orange growers because of social media usefulness and timeliness features attracts the user and leads to more smart work with use of social media, followed by 68.00 per cent were agree that it helps to make group of farmers having common interest, Further the respondents were agree that social media immediately provides information about pest and disease management (67.33%), it

makes possible to collect agricultural data from different geographical areas (64.00%), majority were also agree that it helps to get knowledge about orange export (52.00 %), (52.00%) increases confidence among the orange growers, (50.00%) of the social media user respondents attitude towards social media were they were agree with social media helps for the time management and quality output of farm products (40.67%) followed by 38.67 per cent were agree that it is powerful tool for e-marketing of oranges, followed by 38.00 per cent were agree that social media is easy to operate and tackle by farmers, they also agree economic benefit is possible due to social media (32.00%), due to social media they were well aware about modern technologies in orange cultivation (27.33%), due to social media they learn from other farmers and agricultural experts (24.00%), social media provides information in regional/local languages (22.00%), and they were also agree that product branding is possible due to social media (21.33%), respectively.

The highest number social media user 60.00 per cent were undecided about product branding is possible due to social media, followed by 32.00 per cent were undecided that social media is easy to operate and tackle by farmers and 28.66 per cent were undecided that economic benefit is possible due to social media. The less than one fourth of respondents were undecided that it is powerful tool for e-marketing of oranges (21.33%), time management with quality output is possible (16.00%), social status is increased due to use of social media by orange growers (14.00%), and it makes possible to collect agricultural data from different geographical areas (13.33%), respectively.

The highest number of user of social media 81.33 per cent were disagreed that internet connectivity is not a problem in use of social media means they had problem of internet connectivity, followed by 60.67 per cent were disagreed that agricultural information received through social media is difficult to use at grass root level and 60.67 per cent were disagreed that there is no need of skill and expertise for using social media. The social media user respondents were disagreed that economic benefit is possible due to social media (34.67%), time management with quality

output is possible (32.00%), information provided by social media is at relatively high cost (19.33%), social media is easy to operate and tackle by farmers (18.00%), it is powerful tool for e-marketing of oranges and it helps to get knowledge about orange export (16.67%), product branding is possible due to social media (15.33%), direct selling of oranges is possible through social media without middleman (12.67%), it makes possible to collect agricultural data from different geographical areas (10.00%), social media makes me aware about current happenings in agriculture (4.67%), through social media respondents can learn from other farmers and agricultural experts (4.00%) respectively.

The attitude of the social media user respondents were strongly disagree that information provided by social media is at relatively high cost (77.34%), social media contents are not authentic, complete and interactive (60.67%), agricultural information received through social media is difficult to use at grass root level (16.67%), internet connectivity is not a problem in use of social media (8.67%), social media is easy to operate and tackle by farmers (7.33%), it helps to get knowledge about orange export (4.00%), respectively.

As the majority of the respondents were strongly agreed that social media is useful tool for providing weather reports and simplified use of social media due to its multimedia features, might be due to their daily exposure to the social media and accessing it for seeking information regarding weather updates and other agricultural information. Great majority of the social media user respondents strongly disagreed that social media is costly and its contents are not reliable. As data packs for longer period validity may be at affordable price which individual can bear by knowing its importance for agriculture use and as the respondents were getting agricultural information from authentic sources continuously and respondents were adopting them simultaneously in order to get better returns from orange cultivation. They might have build up the faith on social media.

**Table 35. Distribution of the social media non user respondents according to their statement wise attitude towards social media**

Sl. No.	Statements	Agreements (n=150)				
		SA	A	UD	D	SD
1	I am well aware about modern technologies in orange cultivation through social media	02 (1.33)	05 (3.33)	80 (53.34)	24 (16.00)	39 (26.00)
2	Social media makes me aware about current happenings in agriculture	04 (2.67)	29 (19.33)	82 (54.67)	14 (9.33)	21 (14.00)
3	Multimedia feature attracts the use of social media in farming	05 (3.33)	35 (23.33)	68 (45.34)	13 (8.67)	29 (19.33)
4	Information provided by social media is at relatively high cost (*)	18 (12.00)	28 (18.67)	57 (38.00)	27 (18.00)	20 (13.33)
5	Agricultural information received through social media is difficult to use at grass root level	22 (14.67)	29 (19.33)	37 (24.66)	34 (22.67)	28 (18.67)
6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.	20 (13.33)	25 (16.67)	61 (40.67)	24 (16.00)	20 (13.33)
7	Internet connectivity is not a problem in use of social media (*)	13 (08.67)	26 (17.33)	39 (26.00)	24 (16.00)	48 (32.00)
8	Social media provides information in regional/local languages	22 (14.67)	29 (19.33)	34 (22.67)	26 (17.33)	39 (26.00)
9	It makes possible to collect agricultural data from different geographical areas	23 (15.33)	19 (12.67)	36 (24.00)	33 (22.00)	39 (26.00)
10	It provides weather forecasting updates by single click	22 (14.66)	52 (34.67)	28 (18.67)	25 (16.67)	23 (15.33)
11	There is no need of skill and expertise for using social media (*)	17 (11.33)	30 (20.00)	35 (23.34)	24 (16.00)	44 (29.33)
12	Time management with quality output is possible	23 (15.33)	42 (28.00)	32 (21.33)	24 (16.00)	29 (19.34)
13	Social media is easy to operate and tackle by farmers	18 (12.00)	31 (20.67)	72 (48.00)	11 (7.33)	18 (12.00)

14	Through social media I can learn from other farmers and agricultural experts	25 (16.66)	48 (32.00)	34 (22.67)	33 (22.00)	10 (06.67)
15	Social media immediately provides information about pest and disease management	22 (14.67)	37 (24.67)	63 (42.00)	17 (11.33)	11 (7.33)
16	Social media contents are not authentic, complete and interactive (*)	18 (12.00)	18 (12.00)	46 (30.67)	27 (18.00)	41 (27.33)
17	It helps to make group of farmers having common interest	24 (16.00)	23 (15.33)	65 (43.34)	24 (16.00)	14 (09.33)
18	It is powerful tool for e-marketing of oranges	11 (7.33)	27 (18.00)	52 (34.67)	28 (18.67)	32 (21.33)
19	Social status is increased due to use of social media by orange growers	22 (14.67)	33 (22.00)	48 (32.00)	20 (13.33)	27 (18.00)
20	Direct selling of oranges is possible through social media without middleman	07 (04.67)	17 (11.33)	74 (49.33)	30 (20.00)	22 (14.67)
21	It helps to get knowledge about orange export	16 (10.66)	36 (24.00)	63 (42.00)	19 (12.67)	16 (10.67)
22	Product branding is possible due to social media	12 (08.00)	14 (9.33)	73 (48.67)	20 (13.33)	31 (20.67)
23	Economic benefit is possible due to social media	06 (04.00)	19 (12.67)	79 (52.67)	25 (16.66)	21 (14.00)
24	It increases confidence among the orange growers.	12 (08.00)	21 (14.00)	75 (50.00)	19 (12.67)	23 (15.33)

*Figures in parentheses indicate percentage.*

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

The attitude of social media non user towards social media from Table 35 it was observed that, the highest number of non user of social media 16.66 per cent were strongly agree with through social media I can learn from other farmers and agricultural experts, followed by 16.00 per cent were strongly agree with it helps to make group of farmers having common interest, followed by it makes possible to collect agricultural data

from different geographical areas (15.33%), time management with quality output is possible (15.33%), agricultural information received through social media is difficult to use at grass root level (14.67%), social media provides information in regional/ local languages(14.67%), social status is increased due to use of social media (14.67%), it provides weather forecasting updates by single click (14.66%) and social media immediately provides information about pest and disease management (14.66%),respectively.

From Table 35 it is concluded that, In case of social media non user respondents 34.67 per cent of respondents were agreed with it provides weather forecasting updates by single click followed by through social media I can learn from other farmers and agricultural experts (32.00%), time management with quality output is possible (28.00%), social media provides information about pest and disease management (24.67%) and it helps to get knowledge about orange export (24.00%) respectively.

From Table 35. It is observed that, the social media non users respondent were undecided that, social media makes me aware about current happenings in agriculture (54.67%), respondents were well aware about modern technologies in orange cultivation through social media (53.34%), economic benefit is possible due to social media (52.67%), it increases confidence among the orange growers (50.00%), direct selling of oranges is possible through social media without middlemen (49.33%) and 48.67 per cent of the social media non user orange growers were undecided about product branding is possible due to social media, respectively.

The 22.67 per cent of the social media non user respondents were disagree about statement agricultural information received through social media is difficult to use at grass root level followed by it makes possible to collect agricultural data from different geographical areas (22.00%), through social media respondents can learn from other farmers and agricultural experts (22.00%), direct selling of oranges is possible through social media without middlemen (20.00%) and 18.66 per cent of

the social media non user orange growers were disagreed that it is powerful tool for e-marketing of oranges respectively.

From Table 35 It is revealed that, 32.00 per cent of the social media non user respondents were strongly disagree with internet connectivity is not a problem in use of social media, followed by there is no need of skill and expertise for using social media (29.33%), social media contents are not authentic, complete and interactive (27.33%), respondents were well aware about modern technologies in orange cultivation through social media (26.00%), social media provides information in regional/local languages (26.00%) and it makes possible to collect agricultural data from different geographical areas (26.00%), respectively.

Regarding overall attitude of social media user and social media non user orange growers were explain in Table 36. It is concluded that, majority of the social media user respondents (87.33%) had highly favourable attitude towards social media. While 12.67 per cent of them had moderately favourable attitude towards social media while none of the respondents had less favourable attitude towards social media, respectively. In case of social media non user respondents majority of the respondents (46.00%) had moderately favourable and 40.67 per cent of them had less favourable attitude towards social media while only 13.33 per cent of them had highly favourable attitude towards social media respectively.

About 40.67 per cent of the social media non users lies in less favourable category of attitude towards social media. It may be because they are not at all in possession of the required devices to connect with the social media. It is common feature of a individual to be a part of a society. The happenings around him may ease him to decide his own perception regarding the things available. In line with this the non users of the social media found in moderately favourable category (46.00%), might have come across the benefits during discussion with the other farmers regarding use of social media in agriculture and the results.

**Table 36. Distribution of the respondents according to their overall attitude index towards social media**

Sl. No.	Attitude towards social media	Social media user respondents (n=150)		Social media non user respondents (n=150)		Overall Total (n=300)	
		Freq	%	Freq	%	Freq	%
1	Less favourable (Upto 33.33)	00	00.00	61	40.67	61	20.33
2	Moderately Favourable (33.34 to 66.66)	19	12.67	69	46.00	88	29.33
3	Highly favourable (Above 66.66)	131	87.33	20	13.33	151	50.34
	<b>Total</b>	<b>150</b>	<b>100.00</b>	<b>150</b>	<b>100.00</b>	<b>300</b>	<b>100.00</b>

In case of overall attitude of orange growers towards social media, 50.34 per cent of the respondents had highly favourable attitude towards social media followed by moderately favourable (29.33%) and less favourable (20.33%), respectively. Hence it might be considered that majority of the respondents had positive attitude towards social media.

The orange growers from study area had taken guidance from social media for orange cultivation practices. So, they had experienced positive impact of social media on knowledge levels about improved orange cultivation practices, adoption level of improved orange cultivation practices, production level of orange, increased orchard management, increased income level, family expenditure and possession of different household, farming materials and mostly important increased self confidence and In total, socio-economic status of the beneficiary farmers was improved. The orange growers from study area were gaining highly favourable to favourable levels of benefits to the social media users and this may be the cause that favourable attitude is dominating the scenario. The orange growers' highly favourable attitude indicates a good impact of social media on their livelihood. These findings clearly reflected the active use of social media for orchard management for implementing

innovative cultivation practices in the study area. Majority of the social media non user orange growers were observed in undecided group of attitude towards social media because they were unaware about uses and benefits of social media in agriculture.

These findings are nearly in line with the findings of Meera *et al.* (2004) Kumar (2008) and Naik (2014).

#### **4.4 Impact of social media**

Effects of social media in study area to the orange growers in term of change in eight impact parameters under study are presented as follows.

##### **4.4.1 Change in Knowledge**

Social media platforms are not confined to transfer and sharing of agricultural information but also provide farmers with holistic knowledge about ongoing developments in their surroundings. There is potential increase in the knowledge level due to daily use of social media because of affordable smart phones, cheaper data plans and increasing awareness about using social media. Adequate and relevant knowledge about improved orange cultivation practices is necessary for its adoption hence knowledge has been considered in present study.

The bird eye view of data presented in the Table 37 revealed that amongst improved orange cultivation practices, 98.67 per cent of the social media user had knowledge about bordeaux paste application followed by 98.67 per cent of the respondents had knowledge about crop regulation while 98.00 per cent of them had knowledge about staking or supporting, followed by weed management (96.00%), harvesting and yield (96.00%), varieties cultivated (95.33%) while similar percentage (95.33%) of the respondents had knowledge about nutrient management, insect pest management and disease management respectively followed by similar per cent (94.67%) of them had knowledge about irrigation management, training and pruning and intercropping, respectively.

**Table 37. Distribution of the social media user and non user orange growers according to practice wise knowledge about improved orange cultivation practices**

Sl. No.	Name of practices	Social media user knowledge (n=150)		Social media non user knowledge (n=150)		Overall Total (n=300)	
		Yes	No	Yes	No	Yes	No
1	Varieties cultivated	143 (95.33)	07 (4.67)	112 (74.67)	38 (25.33)	255 (85.00)	45 (15.00)
2	Suitable land	131 (87.33)	19 (12.67)	126 (84.00)	24 (16.00)	257 (85.67)	43 (14.33)
3	Planting material	127 (84.67)	23 (15.33)	115 (76.67)	35 (23.33)	242 (80.67)	58 (19.33)
I)	Planting season						
II)	Spacing						
4	Nutrient management	143 (95.33)	07 (4.67)	126 (84.00)	24 (16.00)	269 (89.67)	31 (10.33)
5	Irrigation management	142 (94.67)	08 (5.33)	129 (86.00)	21 (14.00)	271 (90.33)	29 (9.67)
6	Training and pruning	142 (94.67)	08 (5.33)	132 (88.00)	18 (12.00)	274 (91.33)	26 (8.67)
7	Intercropping	142 (94.67)	08 (5.33)	129 (86.00)	21 (14.00)	271 (90.33)	29 (9.67)
8	Borduex paste application	148 (98.67)	02 (1.33)	126 (84.00)	24 (16.00)	274 (91.33)	26 (8.67)
9	Use of bio-fertilizers and bio-fungicides	138 (92.00)	12 (8.00)	123 (82.00)	27 (18.00)	261 (87.00)	39 (13.00)
10	Crop regulation (Ambia, Mrug, Hast Bahar treatment) Water stress treatment	148 (98.67)	02 (1.33)	127 (84.67)	23 (15.33)	275 (91.67)	25 (8.33)
11	Fruit drop control	140 (93.33)	10 (6.67)	125 (83.33)	25 (16.66)	265 (88.33)	35 (11.67)
12	Insect pest Management	143 (95.33)	07 (4.67)	126 (84.00)	24 (16.00)	269 (89.67)	31 (10.33)

13	Disease Management	143 (95.33)	07 (4.67)	126 (84.00)	24 (16.00)	269 (89.67)	31 (10.33)
14	Weed Management	144 (96.00)	06 (4.00)	120 (80.00)	30 (20.00)	264 (88.00)	36 (12.00)
15	Thining	124 (82.67)	26 (17.33)	133 (88.67)	17 (11.33)	257 (85.66)	43 (14.33)
16	Supporting/Staking	147 (98.00)	03 (2.00)	135 (90.00)	15 (10.00)	282 (94.00)	18 (06.00)
17	Harvesting and yield (after 4-6th year)	144 (96.00)	06 (4.00)	123 (82.00)	27 (18.00)	267 (89.00)	33 (11.00)
18	Marketing	141 (94.00)	09 (6.00)	111 (74.00)	39 (26.00)	252 (84.00)	48 (16.00)

In case of social media non user orange growers, 90.00 per cent of the respondents had knowledge about supporting or staking followed by thining (88.67%), training and pruning (88.00%), irrigation management (86.00%), intercropping (86.00%), crop regulation (84.67%), suitable land (84.00%) and similar per cen (84.00%) of them had knowledge about nutrient management, borduex paste application, insect pest management and disease management, respectively.

From overall knowledge of respondents 94.00 per cent of them had knowledge about supporting or staking followed by crop regulation (91.67%), training and pruning (91.33%), borduex paste application (91.33%), irrigation management (90.33%) and intercropping (90.33%), respectively. This may be due to they were cultivating orange crop from their ancestors and they had good experience in orange cultivation as it is yearlong practice and now a days, most of the orange growers were actively using social media for agriculture purpose in order to get benefit from it and different agricultural research institutions also providing orange technology on social media.

**Table 38. Change in knowledge level among respondents**

Average of knowledge about improved orange cultivation practices	Average knowledge		Difference	% Change
	User mean	Non user mean		
14.53	16.86	12.20	4.66	38.17

The data presented in Table 38 has been revealed that, the average knowledge of respondents about improved orange cultivation practices was 14.53. In case of user the average knowledge was 16.86 and in case of non user respondents it was 12.20. Thus, the difference between average knowledge of user and non user was 4.66 and the per cent change was 38.17 per cent.

In the present study, “Impact of social media on orange growers” as studied only considering the users of the social media.

**Table 39. Distribution of the respondents according to per cent change in knowledge**

Sl. No.	Per cent change in knowledge	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 14.72)	29	19.33
2	Medium (14.73 to 72.5)	81	54.00
3	High (Above 72.5)	40	26.67
	<b>Total</b>	<b>150</b>	<b>100.00</b>

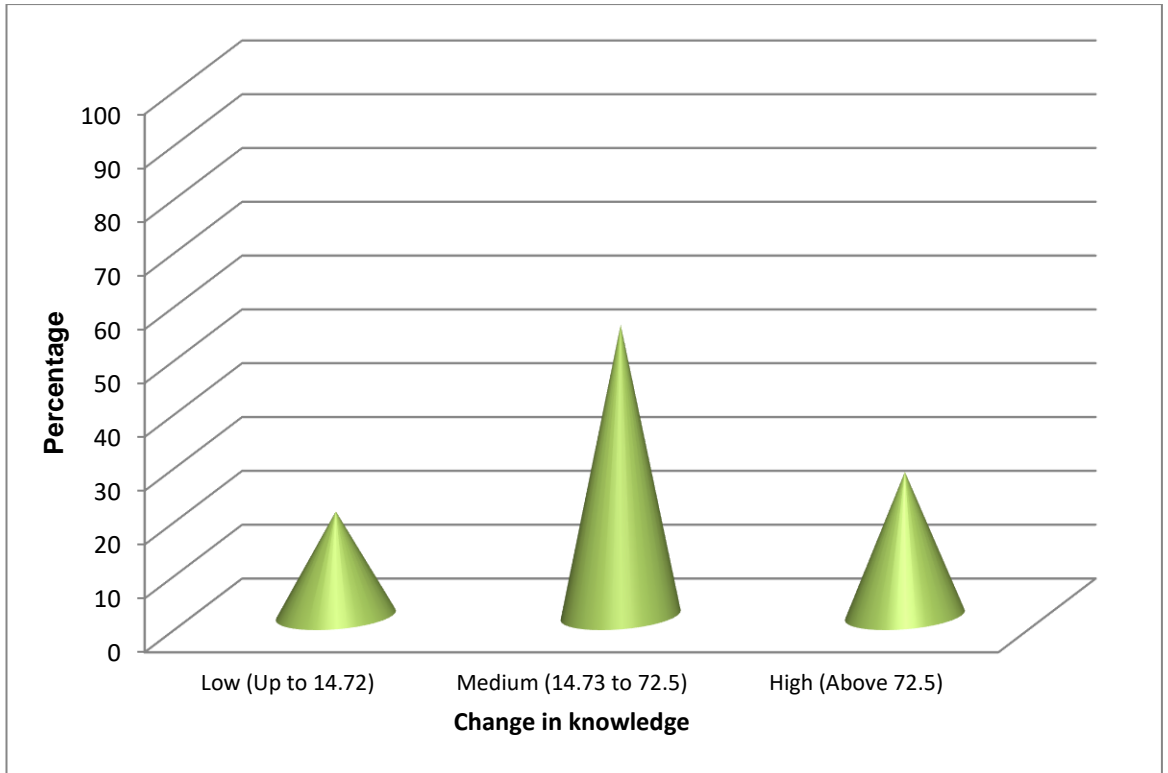
**Mean=43.61**

**SD= 28.89**

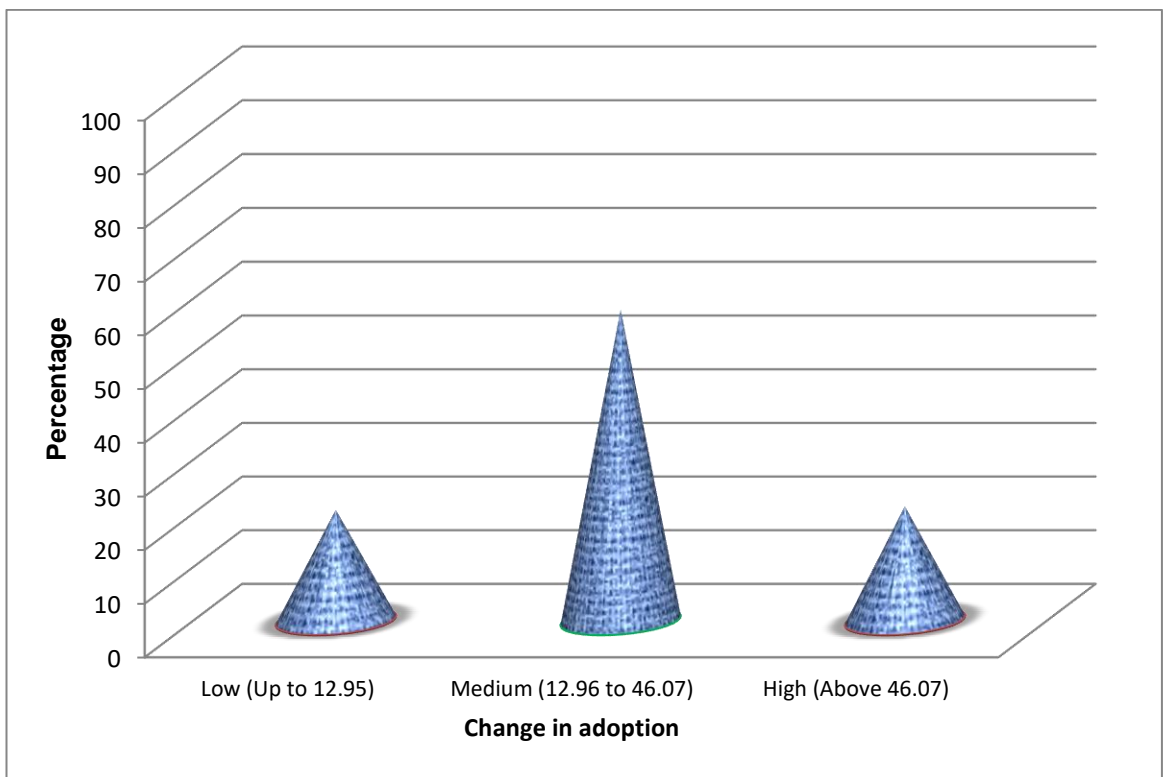
From Table 39 it is concluded that slightly more than half of the respondents (54.00%) experienced medium level of change in knowledge followed by high (26.67%) change in knowledge and only 19.33 per cent of the respondents had experienced low change in knowledge, respectively. Though significant number of the respondents had low level of change in knowledge, they may be already aware about that knowledge through other sources. Similar findings were reported by Ayushi Pal *et al.* (2022).

#### **4.4.2 Change in Adoption**

From Table 40 it is shown that, In case of social media user orange growers, majority of the respondents (77.33%) had full adoption



**Fig. 23 Distribution of the respondents according to per cent change in knowledge**



**Fig. 24 Distribution of the respondents according to per cent change in adoption**

about nutrient management practices followed by irrigation management (72.00%), suitable land (71.33%), training and pruning (68.00%), varieties cultivated (66.00%) and borduex paste application (66.00%), respectively. The social media user respondents had partial adoption about varieties cultivated (26.67%) followed by intercropping (18.67%), planting material (9.33%) and suitable land (8.00%) respectively. Majority of them had no adoption about thinning (57.33%), followed by disease management (46.67%), insect pest management (45.33%), weed management (45.33%), supporting or staking (44.00%) and marketing (43.33%), respectively.

In case of social media non user respondents 26.67 per cent of the respondents had full adoption about use of suitable land followed by irrigation management (22.67%), planting material (20.00%), crop regulation (20.00%) and supporting or staking (20.00%) respectively. Majority of the social media non user respondents had partial adoption about harvesting and yield (73.33%) followed by varieties cultivated (68.67%), supporting or staking (64.00%), thinning (61.33%) and weed management (60.67%), respectively. The majority of the respondents had no adoption about marketing (74.00%), followed by insect pest management (31.33%), borduex paste application (29.33%), crop regulation (29.33%), intercropping (28.66%), irrigation management (26.66%) and training and pruning (26.00%), respectively.

In case of overall adoption 49.00 per cent of the respondents had full adoption about use of suitable land followed by nutrient management (48.00%), irrigation management (47.33%), planting material (42.67%) and varieties cultivated (41.67%), respectively. The 47.67 per cent of the respondents had partial adoption about varieties cultivated, followed by harvesting and yield (38.33%), intercropping (37.67%), planting material (34.33%) and thinning (34.00%), respectively. The majority of the respondents (58.67%) had no adoption about marketing, followed by thinning (39.33%), insect pest management (38.34%), disease management (36.00%), crop regulation (34.34%) and weed management (34.00%), respectively.

**Table 40. Distribution of the social media user and non user orange growers according to practice wise of adoption about improved orange cultivation practices**

Sl. No.	Improved orange cultivation practices	Social media user adoption			Social media non user adoption			Overall Total		
	Name of practices	FA	PA	NA	FA	PA	NA	FA	PA	NA
1	Varieties cultivated	99 (66.00)	40 (26.67)	11 (7.33)	26 (17.33)	103 (68.67)	21 (14.00)	125 (41.67)	143 (47.67)	32 (10.66)
2	Suitable land	107 (71.33)	12 (8.00)	31 (20.67)	40 (26.67)	84 (56.00)	26 (17.33)	147 (49.00)	96 (32.00)	57 (19.00)
3	Planting material	98 (65.33)	14 (9.33)	38 (25.34)	30 (20.00)	89 (59.33)	31 (20.67)	128 (42.67)	103 (34.33)	69 (23.00)
I)	Planting season									
II)	Spacing									
4	Nutrient Management	116 (77.33)	04 (2.67)	30 (20.00)	28 (18.67)	87 (58.00)	35 (23.33)	144 (48.00)	91 (30.33)	65 (21.67)
5	Irrigation management	108 (72.00)	08 (5.33)	34 (22.67)	34 (22.67)	76 (50.67)	40 (26.66)	142 (47.33)	84 (28.00)	74 (24.67)
6	Training and pruning	102 (68.00)	08 (5.33)	40 (26.67)	22 (14.67)	89 (59.33)	39 (26.00)	124 (41.33)	97 (32.33)	79 (26.34)
7	Intercropping	77 (51.33)	28 (18.67)	45 (30.00)	22 (14.67)	85 (56.67)	43 (28.66)	99 (33.00)	113 (37.67)	88 (29.33)
8	Borduex paste application	99 (66.00)	01 (0.67)	50 (33.33)	24 (16.00)	82 (54.67)	44 (29.33)	123 (41.00)	83 (27.67)	94 (31.33)

9	Use of bio-fertilizers and bio-fungicides	92 (61.33)	06 (4.00)	52 (34.67)	23 (15.33)	85 (56.67)	42 (28.00)	115 (38.33)	91 (30.33)	94 (31.33)
10	Crop regulation (Ambia, Mrug, Hast Bahar treatment) Water stress treatment	88 (58.67)	03 (2.00)	59 (39.33)	30 (20.00)	76 (50.67)	44 (29.33)	118 (39.33)	79 (26.33)	103 (34.34)
11	Fruit drop control	81 (54.00)	06 (4.00)	63 (42.00)	26 (17.33)	86 (57.34)	38 (25.33)	107 (35.67)	92 (30.66)	101 (33.67)
12	Insect pest Management	76 (50.67)	06 (4.00)	68 (45.33)	24 (16.00)	79 (52.67)	47 (31.33)	100 (33.33)	85 (28.33)	115 (38.34)
13	Disease Management	75 (50.00)	05 (3.33)	70 (46.67)	27 (18.00)	85 (56.67)	38 (25.33)	102 (34.00)	90 (30.00)	108 (36.00)
14	Weed Management	79 (52.67)	03 (2.00)	68 (45.33)	25 (16.67)	91 (60.67)	34 (22.66)	104 (34.67)	94 (31.33)	102 (34.00)
15	Thining	54 (36.00)	10 (6.67)	86 (57.33)	26 (17.34)	92 (61.33)	32 (21.33)	80 (26.67)	102 (34.00)	118 (39.33)
16	Supporting/Staking	79 (52.67)	05 (3.33)	66 (44.00)	30 (20.00)	96 (64.00)	24 (16.00)	109 (36.33)	101 (33.67)	90 (30.00)
17	Harvesting and yield (after 4-6th year)	82 (54.67)	05 (3.33)	63 (42.00)	22 (14.67)	110 (73.33)	18 (12.00)	104 (34.67)	115 (38.33)	81 (27.00)
18	Marketing	75 (50.00)	10 (6.67)	65 (43.33)	23 (15.33)	16 (10.67)	111 (74.00)	98 (32.67)	26 (8.66)	176 (58.67)

There endures abundant liberty for increasing the adoption level of the orange growers to increase production in a scientific way. Though the average adoption is quite more than average knowledge due to influence from the neighbour's field many orange growers hence partially adopted some orange cultivation practices. Orange growers need to be continuously renovate on technology through social media and persuaded to follow it for increasing profitability.

This finding is supported by Gudadhe (2015) and Kamatkar *et al.* (2021).

**Table 41. Change in adoption level among respondents**

Average of adoption about improved orange cultivation practices	Average adoption		Difference	% Change
	User mean	Non user mean		
19.72	22.32	17.13	5.19	30.27

The data presented in the Table 41 indicated that average adoption about improved orange cultivation practices was 19.72. In case of social media user average adoption was 22.32 and in case of non user it was 17.13. Therefore, the difference between user and non user average adoption was 5.19 and per cent change was 30.27 per cent. Due to use of social media they might have come across different improved orange cultivation practices and subsequently they might have been benefited. Therefore, significant per cent change of 30.27 per cent was observed in adoption of the respondents.

**Table 42. Distribution of the respondents according to per cent change in adoption**

Sl. No.	Per cent change in adoption	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 12.95)	31	20.67
2	Medium (12.96 to 46.07)	87	58.00
3	High (Above 46.07)	32	21.33
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 29.51**

**SD= 16.56**

From Table 42 it is depicted that more than half of the orange growers (58.00%) experienced medium change in adoption followed by 21.33 per cent of the orange growers had observed high change in adoption and 20.67 per cent of the orange growers experienced low change in adoption. The results are in consonance with knowledge as one fifth of the respondents had low category of per cent change in adoption, this may be due to their own awareness and implementation of improved practices in orange cultivation.

#### 4.4.3 Change in production

Social media have impact on quality production in some what extent. Availability of proper facilities during various growth stages of orange orchards results in increased yield. A change in yield of orange improves economic status of the orange grower.

To understand change in production of social media user and non user in study area, major fruit crop orange was considered and results has been depicted in the following Table 43 .

**Table 43. Change in production level among respondents**

Average orange production(Ton)	Average orange production (Ton)		Difference (Ton)	% Change
	User mean	Non user mean		
9.07	9.58	8.56	1.02	11.95

The change in the orange production in study area presented in Table 43. It has seen that, there was average change in orange production of social media user orange growers. Average orange production was 9.07 tons, while average orange production of social media user was 9.58 tons and orange production of social media non user was 8.56. The difference between social media user and non user orange grower was 1.02 ton and per cent change was 11.95 per cent in orange production. It can be inferred that there was no significant per cent change in production level and it can be attributed to fruit drop circumstances in the study year.

**Table 44. Distribution of the respondents according to per cent change in production**

Sl. No.	Per cent change in production	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 6.15)	20	13.33
2	Medium (6.16 to 17.67)	107	71.33
3	High (Above 17.67)	23	15.34
	<b>Total</b>	<b>150</b>	<b>100.00</b>

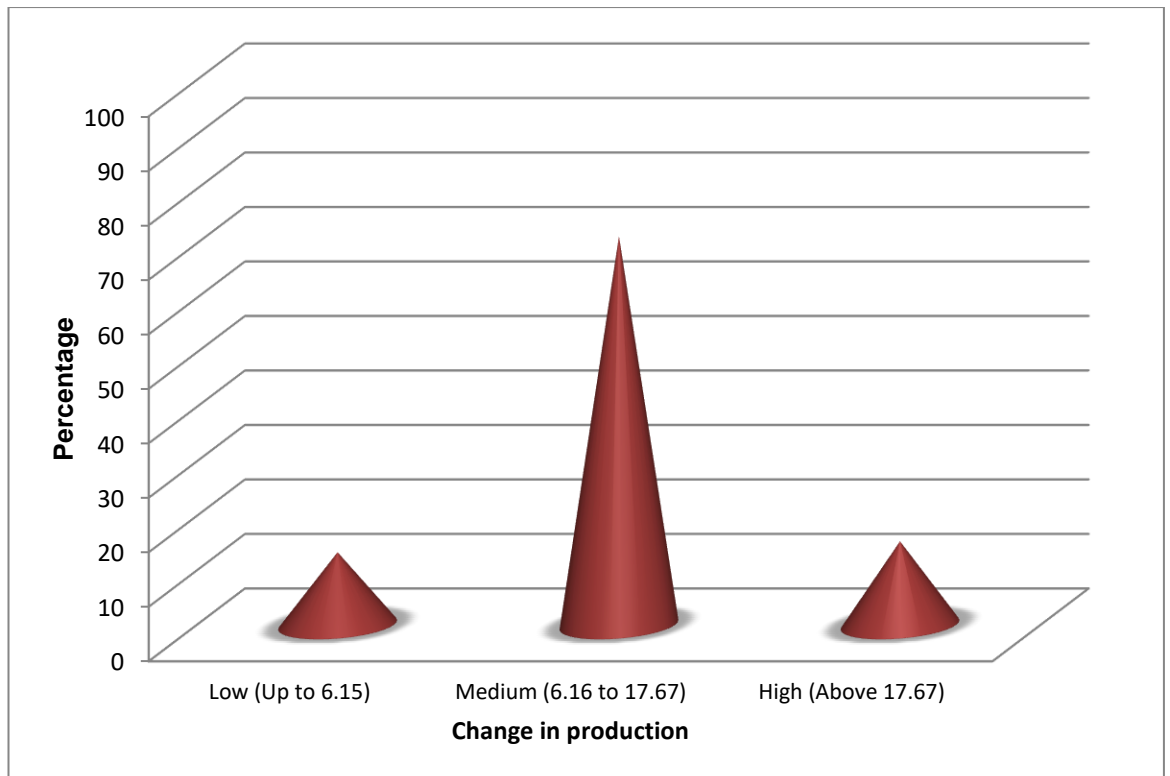
**Mean=11.91**

**SD= 5.76**

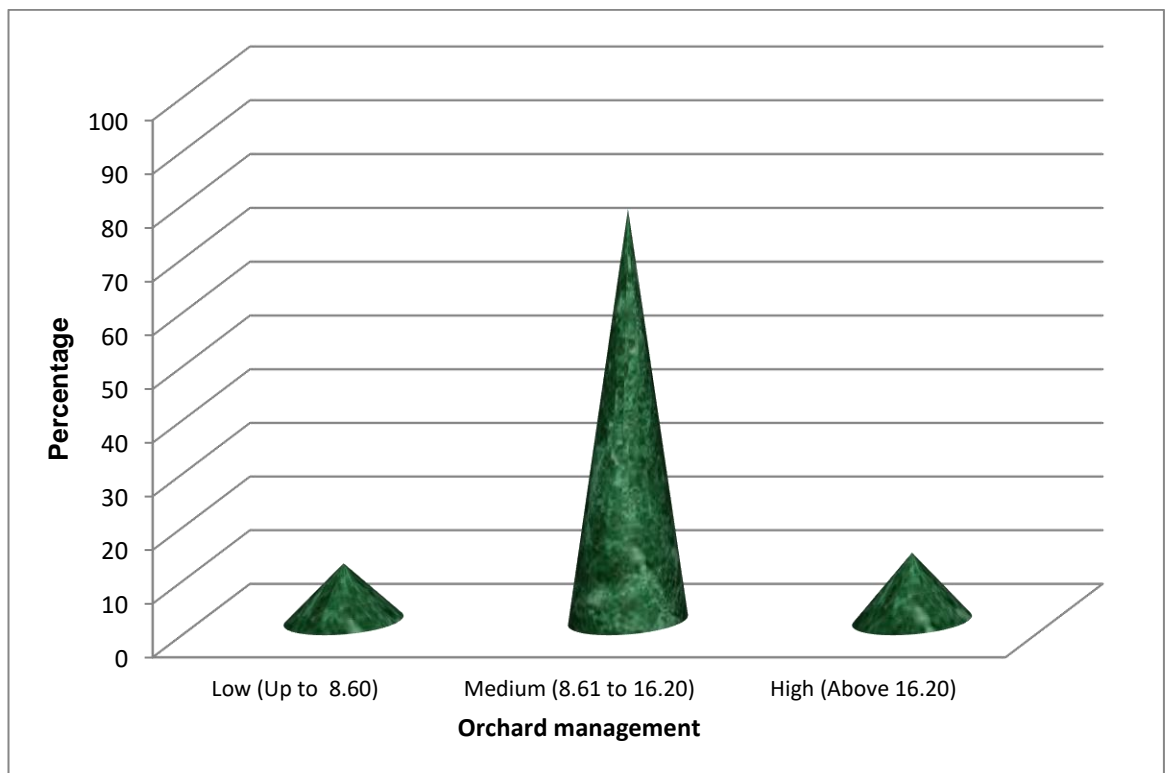
From Table 44 It is clearly shown that nearly three-fourth of the respondents (71.33%) were experienced medium level of change in orange production due to use of social media and 15.34 per cent of them were experienced high change in production, while 13.33 per cent of the orange growers were experienced low change in production. 71.33 per cent of the respondents in medium category of per cent change in production reflects that the users got benefited due to the utilization of social media for orange production to the satisfactory level.

Social media services utilized by the orange growers in study area improved production practices and getting quality yield due to knowledge gain through social media. From above findings it has been concluded that there is increase in production of social media user due to adoption of improved practices compared social media non user orange production. This change is not as high as expected but availability of proper guidance through social media on orange cultivation practices as per need, helped to get quality yield. In the study area, during data collection due to unexpected precipitation at the time of harvesting of orange crop affected the quality and quantity of produce. This might be due to delayed the flowering of next bahar. Therefore, there is difference in yield of orange despite of availability of all favourable conditions for growth and development of orchard. Climate change is the major issue faced by orange growers in the study area. For sustainable orange production there is need to practice modern and updated agricultural practices which are easily available and guided through social media.

Similar findings were reported by Gudadhe (2015) and Campenhout *et al.* (2020).



**Fig. 25 Distribution of the respondents according to per cent change in production**



**Fig. 26 Distribution of the respondents according to per cent change in orchard management**

#### 4.4.4 Change in Orchard management

From Table 45 it is concluded that, 98.00 per cent of the social media user respondents had done soil management practices in orchard followed by mechanization in orchard like use of brush cutter for weed control (96.67%), clean cultivation (96.00%), application of growth regulator (94.00%), drainage management (92.00%), canopy management (89.33%), and use of NSKE 5 per cent or spray of neem oil 100 ml + 10 g detergent in 100 lit water for control of black fly (84.67%), respectively. The great majority of user respondents (92.00%) had maintained clean cultivation followed by soil management (87.33%), cleaning area around orchard like removing alternate hosts like gudvel and chandvel (75.33%) and canopy management (68.00%), respectively.

From overall orchard management, 94.00 per cent of the respondents had maintained clean cultivation followed by soil management (92.67%), mechanization in orchard (79.67%), cleaning area around orchard (79.67%) and canopy management (78.67%), respectively.

**Table 45. Distribution of the social media user and non user orange growers according to statement wise orchard management practices**

Sl. No.	Orchard management practices	Social media user (n=150)		Social media non user (n=150)		Overall Total (n=300)	
		Yes (1)	No (0)	Yes (1)	No (0)	Yes (1)	No (0)
1	Clean cultivation	144 (96.00)	06 (4.00)	138 (92.00)	12 (8.00)	282 (94.00)	18 (06.00)
2	Soil management	147 (98.00)	03 (2.00)	131 (87.33)	19 (12.67)	278 (92.67)	22 (07.33)
3	Use of NSKE 5% or Spray of neem oil 100ml+10g detergent in 100 lit water for control of black fly	127 (84.67)	23 (15.33)	75 (50.00)	75 (50.00)	202 (67.33)	98 (32.67)
4	Type of drainage	138 (92.00)	12 (8.00)	84 (56.00)	66 (44.00)	222 (74.00)	78 (26.00)

5	Timely fertilizer management	112 (74.67)	38 (25.33)	51 (34.00)	99 (66.00)	163 (54.33)	137 (45.67)
6	Canopy management	134 (89.33)	16 (10.67)	102 (68.00)	48 (32.00)	236 (78.67)	64 (21.33)
7	Raised bed cultivation	66 (44.00)	84 (56.00)	08 (5.33)	142 (94.67)	74 (24.67)	226 (75.33)
8	Mechanization in orchard (like use of brush cutter for weed control, boon sprayer & fruit harvester)	145 (96.67)	05 (3.33)	94 (62.67)	56 (37.33)	239 (79.67)	61 (20.33)
9	Application of growth regulator	141 (94.00)	09 (6.00)	87 (58.00)	63 (42.00)	228 (76.00)	72 (24.00)
10	Organic cultivation	49 (32.67)	101 (67.33)	32 (21.33)	118 (78.67)	81 (27.00)	219 (73.00)
11	Mulching with plastic or organically	126 (84.00)	24 (16.00)	56 (37.33)	94 (62.67)	182 (60.67)	118 (39.33)
12	Cleaning area around orchard (like removing alternate hosts like gudvel and chandvel)	126 (84.00)	24 (16.00)	113 (75.33)	37 (24.67)	239 (79.67)	61 (20.33)
13	Other (Use of pheromone trap for control of fruit fly)	45 (30.00)	105 (70.00)	18 (12.00)	132 (88.00)	63 (21.00)	237 (79.00)

From Table 46 it is revealed that the orchard management average was 9.74. The average of social media user orchard management was 10.24 and in case on non user it was 9.12. Difference between user and non user average orchard management score was 1.12 and per cent change was 12.39 per cent. It is attributed to mainly knowledge they possessed at what extent they adopted the input practices and knowledge about traditional and indigenous practices. Though there is no significant per cent change in orchard management but the quite significant change was observed which may be pointed out towards the use of social media.

**Table 46. Change in orchard management among respondents**

Average of orchard management	Average orchard management		Difference	% Change
	User mean	Non user mean		
9.74	10.24	9.12	1.12	12.39

From Table 47. It is clearly shown that more than three-fourth of the respondents (76.67%) were experienced medium level of change in orange management due to use of social media while 12.66 per cent of them were experienced high change in orchard management. The 10.67 per cent of the orange growers were experienced low change in orchard management.

Similar findings were reported by Khade (2017).

**Table 47. Distribution of the respondents according to per cent change in orchard management**

Sl. No.	Per cent change in orchard management	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 8.60)	16	10.67
2	Medium (8.61 to 16.20)	115	76.67
3	High (Above 16.20)	19	12.66
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 12.40**

**SD= 3.80**

#### 4.4.5 Change in Annual income

**Table 48. Change in annual income among respondents**

Particular	Average annual income		Difference	% Change
	User mean	Non user mean		
<b>Average of annual income</b>	1211376	940980	270396	28.73

From Table 48. it is concluded that average annual income of social media user respondents was 1211376 /- and social media non user respondents' annual income average was 940980 /-. The difference between social media user and non user respondents was 270396 /- and per cent change was 28.73 per cent.

**Table 49. Distribution of the respondents according to per cent change in annual income**

Sl. No.	Per cent change in annual income	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 6.06)	21	14.00
2	Medium (6.07 to 19.72)	107	71.33
3	High (Above 19.72)	22	14.67
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 12.89**

**SD= 6.83**

It is observed from Table 49. Nearly three fourth of the respondents (71.33%) were experienced medium level of change in annual income due to use of social media while 14.67 per cent of them were experienced high change in annual income. The 14.00 per cent of the orange growers were also experienced low change in annual income.

Similar findings were reported by Patil (2004).

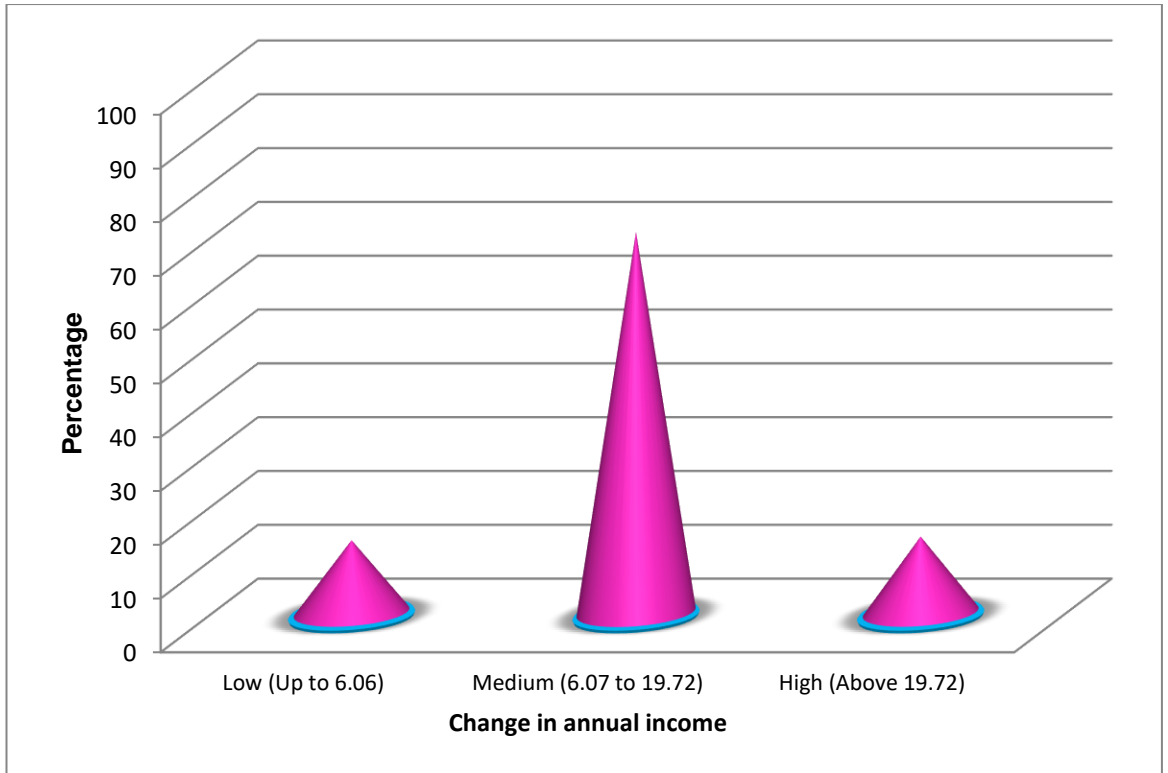
Though there was no significant change in orchard management and production they could achieve reasonably good per cent change in their annual income. This may be due to adoption of different marketing strategies they applied during selling of their orange and social media might have helped them in decision making.

#### **4.4.6 Change in Family expenditure**

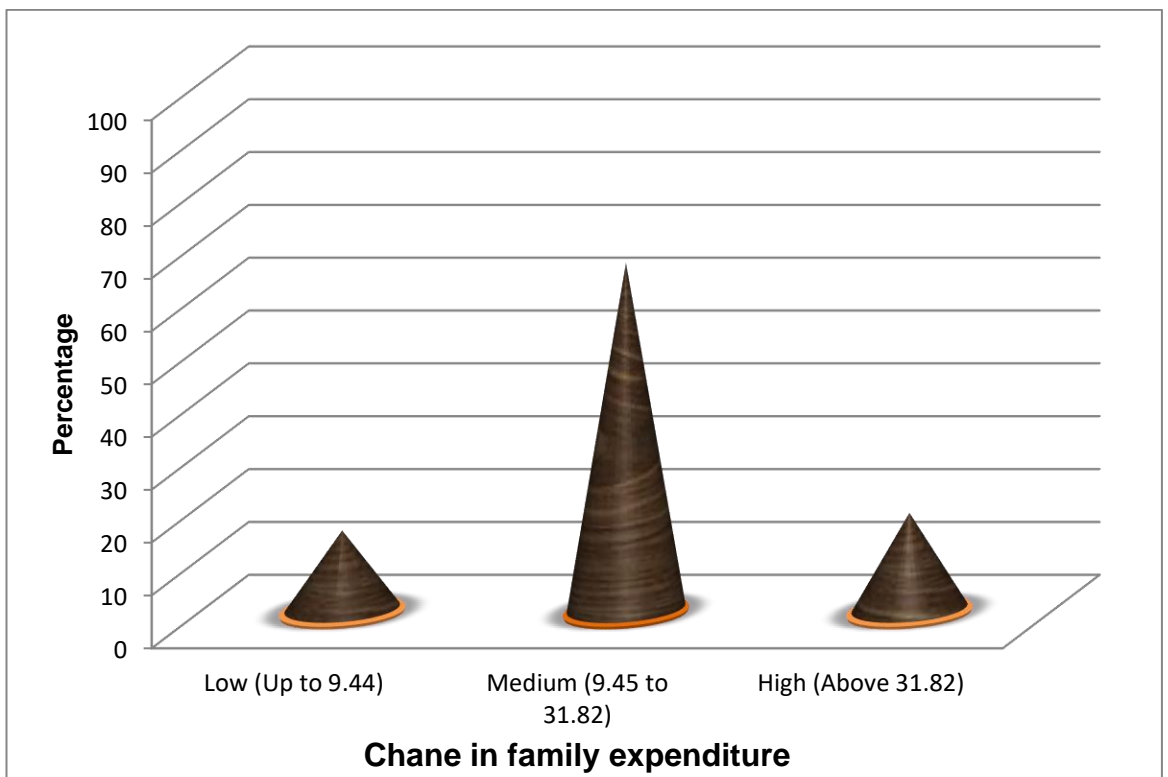
**Table 50. Change in family expenditure among respondents**

Particular	Average Family expenditure		Difference	% Change
	User mean	Non user mean		
<b>Average of family expenditure</b>	461353	386353	75000	19.41

From Table 50, it is indicated that average family expenditure of social media user respondents was Rs. 4,61,353 /- and Rs. 386353/- in case of social media non user. The difference between average means of social media user and non user orange grower was Rs. 75,000/- and per



**Fig. 27 Distribution of the respondents according to per cent change in annual income**



**Fig. 28 Distribution of the respondents according to per cent change in family expenditure**

cent change was 19.41. It is obvious that if one is earning more, tend to satisfy back. It is accordingly around 20.00 per cent change was observed in family expenditure in the users and non users of social media.

**Table 51. Distribution of the respondents according to per cent change in family expenditure**

Sl. No.	Per cent change in family expenditure	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 9.44)	23	15.33
2	Medium (9.45 to 31.82)	99	66.00
3	High (Above 31.82)	28	18.67
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 20.63**

**SD= 11.19**

The results from Table 51. It is clearly shown that, less than three fourth of the respondents (66.00%) were experienced medium level of change in family expenditure and 18.67 per cent of them were experienced high level of change in family expenditure. The 15.33 per cent of the orange growers experienced low level of change in family expenditure.

Similar findings were reported by Neeta Deokate (2018).

#### 4.4.7 Change in Material possession

**Table 52. Change in material possession among respondents**

Particular	Average Material Possession		Difference	% Change
	User mean	Non user mean		
<b>Average of material possession</b>	54.70	45.84	8.86	19.32

From Table 52. it is concluded that average material possession of social media user respondents was 54.70 and 45.84 in case of social media non user respondents. The difference between average means of social media user and non user respondents was 8.86 and per cent change was 19.32 per cent.

**Table 53. Distribution of the respondents according to per cent change in material possession**

Sl. No.	Per cent change in material possession	Respondents (n=150)	
		Frequency	Percentage
1	Low (<Up to 10.91)	14	09.33
2	Medium (10.92 to 28.37 )	119	79.33
3	High (Above 28.37)	17	11.34
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 19.64**

**SD= 8.73**

The results from Table 53. It is clearly shown that, more than three fourth of the respondents (79.33%) were experienced medium level of change in material possession, while 11.34 per cent of them were experienced high level of change in material possession and 9.33 per cent of the orange growers were experienced low level of change in material possession. It is in consonance with the family expenditure and change in annual income. Increasing income might have diverted the respondents to go for purchasing of different materials for their family as well as farm equipments.

Similar findings were reported by Ingle (2002).

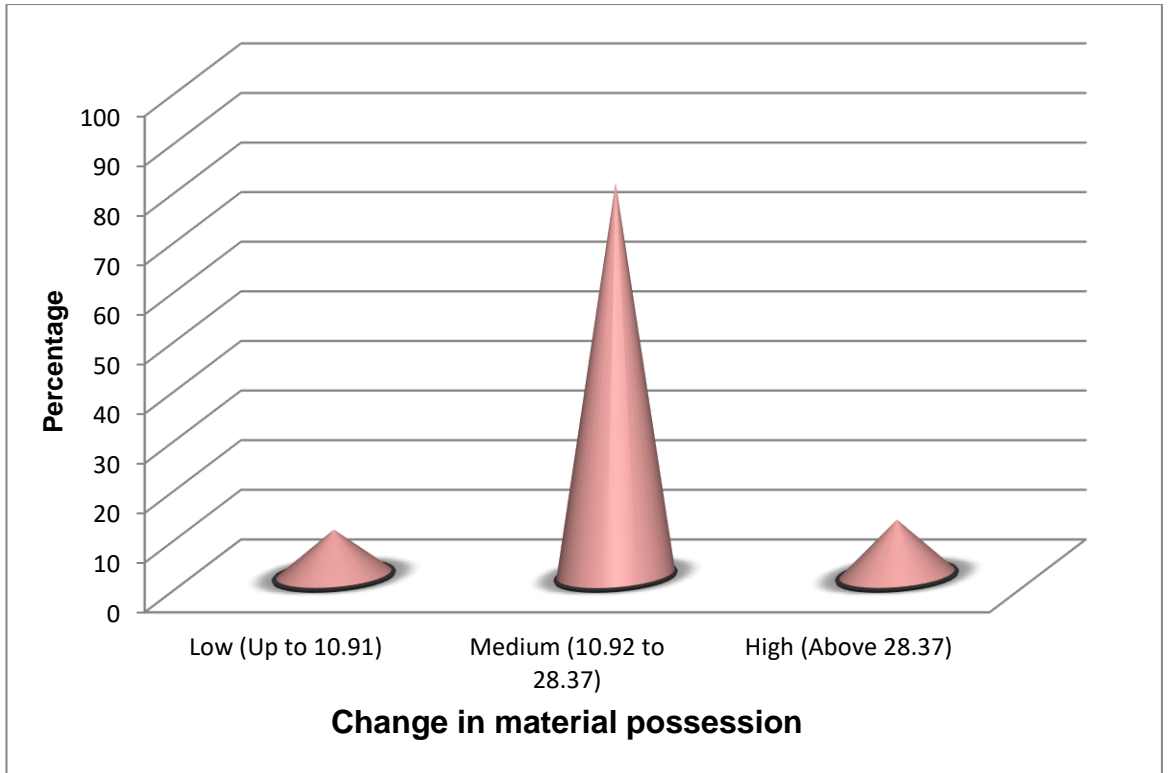
#### **4.4.8 Change in Self confidence**

Self confidence refers to extent of feeling about one's own powers, abilities and resourcefulness to perform any activity.

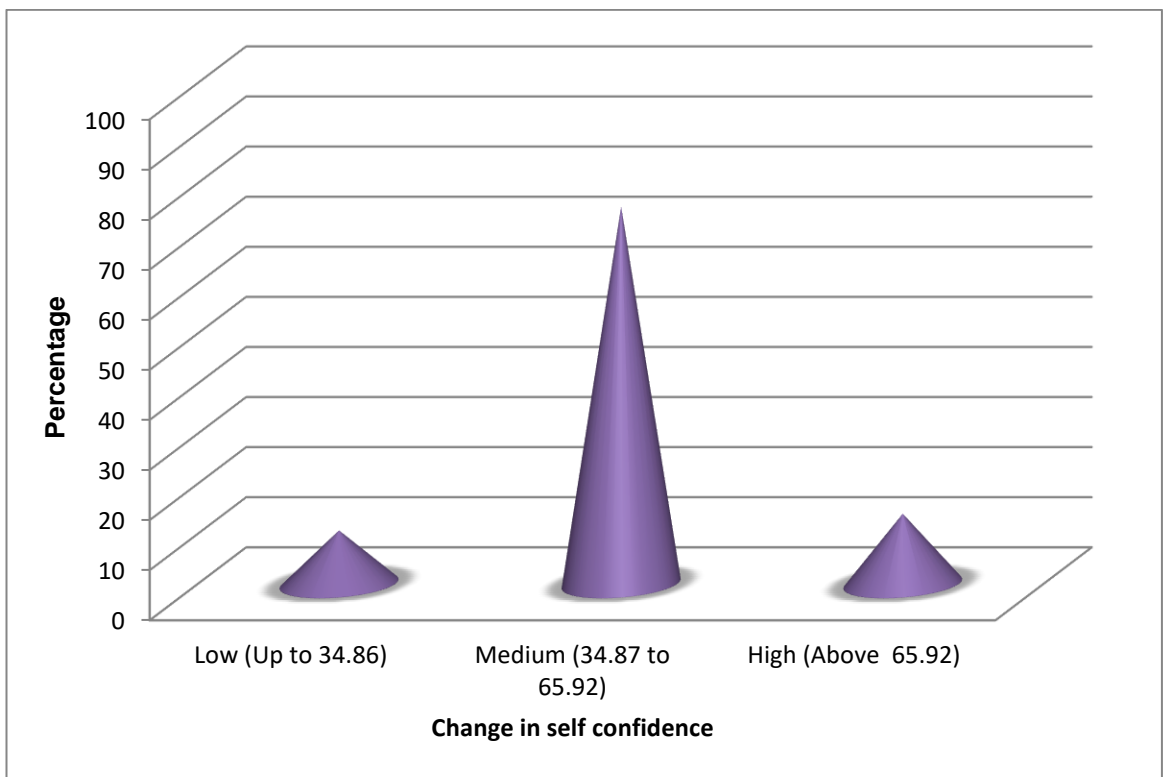
**Table 54. Change in self confidence among respondents**

Particular	Average Self Confidence		Difference	% Change
	User mean	Non user mean		
<b>Average of self confidence</b>	32.93	22.05	10.88	49.34

From Table 54. it is revealed that the average self confidence of social media user was 32.93 and in case of social media non user it was 22.05. The difference between the average mean of self confidence between social media user and social media non user was 10.88 and per cent change was 49.34 per cent.



**Fig. 29** Distribution of the respondents according to per cent change in material possession



**Fig. 30** Distribution of the respondents according to per cent change in self confidence

Self confidence means feeling unsure of urself and your abilities in a realistic secure way. The confidence on the part of respondents is mainly attributed to the knowledge they gain and actually adopted in practice. Exposure to the new area also develop the confidence that is regret for your own standing in the society. 49.34 per cent of the respondents were found to be in per cent change in self confidence. This may be due to their exposure to the larger work and regarding cultivation of orange in particular through the use of social media.

**Table 55. Distribution of the respondents according to per cent change in self confidence**

Sl. No.	Per cent change in self confidence	Respondents (n=150)	
		Frequency	Percentage
1	Low ( Up to 34.86)	16	10.67
2	Medium (34.87 to 65.92)	113	75.33
3	High (Above 65.92)	21	14.00
	<b>Total</b>	<b>150</b>	<b>100.00</b>

**Mean= 50.39**

**SD= 15.53**

It is evident from Table 55. that, majority (75.33%) of the respondents were experienced medium level of change in self confidence followed by 14.00 per cent of them were experienced high level of change in self confidence. Only 10.67 per cent of the orange growers respondents were experienced low level of change in self confidence.

Similar findings were reported by Chinmayee Jally (2018).

#### **4.4.9 Impact of social media on orange growers**

The impact score of social media on orange growers was computed by summing up the mean values of change in percentage of selected eight impact parameter change in knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence as follows. For this study social media user respondents and social media non user respondents were selected having same orange orchard size and from same village area.

**Table 56. Distribution of respondents according to impact of social media on various parameters of orange growers**

Sl. No.	Impact Parameter	Respondents (n=300)		
		Mean		% Change
		User	Non user	
1	Knowledge	16.86	12.20	38.17
2	Adoption	22.32	17.13	30.27
3	Production (Ton)	9.58	8.54	11.96
4	Orchard management	10.24	9.12	12.39
5	Annual income (Rs.)	1211376	940980	28.73
6	Family expenditure (Rs.)	461353	386353	19.41
7	Material possession	54.70	45.84	19.32
8	Self confidence	32.93	22.05	49.34
	<b>Total</b>	<b>26.19</b>		

#### **4.4.9.1 Knowledge**

Here knowledge level about improved orange cultivation practices have been considered for evaluation of change in knowledge the social media user respondents and social media non user respondents were asked about their knowledge level of improved orange cultivation practices through use of social media. From the data presented in the Table 56, It is seen that, social media user orange growers mean value of knowledge of improved orange cultivation practices was 16.86, which was less in case of social media non user orange growers (12.20). There was 38.17 per cent change observed over social media non user knowledge. It is concluded that use of social media for gaining knowledge about orange cultivation and other farming practices may be the reason for per cent change increase in knowledge.

#### **4.4.9.2 Adoption**

It is observed from Table 56, that the mean value of social media user orange growers adoption was 22.32 which was 17.13 in case of social media non user orange growers. There was 30.27 per cent change

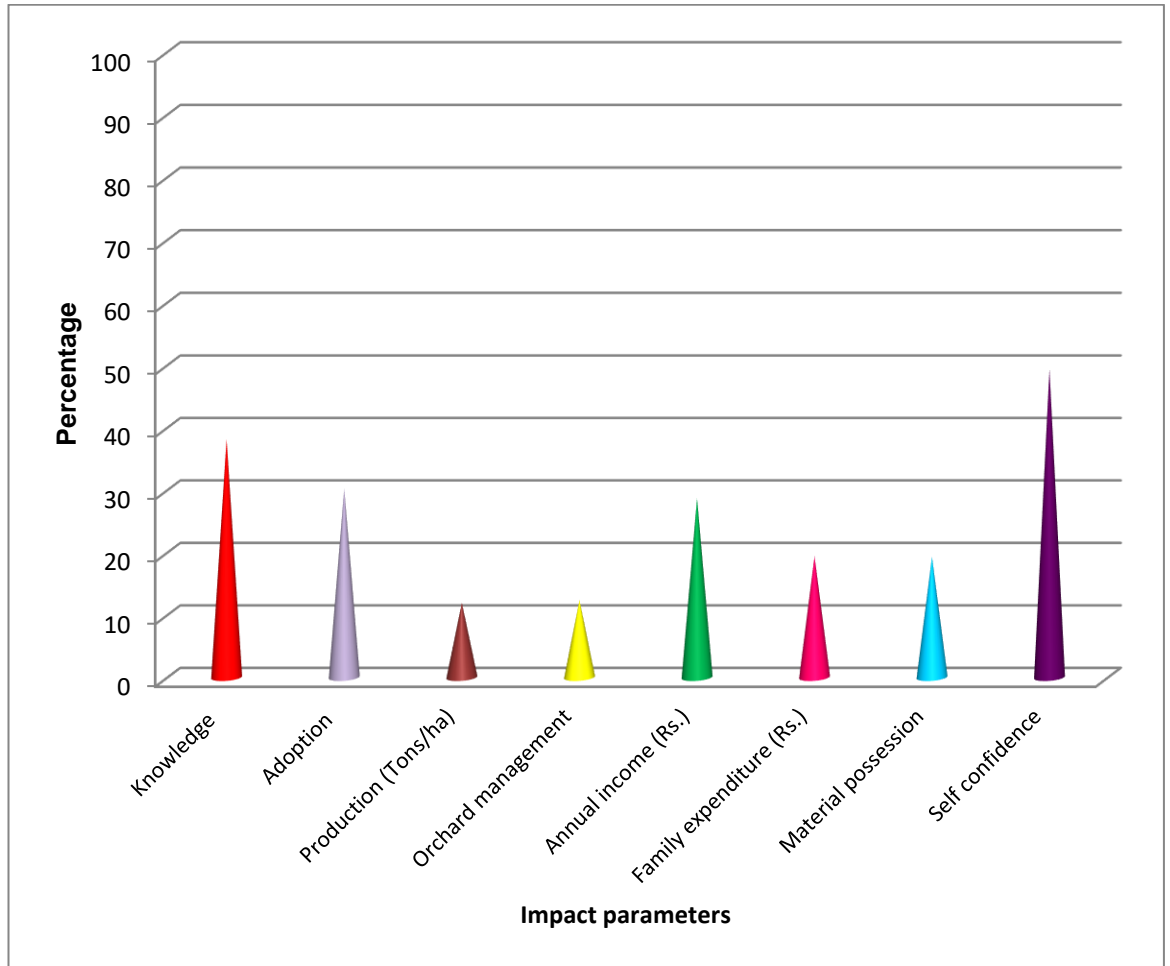
taken place over social media non user orange growers. The continuous contact of orange growers with experts and other innovative farmers and their success stories on social media might be reason to influence the adoption behaviour of orange growers.

#### **4.4.9.3 Production**

The data in the Table 56 found that, mean value of yield of orange in case of social media user respondent was 9.58 tones/ha., which was 8.56 tones/ha in case of social media non user respondents. The 11.96 per cent change was observed over social media non user. It might be concluded that due to adoption of improved orange cultivation practices there may be increase in production with quality of orange produce of social media user orange growers.

#### **4.4.9.4 Orchard management**

Besides the improved orange cultivation practices orange growers also tried many of the management practices for maintaining their orange orchard based on their level of experience and profit from those practices .From Table 56, it was observed that mean value of social media user orange growers was 10.24 while the mean value of social media non user orange growers was 9.12. There was 12.39 per cent change in orchard management over social media non user. The probable reason behind this can be accessibility of the farm related knowledge through social media. The practices like clean cultivation, soil management, use NSKE 5.00 per cent or spray of neem oil 100 ml+ 10 gm detergent in 100 litre water for control of black and white fly, type of drainage, timely fertilizer management, canopy management, raised bed cultivation, mechanization in orchard like use of brush cutter for weed control, bloom sprayer and fruit harvester, application of growth regulator, organic cultivation, mulching with plastic or organically and cleaning area around orchard like removing alternate host like gudvel and chandvel respectively. It is noticed that orange growers from study area not took benefit from available space for proper intercropping in orchard therefore there is need to motivate them towards proper cultivation of crops like vegetables, groundnut others with suitable varieties in summer season also.



**Fig. 31** Distribution of respondents according to mean per cent changes in impact parameters

#### **4.4.9.5 Annual income**

The majority of the social media orange growers in the study area were adopting exact improved orange cultivation practices and cultivating intercrops with orchard therefore, their financial background was quite better. It is observed that average annual income of the social media user orange growers was Rs.12,11,376 whereas, in case of social media non user orange growers it was Rs. 9,40,980/-. The per cent change was 28.73 per cent over the social media non user orange growers. The increase in annual income was might have been reflected because of the good price policy to agricultural produce by government. Increasing in production with quality naturally helped to increase the annual income of the orange growers from study area.

#### **4.4.9.6 Family expenditure**

The data in the Table 56, it was found that, mean value of family expenditure in case of social media user respondent was Rs. 461353 which was Rs. 386353 in case of social media non user respondents. The 19.41 per cent change was observed over social media non user. It might be concluded that due to adoption of improved orange cultivation practices, orange grower are trying to apply different inputs in his farm and home also so, there may be increase in family expenditure of social media user orange growers.

#### **4.4.9.7 Material possession**

Social change in the orange growers is indicated by material possession. It is seen from Table 56 that, mean value of social media user respondents material possession was 54.70 while mean value of social media non user orange growers was 45.84 while per cent change in material possession over the social media non user respondents was 19.32 per cent. Increased family expenditure, adoption of newer technologies for increasing production and quality output and income thereby were the probable reason behind this result as purchasing power of the orange growers increased.

#### **4.4.9.8 Self confidence**

From Table 56 it is evident that, mean value of social media user respondents self confidence was 32.93 which is 22.05 in case of

social media non user respondents. The per cent change of self confidence over the social media non user respondents was 49.34 per cent. Increased self confidence due to more interaction as per comfort of the respondents with other farmers and experts about successful farming may be the reason of the outcomes of the findings.

#### 4.4.10 The overall impact of social media on orange growers

**Table 57. Distribution of the respondents according to overall impact of social media on orange growers**

Sl. No.	Category	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 19.51)	15	10.00
2	Medium ( 19.52 to 30.73)	98	65.33
3	High (Above 30.73)	37	24.67
<b>Total</b>		<b>150</b>	<b>100.00</b>

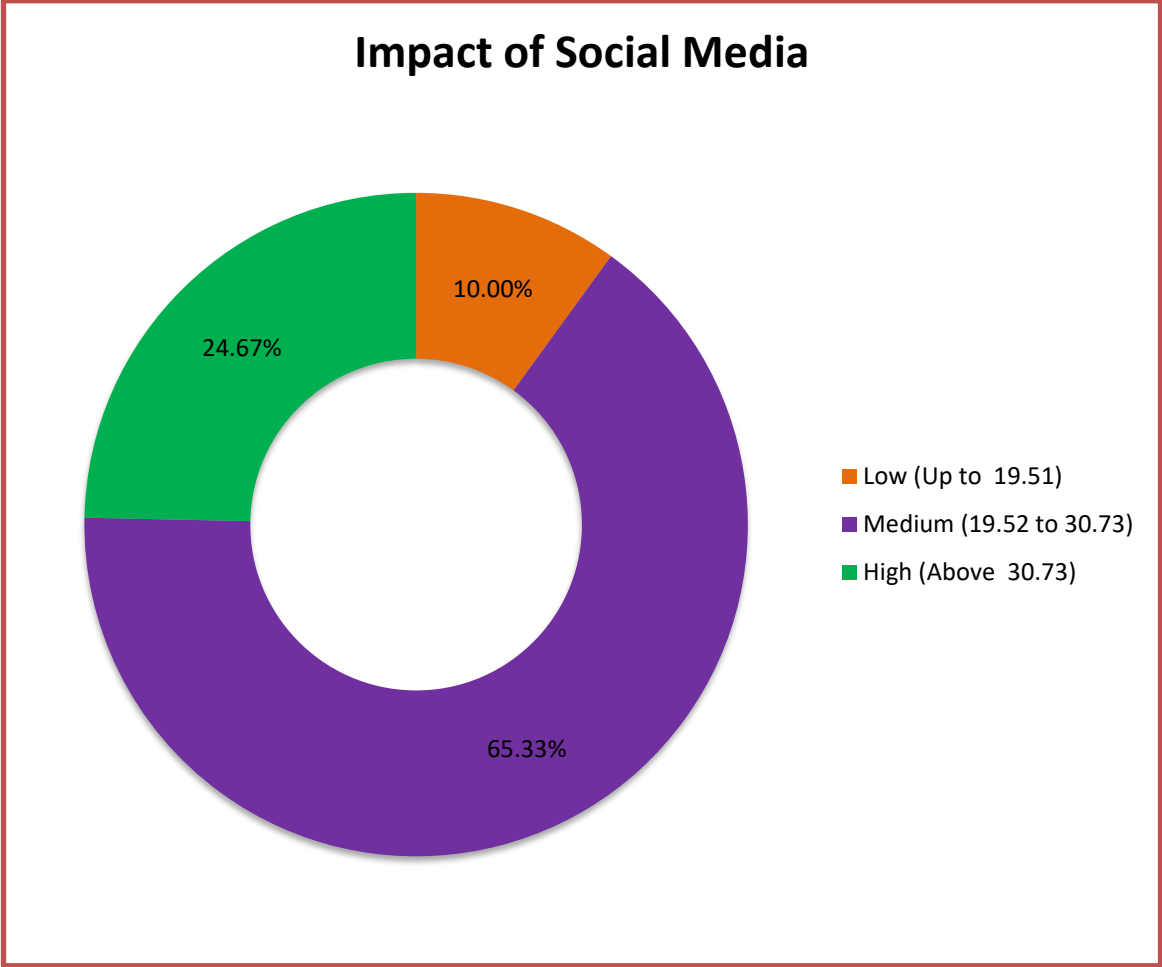
**Mean= 25.12**

**SD= 5.61**

There were eight parameters studied under impact of social media on orange growers. Attempt was made to cover technological change, economic change, infrastructural change and social change parameters. By summing up the mean values of change in percentage of selected eight parameters, overall impact score was calculated for all the respondents and result has been presented in the following Table 57.

The data in Table 57 revealed that, majority of the respondents (65.33%) were found in medium impact category, followed by 24.67 per cent of the respondents were found in high impact, whereas only 10.00 per cent of the respondents found in low impact categories, respectively.

In outline, adoption of modern technologies according to suitable situations with proper guidance through social media and utility of technology by social media users in study area resulted into positive impact on orange growers. Social media has helped to improve socio-economic condition of the orange growers.



**Fig. 32** Distribution of the respondents according to overall impact of social media on orange growers

Similar findings were reported by Sonagra (2007), Gandhi *et al.* (2008), Narsimha and Pushpa (2009), Naik (2014), Kumar and Kumar (2018b), Campenhout *et al.* (2020), Colussi *et al.* (2022), Guntukogula *et al.* (2022) and Richa Kumari *et al.* (2022), respectively.

#### 4.4.11 Testing the significance difference of the means

**Table 58. Testing the significance difference of the means in impact parameters of social media user and non user orange growers**

Sl. No.	Impact Parameter	Respondents (n=300)		
		Mean		'Z' Value
		SM User	SM Non user	
1	Knowledge	16.86	12.20	17.91**
2	Adoption	22.32	17.13	5.40**
3	Production (Tons)	9.58	8.54	6.73**
4	Orchard management	10.24	9.12	6.92**
5	Annual income (Rs.)	1211376	940980	5.82**
6	Family expenditure (Rs.)	461353	386353	5.26**
7	Material possession	54.70	45.84	10.97**
8	Self confidence	32.93	22.05	38.07**

\*\* Significant at 0.01 level of probability

In order to test the variability of means of knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence of the social media user orange growers and non user orange growers, the data were subjected to 'Z' test and the results thus obtained have been presented in Table 58.

It is evident from Table 58 that, the calculated 'z' values of knowledge (17.91), adoption (5.40), production (6.73), orchard management (6.92), annual income (5.82), family expenditure (5.26), material possession (10.97) and self confidence (38.07) were found significant at 0.01 level of probability.

This clearly showed that the social media had produced desirable changes in respect to knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence.

Similar findings were reported by Vidya Tayade (2003), Patil (2004), Shubhangi Parshuramkar (2013), Khade (2017) and Neeta Deokate (2018), respectively.

#### 4.5.1 Relationship between characteristics of orange growers with utilization pattern

**Table 59. Correlation coefficients of characteristics of the social media user and non user orange growers with utilization pattern**

Sl. No.	Independent variable	Social media user orange growers
		'r' values
1	Education▪	0.304**
2	Family size▪	0.128 <sup>NS</sup>
3	Occupation◻	0.077 <sup>NS</sup>
4	Land holding▪	0.318**
5	Size of orchard▪	0.308**
6	Farming experience▪	0.328**
7	Social participation◻	0.285**
8	Annual income▪	0.229**
9	Availability of social media◻	0.436**
10	Source of information◻	0.350**
11	Innovativeness◻	0.279**
12	Risk orientation◻	0.221**
13	Market orientation◻	0.324**
14	Attitude◻	0.315**

NS- Non Significant \*\*Significant at the 0.01 level of probability \*Significant at the 0.05 level of probability ▪Pearson's correlation ◻Rank correlation

It is apparent from Table 59. that the variables related to social media user orange growers namely, education, land holding, size of orchard, farming experience, availability of social media, social participation, annual income, sources of information, innovativeness, risk orientation, market orientation and attitude showed positive and highly significant relationship with utilization pattern of social media at 0.01 per cent level of probability about utilization pattern of social media. Family size and occupation showed non significant relationship with utilization pattern of social media. Similar findings were reported by Meshram et al. (2014) and Naik (2014) respectively.

It means that formal education, availability of social media, social participation and sources of information might have helped orange growers to the greater extent in utilization of social media effectively and indirectly improved their attitude in positive way and develop the farming experience and market orientation and innovativeness.

#### **4.5.2 Relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with attitude**

From Table 60, the result indicated that the variables namely; availability of social media, social participation, sources of information, innovativeness, risk orientation, market orientation and utilization pattern showed positive and highly significant relationship with attitude of social media user orange growers at 0.01 per cent level of probability. The variables namely; education, family size, occupation, land holding, size of orchard, farming experience and annual income showed non significant relationship with attitude of social media user orange growers respectively.

In case of social media non user orange growers the variable only annual income showed positively significant relationship with attitude at 0.01 per cent level of probability. The variables namely education, family size, occupation, land holding, size of orchard, farming experience, social participation, availability of social media, sources of information, innovativeness, risk orientation and market orientation showed non significant relationship with attitude of social media non user respondents.

**Table 60. Correlation coefficients of characteristics of the social media user and non user orange growers with overall attitude of orange growers towards social media**

SI. No.	Independent variable	Social media user orange growers	Social media non user orange growers
		'r' values	'r' values
1	Education▪	0.024 <sup>NS</sup>	0.007 <sup>NS</sup>
2	Family size▪	-0.050 <sup>NS</sup>	0.032 <sup>NS</sup>
3	Occupation▫	0.065 <sup>NS</sup>	0.034 <sup>NS</sup>
4	Land holding ▪	0.064 <sup>NS</sup>	0.155 <sup>NS</sup>
5	Size of orchard▪	0.112 <sup>NS</sup>	0.086 <sup>NS</sup>
6	Farming experience▪	0.121 <sup>NS</sup>	-0.045 <sup>NS</sup>
7	Social participation▫	0.302 <sup>**</sup>	0.153 <sup>NS</sup>
8	Annual income▪	0.143 <sup>NS</sup>	0.172 <sup>**</sup>
9	Availability of social media▫	0.314 <sup>**</sup>	-0.003 <sup>NS</sup>
10	Source of information▫	0.354 <sup>**</sup>	0.069 <sup>NS</sup>
11	Innovativeness▫	0.321 <sup>**</sup>	0.136 <sup>NS</sup>
12	Risk orientation▫	0.230 <sup>*</sup>	0.019 <sup>NS</sup>
13	Market orientation▫	0.369 <sup>**</sup>	0.025 <sup>NS</sup>
14	Utilization pattern of social media▫	0.241 <sup>*</sup>	-

*NS- Non Significant \*\*Significant at the 0.01 level of probability \*Significant at the 0.05 level of probability ▪Pearson's correlation ▫Rank correlation*

Similar findings were reported by Raghuprasad (2012), Onima (2014), Bhati (2015), Khondokar (2015), Kumar (2016), Haseena Bibi (2017), Naik *et al.* (2020) and Mahajan *et al.* (2022), respectively.

#### **4.5.3.1 Relationship between the personal, socio-economic, communicational and psychological characteristics of social media user orange growers with impact of social media**

The results indicated in the Table 61, revealed that the variables namely education, occupation, size of orchard, farming experience, social participation, annual income, availability of social media, sources of information, innovativeness, risk orientation, market orientation, utilization pattern and attitude of social media user orange growers showed

positive and highly significant relationship with impact of social media on orange growers at 0.01 per cent level of probability. Similar findings were reported by Pranali Thakare (2022). It means that education widens the impact of social media on orange growers.

**Table 61. Correlation coefficients of characteristics of the social media user orange growers with overall impact**

Sl. No.	Independent variable	'r' values
1	Education▪	0.270**
2	Family size▪	-0.031 <sup>NS</sup>
3	Occupation◻	0.228**
4	Land holding ▪	0.196*
5	Size of orchard▪	0.279**
6	Farming experience▪	0.310**
7	Social participation◻	0.432**
8	Annual income▪	0.291**
9	Availability of social media◻	0.447**
10	Source of information◻	0.371**
11	Innovativeness◻	0.273**
12	Risk orientation◻	0.260**
13	Market orientation◻	0.379**
14	Utilization pattern of social media◻	0.313**
15	Attitude◻	0.471**

*NS- Non Significant \*\*Significant at the 0.01 level of probability \*Significant at the 0.05 level of probability ▪Pearson's correlation ◻Rank correlation*

Only the variable land holding showed positive and significant relationship with impact of social media on orange growers at 0.05 per cent level of probability. Education play very important role as increase in education, more positive effect on social media. Other variables occupation, land holding, size of orchard, farming experience, social participation, annual income, availability of social media, sources of information. Innovativeness, market orientation, utilization pattern of social

media and attitude increase. It helps to increase the impact of social media. Also it is possible that interaction with other members more frequently helped them to share ideas and information among themselves.

The variable family size showed non significant relationship with impact of social media on orange growers. Therefore null hypothesis was accepted for this characteristic with impact of social media.

From Table 62 It is showed that the variable, market orientation showed positive and highly significant relationship with impact of social media at 0.01 per cent level of significance. Education, land holding, size of orchard, farming experience, annual income, availability of social media and attitude showed positive and significant relationship at 0.05 per

#### 4.5.3.2 Relationship between the personal, socio-economic, communicational and psychological characteristics of social media non user orange growers with impact of social media

**Table 62. Correlation coefficients of characteristics of the social media non user orange growers with overall impact**

Sl. No.	Independent variable	'r' values
1	Education▪	0.191*
2	Family size▪	-0.091 <sup>NS</sup>
3	Occupation◻	0.038 <sup>NS</sup>
4	Land holding ▪	0.177*
5	Size of orchard▪	0.195*
6	Farming experience▪	0.182*
7	Social participation◻	0.058 <sup>NS</sup>
8	Annual income▪	0.193*
9	Availability of social media◻	0.181*
10	Source of information◻	-0.022 <sup>NS</sup>
11	Innovativeness◻	-0.076 <sup>NS</sup>
12	Risk orientation◻	0.135 <sup>NS</sup>
13	Market orientation◻	0.216**
14	Utilization pattern of social media◻	-
15	Attitude◻	0.159*

*NS- Non Significant \*\*Significant at the 0.01 level of probability \*Significant at the 0.05 level of probability ▪Pearson's correlation ◻Rank correlation*

cent level of significance. There is positive effect of these variables on impact of social media. Whereas family size, occupation, social participation, sources of information, innovativeness and risk orientation of social media non user orange growers showed non significant relationship with impact of social media, so there is no effect of these variables on impact of social media.

Similar findings were reported by Maraddi and Varma (2001), Nejkar (2008), Shrinivas (2013), Ugalmugle (2013), Lagad (2015), Patil (2015), Prasad and Kushwaha (2015), Ankita Angaitkar (2018), Chinmayee Jally (2018) and Singh and Kameshwari (2022), respectively.

#### 4.5.3.3 Multiple regression analysis

**Table 63. Multiple regression analysis between personal socio-economic, communicational and psychological characteristics of social media user orange growers and overall impact of social media**

Sl. No.	Independent variable	Regression coefficient	Standard Error	't' value
1	Education	0.461*	0.244	1.885
2	Occupation	0.881*	0.633	1.391
3	Land holding	-0.113	0.089	-1.269
4	Size of orchard	0.009	0.368	0.0246
5	Farming experience	0.038	0.062	0.608
6	Social participation	1.424****	0.514	2.770
7	Annual income	1.199*	8.795	1.363
8	Availability of social media	1.180**	0.535	2.202
9	Source of information	0.800***	0.194	4.114
10	Innovativeness	0.048	0.289	0.169
11	Risk orientation	0.229	0.190	1.201
12	Market orientation	0.279*	0.185	1.510
13	Utilization pattern of social media	0.172*	0.124	1.381
14	Attitude	0.411**	0.141	2.902

**$R^2=0.56$**

**$F\text{ value}=12.21$**

\*\*\* Significant at 0.01 level of probability \*\* Significant at 0.05 level of probability \*Significant at 0.10 level of probability

Correlation can only indicate the existence or non existence of relationship between to variables. Multiple regression analysis was used to determine the influence and contribution of independent variables in predicting dependent variable. It was used to find out the individual and overall influence of selected independent variables on dependent variable. Here eight parameters of impact and overall impact of social media were considered as dependent variables. An intervening variable attitude was also treated as independent variable in regression analysis. Only those independent variables of all orange growers together showing significant correlation with dependent variables impact were selected for regression analysis.

The information pertaining to multiple regression analysis of profile of orange growers with overall impact of social media was presented under in Table 63.

From Table 63. It is clearly depicted that out of 14 independent variables namely; education, occupation, social participation, annual income, availability of social media, sources of information, market orientation, utilization pattern and attitude showed positively significant relationship with impact of social media on orange growers. It is observed from Table 50 that the 't' test of significance indicates that the regression coefficient ( $\beta$ -value) were found to be significant for education, occupation, social participation, annual income, availability of social media, sources of information market orientation, utilization pattern and attitude of orange growers. It may be seen from  $R^2$  value (Table 50.) that the selected 14 variables explained to the extent of 0.56 per cent variation in the impact of social media on orange growers. Also the education, occupation, social participation, annual income, availability of social media, sources of information, market orientation, utilization pattern and attitude as a variables showed positive and significant relationship with impact of social media indicate that the social media users education increases by 1.00 per cent their impact of social media increases by 0.461 per cent, when occupation increases by 1.00 per cent their impact of social media increases by 0.881 per cent, when social participation changes by 1.00 per

cent then their impact also changes by 1.4241 per cent, when annual income changes by 1.00 per cent their impact also increases by 1.199 per cent, when availability of social media changes by 1.00 per cent then impact increases by 1.180 per cent, when sources of information increases by 1.00 per cent then impact increases by 0.800 per cent, when market orientation changes by 1.00 per cent then their impact increases by 0.279 per cent, when utilization pattern changes by 1.00 per cent their impact increases by 0.172 per cent and when attitude changes by 1.00 per cent then impact of social media increases by 0.411 per cent, respectively.

Similar findings were reported by Vidya Tayade (2003), Khade (2017) and Ankita Angaitkar (2018), respectively.

#### **4.6 Constraints faced by orange growers in use of social media**

The constraints are the set of conditions or cause which prohibit or restraint the performance of an individual. Constraints play crucial role in adoption of technology. The constraints were calculated by applying “Garrett’s ranking” method to study the performance of constraints into numerical scores. The besides frequency distribution, constraints are arranged based on their severity from the point of view of the respondents.

To secure better result of any extension service it is very essential to cut back on the constraints. Satisfaction of the intended respondents is more important. Therefore, it is important to study difficulties faced by respondents while deriving benefits from available social media for agriculture purpose.

The cursory look at the Table 64 depicted that, constraints are presented in four sections. The ranks were assigned to the highest Garret value for each constraint. These are discussed here.

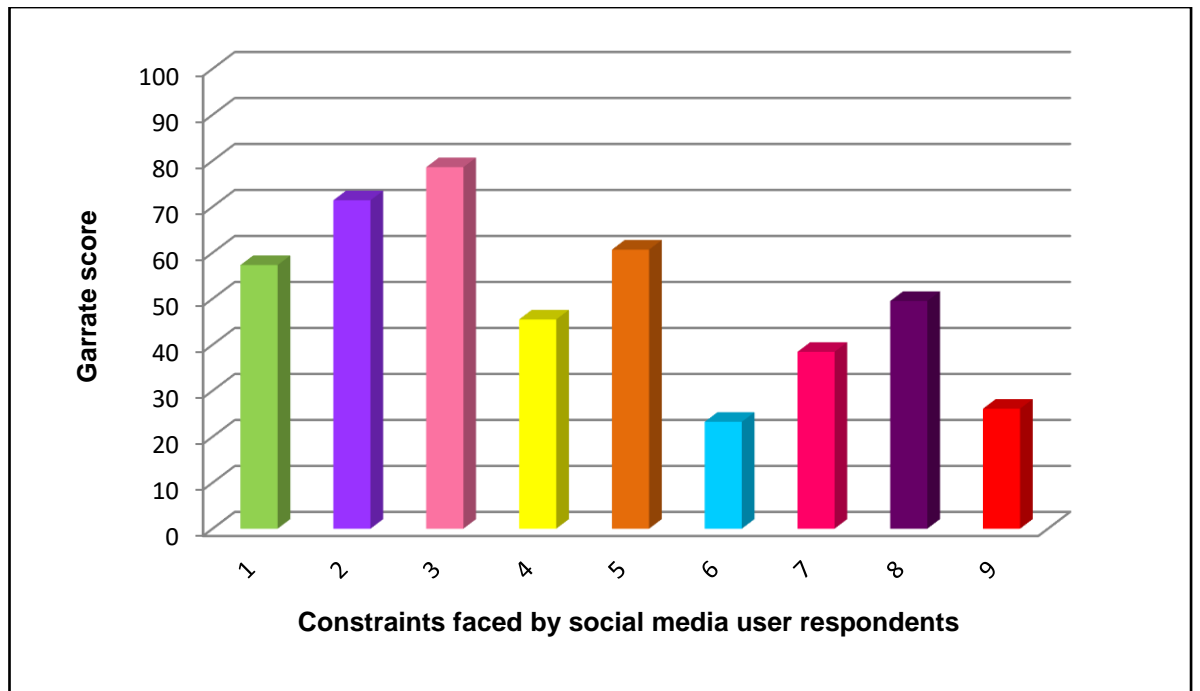
The results from Table 64 Indicated that most important constraint as considered by great majority of the respondents was irregular internet connectivity with Garret value 78.60 and given 1<sup>st</sup> rank followed by constraints in decreasing order of ranking were sometimes contents are not need based and irrelevant with the individual needs (71.40), authenticity of agricultural information shared through social media is less due to unavailability of professionals (60.68), very few social media services are

available in agriculture (57.32), diversion of mind and consumption of more time on unwanted things (49.50), due to engagement in farm operations there is very less time to use social media (45.50), practical applicability and customization of messages received through social media is less (38.46), irregular electric supply at rural area (26.09) and high cost of social media services (23.24) having II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup>, VIII<sup>th</sup> and IX<sup>th</sup> ranks, respectively.

**Table 64. Distribution of the social media user orange growers according to constraints faced by them**

Sl. No.	Constraints	Respondents (n=150) Total mean of Garret score	Rank
<b>A)</b>	<b>Technical constraints</b>		
1	Very few social media services are available in agriculture	57.32	IV
2	Sometimes content are not need based and irrelevant with the individual needs	71.40	II
<b>B)</b>	<b>Infrastructural constraints</b>		
3	Irregular internet connectivity	78.60	I
<b>C)</b>	<b>Psychological constraints</b>		
4	Due to engagement in farm operations there is very less time to use social media	45.50	VI
5	Authenticity of agricultural information shared through social media is less due to unavailability of professionals	60.68	III
<b>D)</b>	<b>Others</b>		
6	High cost of social media services	23.24	IX
7	Practical applicability and customization of messages received through social media is less	38.46	VII
8	Diversion of mind and consumption of more time on unwanted things	49.50	V
9	Irregular electric supply at rural area	26.09	VIII

So the major constraints faced by the social media user orange growers were, irregular internet connectivity, sometimes contents of



**Fig. 33 Distribution of the social media user respondents according to the constraints faced by them in use of social media**

1. Very few social media services are available in agriculture
2. Sometimes content are not need based and irrelevant with the individual needs
3. Irregular internet connectivity
4. Due to engagement in farm operations there is very less time to use social media
5. Authenticity of agricultural information shared through social media is less due to unavailability of professionals
6. High cost of social media services
7. Practical applicability and customization of messages received through social media is less
8. Diversion of mind and consumption of more time on unwanted things
9. Irregular electric supply at rural area

social media were not need based and they are also irrelevant, authentication of information shared on social media and very few social media services are available in agriculture, respectively.

#### **4.6.1.1 Very few social media services are available in agriculture**

This may be due to the fact that still most of the rural villages were without sufficient infrastructural facilities and strong network connectivity as a consequence of which the social media services had not reached the each and every rural community. So there is need to introduce newly updated and need based social media services for practical application in orange cultivation and make respondents aware about available social media applications and services for agriculture and orange cultivation in specific.

#### **4.6.1.2 Sometimes content are not need based and irrelevant with the individual needs**

Due to large number of sources and number of beneficiaries connected to particular social media respondents faced the constraint of irrelevant posts shared on different social media groups particularly on WhatsApp groups of farmers due to which farmers interest may be hindered in using social media and ranked as second most serious constraint.

#### **4.6.1.3 Irregular internet connectivity**

Internet usage in least developed country is less, compared with the developed and developing countries due to major infrastructural constraint of lack of power supplies in rural and urban areas, cell towers and broadband spectrum, also the bounded use of smartphones. So there is restriction in reach and advantage of regular internet connectivity for using social media.

#### **4.6.1.4 Due to engagement in farm operations there is very less time to use social media**

As the majority of the orange growers were engaged in orange cultivation practices, farming operations and allied occupations. Also they had participation in some social organizations and particular farm

operations need to be completed on accurate time so respondents got less time to use social media for accessing agricultural information on right time.

#### **4.6.1.5 Authenticity of agricultural information shared through social media is less due to unavailability of professionals**

Presence of local social media groups without technical assistance for sharing information and inadequate response from end users respondents experienced lack of certified remarkable information, lack of communication and not getting proper solutions on their queries which can be trusted and applied trial basis in the field.

#### **4.6.1.6 High cost of social media services**

Social media has become a resourceful platform to forthfresh information despite of qualification difference. As the most preferred form by the respondents, audio-visual and pictorial like multimedia features of the social media consumes more data than text messages. Concurrently orange growers faced challenges like high data price and extra charges of particular social media services which don't apt into orange grower's budget. As there was no fruitful supportive policy from the government to encourage social media based agricultural learning it was expressed as a constraint. Possession and daily use of social media tools and services involved financial burden on the part of the respondent hence, it was viewed as a constraint by respondents.

#### **4.6.1.7 Practical applicability and customization of messages received through social media is less**

Sometimes technological messages delivered through social media are unrealistic and not practically applicable by orange growers due to certain financial factors and unsuitability to that geographical condition. Social media services are designed in general to furnish the needs of large group of people over a specified geographical region while for a individual orange grower, whose conditions or necessities may depend on the micro climatic factors of his/her particular region as outcome it was experienced as a constraint by the respondents

#### 4.6.1.8 Diversion of mind and consumption of more time on unwanted things

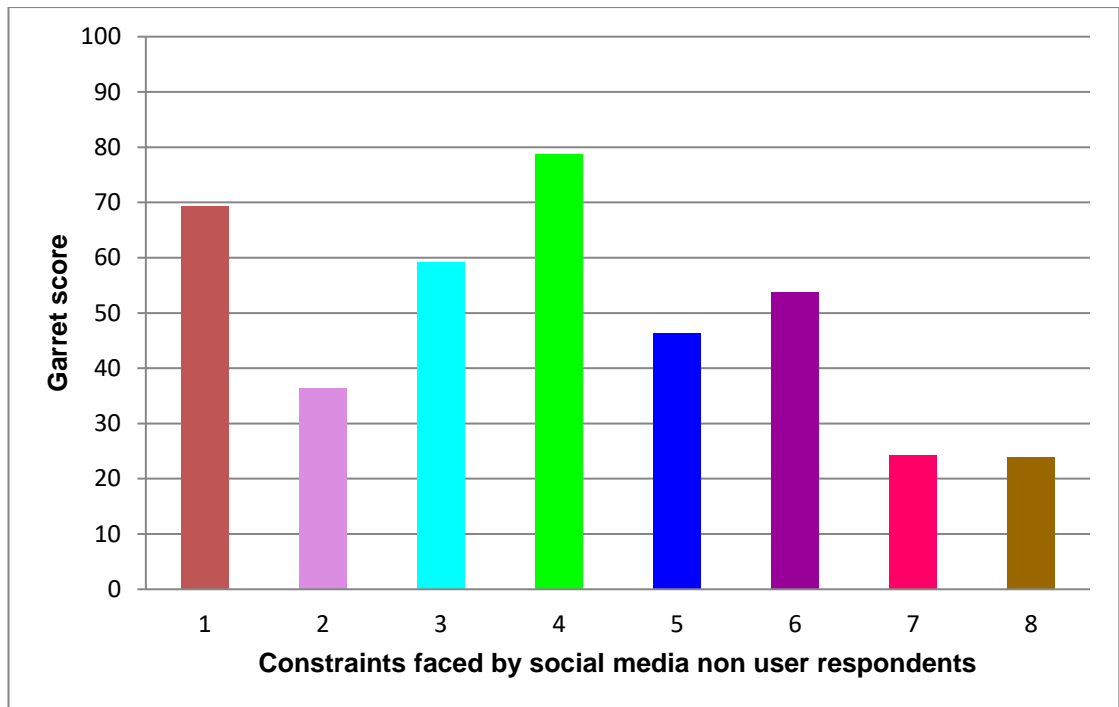
Due to unnecessary post shared on social media while accessing on it for agriculture purpose and attractive nature due to multimedia features of social media mind gets diverted towards unwanted things and consumes time was experienced as a fifth most serious constraint by the respondents.

#### 4.6.1.9 Irregular electric supply at rural area

Proper physical infrastructural facility is basic requirement for getting better access and use of social media services in practical farm operations. Interrupted powers supply is one of the major limitations in reach and advantage of network connection while using social media.

**Table 65. Distribution of the social media non user orange growers according to constraints faced by them**

Sl. No.	Constraints	Respondents (n=150) Total mean of Garret score	Rank
<b>A)</b>	<b>Technical constraints</b>		
1	Complex nature of social media	69.36	II
2	Language barrier to use social media	36.38	VI
<b>B)</b>	<b>Cultural constraints</b>		
3	No faith in social media information due to traditional belief in existing system	59.20	III
<b>C)</b>	<b>Infrastructural constraints</b>		
4	Irregular internet connectivity	78.64	I
<b>D)</b>	<b>Psychological constraints</b>		
5	Lack of time to utilize the social media	46.34	V
6	Shortage of expertise to use the social media	53.79	IV
<b>E)</b>	<b>Others</b>		
7	High cost of social media services	24.34	VII
8	Irregular electric supply at rural area	23.86	VIII



**Fig. 34 Distribution of the social media non user respondents according to the constraints faced by them in use of social media**

1. Complex nature of social media
2. Language barrier to use social media
3. No faith in social media information due to traditional belief in existing system
4. Irregular internet connectivity
5. Lack of time to utilize the social media
6. Shortage of expertise to use the social media
7. High cost of social media services
8. Irregular electric supply at rural area

From Table 65. it is apparent that, majority of the social media non user respondents had given I<sup>st</sup> rank as a major constraint was irregular internet connectivity with Garret value 78.64 followed by complex nature of social media (69.36), no faith in social media information due to traditional belief in existing system (59.20), shortage of expertise to use the social media (53.79), lack of time to utilize the social media (46.34), language barrier to use social media (36.38), high cost of social media services (24.34) and irregular electric supply at rural area (23.86) having II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup> and VIII<sup>th</sup> ranks, respectively.

#### **4.6.2.1 Complex nature of social media**

Social media handling requires basic understanding and minimum knowledge of ongoing updates of social media services for agriculture which make these tools a little complex as a outcome majority of social media non user respondents show less preference to use social media as they were not much self confident, unaware about technical knowhow to use available social media for agriculture purpose and less educated as compared to social media user respondents due to which they were not familiar with social media utilization this might be probable reason behind the constraint that respondents felt that the social media was complex in nature.

#### **4.6.2.2 Language barrier to use social media**

Generally preference of information provided through social media is in English language and contains lot of technical words which are not understandable as a respondent's literacy level is low as compared to social media user respondents and they are more comfortable with their mother tongue due the such type of heterogeneous nature of farming community henceforth, may be reported as sixth most serious constraint faced by the respondents.

#### **4.6.2.3 No faith in social media information due to traditional belief in existing system**

Social and cultural background of respondents denied to somewhat extent from accepting social media for sourcing agricultural

information and e-marketing and carried farm operations and related activities traditionally because of their familiarity with traditional services and communicational channels which creates obstacle in trusting and practically utilizing the new technologies like social media for agricultural purpose.

#### **4.6.2.4 Lack of time to utilize the social media**

As the respondents were busy in carrying the farm operations in their traditional way with season bound activities in combination with engaging their time in their other daily routine works and not much interested to use social media for accessing agricultural information for orange cultivation and others this might be presumed reason behind the this psychological constraint.

#### **4.6.2.5 Shortage of expertise to use the social media**

As social media is relatively newer concept to the people in the globe. Online presence of old generation is still very less in comparison with young beside they prefer to abstain use of social media because of their low level of skills, limited exposure and proficiency in using social media.

From the above findings it can be concluded infrastructural constraint was the hindering constraints faced by social media user orange growers in use of social media.

It is concluded from above findings that, even though the orange growers were quite satisfied with the social media services but we need to wait long as we want to proven results for sustainable development of orange growers by taking needful action on minimization of these constraints by the authorities.

Introducing orange growers with social media knowledge can give birth to innovative ideas and artistic creativity for orange production. In the light of young farmers moving away from agriculture sector, there is need to attract and retain them in agriculture field. In this context social media forms perfect media tools and there is need to address the issues with respect to use of social media. It is important obligation on the part of

extension system to collaborate social media services which provides continuous support mechanism to users. The government, NGO's, public and other bodies working together honestly can solve the present constraints and create new opportunities for social media in agriculture field.

The findings were supported by findings of Rajni Jain (2012), Saravanan (2013), Khondokar (2015), Sonal Gupta (2015), Jijina (2016), Bite (2017), Khou and Kishore (2018), Jiriko et al. (2020) and Bhagyashri Kesharwani *et al.* (2022)

#### **4.7 Suggestions obtained from orange growers to overcome the constraints**

Suggestions are the solutions to overcome or minimize constraints. It is important to seek the opinion of the orange growers who were directly involved active use of social media services for orange cultivation, farming related activities and business and others. The respondents were requested to express their suggestions. The frequency and percentage of each suggestion was worked out and assigned rank accordingly.

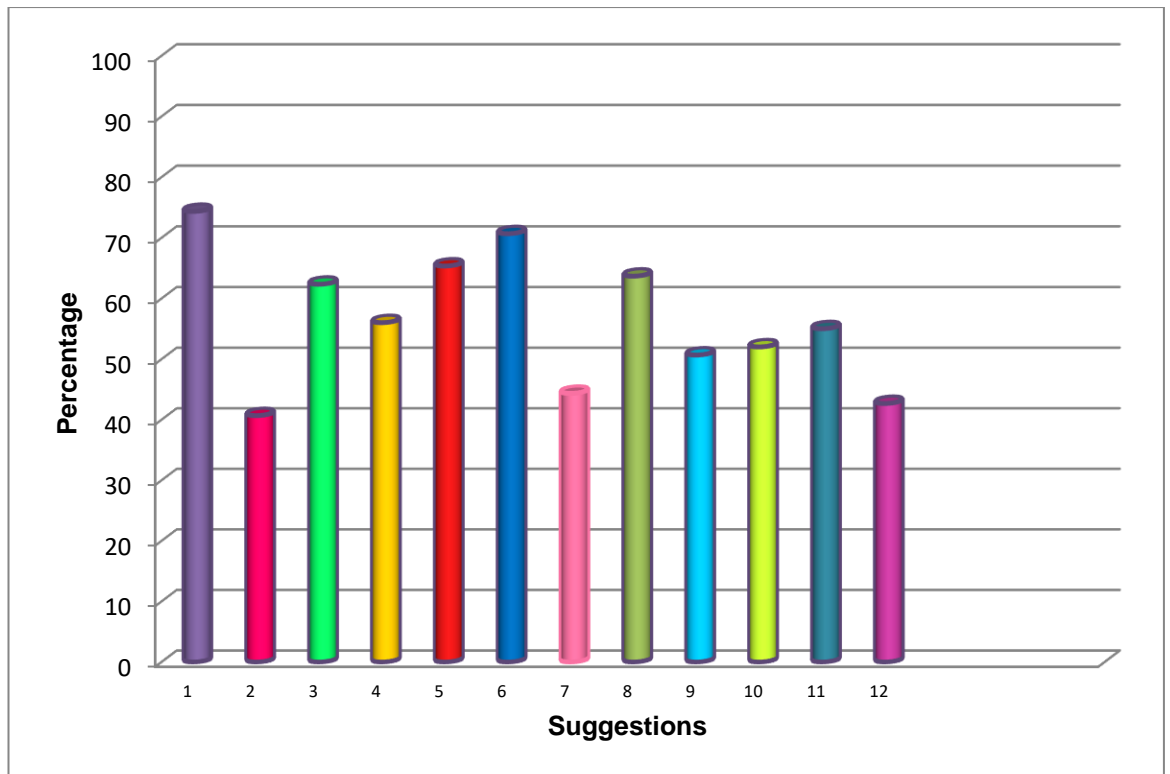
The suggestions given by social media user orange growers and social media non user orange growers have been presented in Table 66.

The results from Table 66 Indicated that, majority of the respondents were suggested that, provide the regular strong internet connectivity in rural area (74.33%) and social media should provide right information at right time in right format covering the emergency messages like climate changes / natural calamities (70.66%) and assigned I<sup>st</sup> and II<sup>nd</sup> ranks, respectively. The suggestions like practically applicable solutions with minimum input cost should be provided through social media was reported by 65.33 per cent of the respondents securing III<sup>rd</sup> rank followed by the respondents had suggested social media groups of farmers should be

**Table 66. Distribution of the respondents according to suggestions given by them in overcoming constraints**

Sl. No	Suggestions	Respondents (n=300) Frequency (%)	Rank
<b>A) Technical suggestions</b>			
1	Provide the regular strong internet connectivity in rural area	223 (74.33)	I
2	Regular electricity supply	122 (40.66)	XII
3	Contents of social media applications should be developed and updated as per need, preference and geographical conditions	187 (62.33)	V
4	Social media contents should be available in local/regional languages	168 (56.00)	VI
5	Practically applicable solutions with minimum input cost should be provided through social media	196 (65.33)	III
6	Social media should provide right information at right time in right format covering the emergency messages like climate changes / natural calamities	212 (70.66)	II
7	Reliable farm literature should be made available through social media	133 (44.33)	X
<b>B) Social suggestions</b>			
8	Social media groups of farmers should be actively run by the state agricultural departments by providing instant and proper solutions to the farmer's field problems	191 (63.66)	IV
9	Daily interaction of experts with farmers of that area should be arranged regarding farm discussion through social media	152 (50.66)	IX
<b>C) Psychological suggestions</b>			
10	Technological cost should be mentioned in the message delivered	156 (52.00)	VIII
11	Orange growers should be motivated to use social media for adopting innovative agricultural practices	165 (55.00)	VII
<b>D) Others</b>			
12	Awareness must be created about using social media in agriculture	128 (42.66)	XI

*Figures in parentheses indicate percentage*



**Fig. 35 Distribution of the orange growers according to the suggestion offered by them to overcome the constraints**

1. Provide the regular strong internet connectivity in rural area
2. Regular electricity supply
3. Contents of social media applications should be developed and updated as per need, preference and geographical conditions
4. Social media contents should be available in local/regional languages
5. Practically applicable solutions with minimum input cost should be provided through social media
6. Social media should provide right information at right time in right format covering the emergency messages like climate changes / natural calamities
7. Reliable farm literature should be made available through social media
8. Social media groups of farmers should be actively run by the state agricultural departments by providing instant and proper solutions to the farmer's field problems
9. Daily interaction of experts with farmers of that area should be arranged regarding farm discussion through social media
10. Technological cost should be mentioned in the message delivered
11. Orange growers should be motivated to use social media for adopting innovative agricultural practices
12. Awareness must be created about using social media in agriculture

actively run by the state agricultural departments by providing instant and proper solutions to the farmer's field problems (63.66%), contents of social media applications should be developed and updated as per need, preference and geographical conditions (62.33%), Social media contents should be available in local/ regional languages (56.00%), orange growers should be motivated to use social media for adopting innovative agricultural practices (55.00%), technological cost should be mentioned in the message delivered (52.00%), daily interaction of experts with farmers of that area should be arranged regarding farm discussion through social media (50.66%), reliable farm literature should be made available through social media (44.39%), awareness must be created about using social media in agriculture (40.66%) and regular electricity supply should be provided (40.66%) securing IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup>, VIII<sup>th</sup>, IX<sup>th</sup>, X<sup>th</sup>, XI<sup>th</sup> and XII<sup>th</sup> ranks respectively.

#### **4.7.1 Provide the regular strong internet connectivity in rural area**

In the study area network bandwidth was poor which was undesirable and reduce respondent's keenness for accessing agricultural information and while attending online programmes on social media as audio visual and pictorial multimedia features of social media requires good quality internet network. Sometimes, needed information or help from social media was unable to fothersh at right time as the agricultural practices are time bound due to this serious problem of connectivity when the orange growers searching for it particularly while present in their farm at that time respondents felt it unfeasible. On the other hand the responses received to the respondent's queries from experts were too late due to poor internet connectivity which hinders the interest and this may the reason behind limited access or no access to social media by some respondents due to the evidence at this time the mass of rural areas are without uninterrupted internet connection and network signals. Henceforth, respondents suggested to provide regular strong internet connectivity in rural areas.

#### **4.7.2 Regular electricity supply**

Majority of villages still faced the power supply deficit and lack of communication facilities. As electricity is the main source of power

supply without which social media devices are unable to run. Uninterrupted electricity supply busts the interest of respondents in using social media therefore suggested to provide regular electric supply.

#### **4.7.3 Contents of social media applications should be developed and updated as per need, preference and geographical conditions**

Variety of technologies are suited to specified geographical area and not to the every climatic conditions and soil conditions therefore, services provided through social media should be properly customized technologies content as per preference and circumstances of farming system. It will lead to proper facilitation of respondent's involvement in the development process.

#### **4.7.4 Social media contents should be available in local/regional languages**

Majority of the respondents were comfortable to capture the creative things with their regional languages and easily appraised the technological knowledge or any content they access on social media for their actual use in agricultural activities based on their literacy level. Hence, it was suggested by the respondents to make social media contents available in regional languages.

#### **4.7.5 Practically applicable solutions with minimum input cost should be provided through social media**

Many times there is availability of huge technological information but due to cumbersome and complex technology, higher cost of technology and certain socio-economic conditions it fails to generate among the respondents and adopt the available technologies from social media despite of having relative benefit and probable profits. Lesser the cost more would be the user numbers. So, the profitable and cost effective technologies should be generated, popularized and simply demonstrated so as to apply realistically by the respondents.

#### **4.7.6 Social media should provide right information at right time in right format covering the emergency messages like climate changes / natural calamities**

As all the activities are controlled by time, technology and network particularly in case of agricultural field operations information timeliness communication is very important for orange growers as they have to deal with different farm operations which are restricted by time. Social media is ray of the hope for farmers in this changing environment and lifestyle that it can provide updates in the form of social media messages on climatic changes, climate resilient technologies in order to take necessary precautions for securing their crops during the unpredictable weather conditions like heavy rainfall, foreign pest attack like locust others., as it is very much needed in today's changing weather condition. For effective utilization of social media suggestion comes out from respondents to provide right information at right time in right format covering the emergency messages like climate changes / natural calamities in study area.

#### **4.7.7 Reliable farm literature should be made available through social media**

Due to availability of huge number of information sources for agricultural data provision but in many services there is absence of professionals of higher experience. Reliability of information or surety of provided information was not obtained so, respondents suggested to provide good quality farm literature with authenticity.

#### **4.7.8 Social media groups of farmers should be actively run by the state agricultural departments by providing instant and proper solutions to the farmer's field problems**

There were limited groups in the study area which are made for orange growers but the response from these groups was not satisfactory so respondents suggested to run the social media groups actively with feedback mechanism and question answer session by

agricultural departments in order to receive quick solutions for the farming issues of the respondents.

#### **4.7.9 Daily interaction of experts with farmers of that area should be arranged regarding farm discussion through social media**

To keep the respondents updated with latest technologies and facilitate the solutions on the field problems by means of interactive social media it is necessary to arrange regular discussion and communication of respondents with experts. There was occasional interaction only through workshop sessions with the professionals in the limited areas hence they suggested to frequently interaction of respondents and experts on current issues and seasonal orchard management practices.

#### **4.7.10 Technological cost should be mentioned in the message delivered**

Respondents opined that, many times while they were accessing for the agricultural information or newer technologies, they remain away from adopting that technology due to unaware about it's cost of implementation. Therefore, the suggestion originated to mention technological cost in the messages delivered with technology in order to decide whether the adoption of that technique is profitable or not.

#### **4.7.11 Orange growers should be motivated to use social media for adopting innovative agricultural practices**

It is fact that farming communities are not persuaded about advantages of social media for agriculture. There were at a time active social media users while on the other hand non users also which were dependent on the traditional farming due to various factors like old age, literacy and social media handling skills. So, they should be motivated to use social media for adopting innovative agricultural practices.

#### **4.7.12 Awareness must be created about using social media in agriculture**

The social media tool for agricultural purpose was ignored by the many of the respondents due to less trust on it, So, it is suggested by

the respondents who were getting benefit from social media in their orange cultivation practices, production and marketing, they suggested to make other respondents aware about using it enthusiastically for the agriculture purpose.

Lack of confidence due to use of conventional form of sources of information over the years were carried on. Lack of handling skills and utilization of social media could be the factor to arise the need of making respondents aware about social media.

It will be better if the social media usages are more in agriculture particularly than present status of social media usage in general. It will improve the agriculture sector and orange grower's livelihood as it can devote to great extent in the agriculture territory specifically in better orange production, processing, marketing and thereby interminable development.

The findings were supported by findings of Kumar *et al.* (2019), Krishnaji *et al.* (2020) and Anita Deshmukh *et al.* (2021).

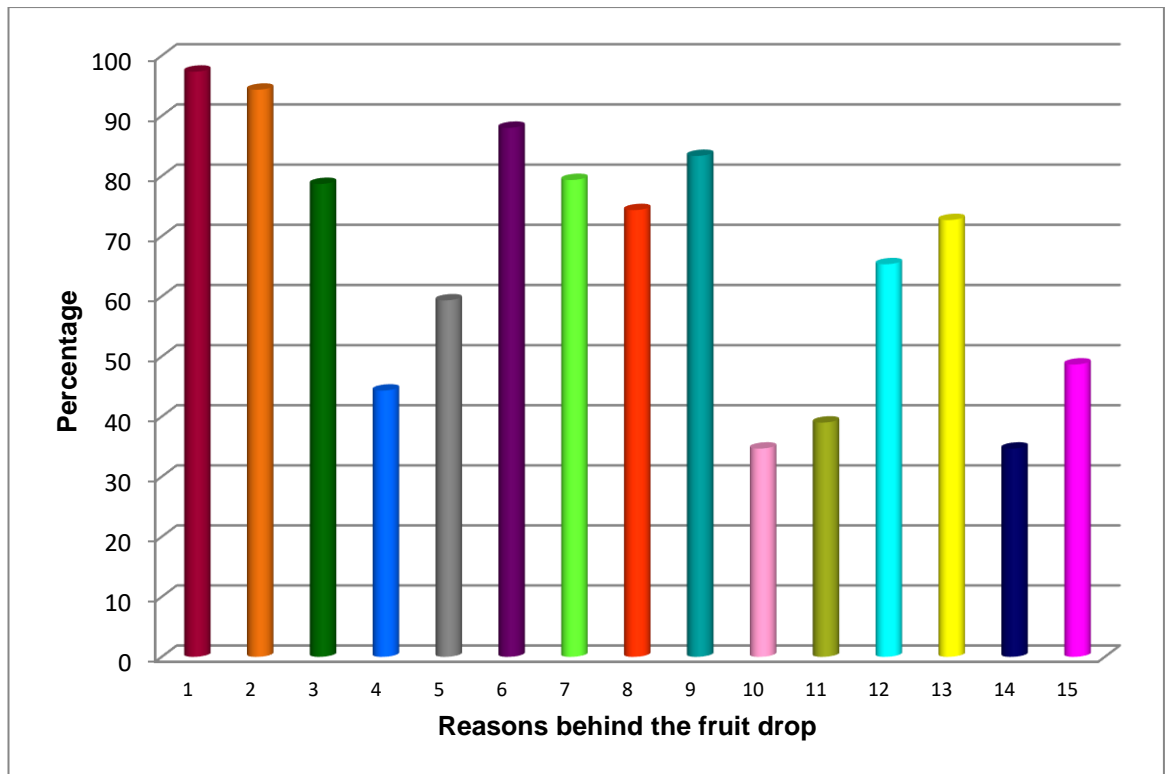
#### **4.8.1 Reasons behind fruit drop in oranges as perceived by orange growers**

The agro-ecological conditions of the Vidarbha region of Maharashtra are best suited for the orange fruit production. Orange cultivation has proved boon for the growers due to its higher economic productivity as compared to other crops in the area. However since, last three to four years orange growers are facing very serious problem of orange fruit drop due to different abiotic, physiological, pathological, entomological and other management factors. These reasons differ according to particular region in the both Amravati and Nagpur district. According to Director of Central Citrus Research Institute (CCRI), M. S. Ladaniya, orange is known as horticultural crop alternate between 'on and off' years. Alternate years the crop is good or less due to physiological condition. If a farmer doesn't give enough nutrition in the dull year, production is bound to fall. Ambia crop is an irrigated crop compared to mrig crop. Due to weather conditions, there has been an acute shortage of water resulting in less production.

**Table 67. Distribution of respondents according to reasons behind fruit drop in oranges as perceived by orange growers**

Sl. No.	Statements	Respondents (n=300)	
		Frequency	Percentage
<b>A</b>	<b>Abiotic reasons/ Natural calamities</b>		
1	High temperature with water stress for longer duration	292	97.33
2	High humidity due to continuous rainfall	283	94.33
<b>B</b>	<b>Biotic reasons</b>		
<b>a.</b>	<b>Pathological fruit drop</b>		
3	Fruit rot (Due to fungus)	236	78.67
4	Greening disease	133	44.33
5	Root rot	178	59.33
6	Phytophthora (Dinkya)	264	88.00
7	Dieback (Shendemar)	238	79.33
<b>b.</b>	<b>Entomological fruit drop</b>		
8	Fruit flies (Fal mashi)	223	74.33
9	Fruit sucking moths	250	83.33
10	White fly and black fly (Kolshi)	104	34.67
<b>C.</b>	<b>Other management factors</b>		
11	Physiological fruit drop due to hormonal imbalance	117	39.00
12	Nutrient deficiency	196	65.33
13	Ineffective water management during Ambiya Bahar (Type of irrigation used)	218	72.67
14	Poor drainage due to improper site selection/ unsuitable soil	104	34.67
15	Declining sources of water & ground water level	146	48.66

\*Multiple reasons were reported by the respondents



**Fig. 36 Distribution of respondents according to reasons behind fruit drop in oranges as perceived by orange growers**

1. High temperature with water stress for longer duration
2. High humidity due to continuous rainfall
3. Fruit rot (Due to fungus)
4. Greening disease
5. Root rot and foot rot
6. Phytophthora (Dinkya)
7. Dieback (Shendemar)
8. Fruit flies (Fal mashi)
9. Fruit sucking moths
10. White fly and black fly (Kolshi)
11. Physiological fruit drop due to hormonal imbalance
12. Nutrient deficiency
13. Ineffective water management during Ambiya Bahar (Type of irrigation used)
14. Poor drainage due to improper site of selection/unsuitable soil
15. Declining sources of water & ground water level

The data regarding reasons behind fruit drops in oranges as perceived by orange growers were presented in Table 67, it was observed that great majority of the respondents (97.33%) expressed reason that fruit drop due to abiotic factors like high temperature with water stress for longer duration. The input cost is very high for orchard management and interculture operations so extra cost for artificial maintainance of temperature by planting shelter trees is not affordable or possible by orange growers. The 94.33 per cent of the respondents said fruit drop due to the reason high humidity, continuous rainfall were the same for all over study area as they were facing the unfavourable weather conditions which are out of human control due to which orange growers were desperated as they are not getting expected yield and better market prices. and suggested to provide proper subsidies to get economic help and design suitable policies to withstand the orange growers in such conditions.

In case of biotic factors, most of the respondents (88.00%) perceived reason behind fruit drop was due to Phytophthora (Dinkya) followed by entomological fruit drop, fruit sucking moth (83.33%), dieback (Shendemar) (79.33%), fruit rot (78.67%), fruit flies (Fal mashi) (74.33%), ineffective water management during Ambia Bahar (72.67%), nutrient deficiency (65.33%) which was observed by respondents through regular observation of symptoms on leaves, stem, fruits and other parts of tree, this was followed by root rot (59.33%), these were the major reasons of fruit drops in orange cultivation responded by majority of the respondents. The reasons of the fruit drop expressed by respondents were declining sources of water and ground water level (48.67%), greening disease (44.33%), physiological fruit drop due to hormonal imbalance (39.00%), white fly and black fly (34.67%) and poor drainage due to improper site selection ((34.67%), respectively.

In case of pathological fruit drop it was observed that fruit rot due to fungi, greening disease, root rot, phytophthora (Dinkya) and dieback (Shendemar) were the pathological causes of fruit drop in orange experienced by the respondents in the study area respectively. Fruit flies, fruit sucking moths, and white fly and black fly (Kolshi) were the major

entomological cause of fruit drop as perceived by the respondents. All the causes of fruit drop in orange are interlinked with each other due to different biotic, abiotic and physiological factors. The infestation of bark eating caterpillar was observed in some cases where the ignorance towards proper orchard management due to engagement in some another job. The attack of *kolshi* i. e., white and black fly was observed in Katol and Kalmeshwar tahsil in major proportion whereas, the greening disease was observed in Chandurbajar tahsil.

Poor drainage due to improper site of selection was observed significantly in Chandurbajar tahsil. Similarly, ineffective water management practices and decreasing ground water level was observed significantly in Kalmeshwar and Narkhed tahsil respectively. In Amravati district, talukas ranking for major fruit drop were Chandurbajar, Achalpur, Morshi and Warud respectively. All these are most severe reasons in Amravati district as compared to Nagpur in case of pest and disease attack.

Anita Deshmukh (2019), Lalit (2019) and Ratnapal *et al.* (2019).

#### **4.8.2 Reasons behind removal of orchard**

From the data in the Table 68. , it can be interpreted that great majority of the respondents (97.67%) had given the reason behind removal of orchard were, unsatisfactory market price to oranges, followed by high cost of cultivation and interculture operations (86.04%), unavailability of water at appropriate time (62.79%), prefer to grow other crops instead of orchard (27.90%), decision in frustration (18.60%) and old age of orchard (6.98%) respectively. These are the reasons of removal of orange orchard expressed by orange grower respondents.

Chandurbajar was the only tahsil in Amravati district in which selected villages were observed from which some farmers removed their orchard namely; Jasapur, Madhan, Tondgaon, Talegaon Mohana and Belaj. From Kalmeshwar tahsil of Nagpur district, villages namely, Madasawangi, Budhala and Mhasepathar whereas, Yerla village from Narkhed tahsil orange farmers were observed from which some farmers removed their orchard. Thus, total 43 farmers were selected who removed

orchard due to various reasons. The data were obtained from 43 orange growers regarding removal of orange orchard and presented in Table 68.

**Table 68. Distribution of respondents according to reasons behind removal of orchard**

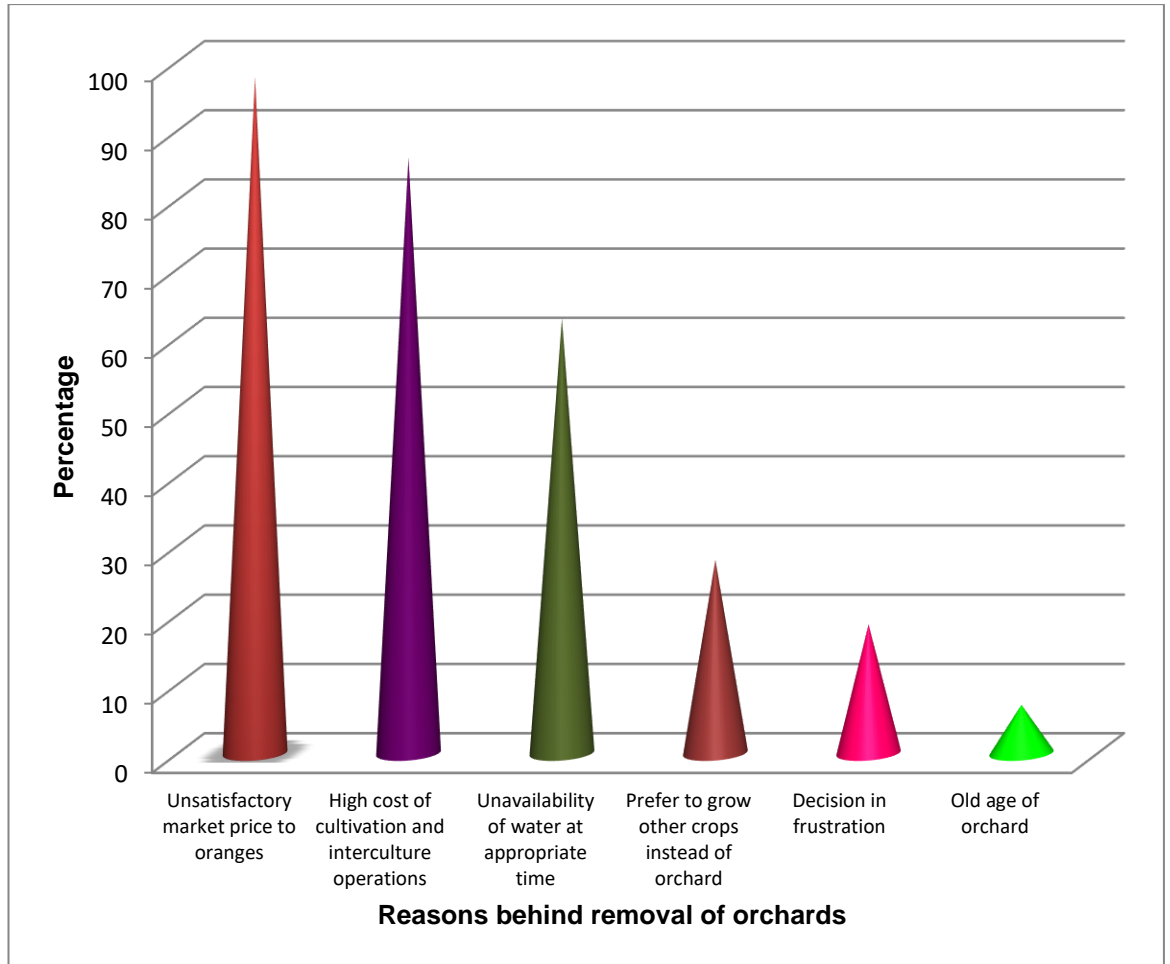
Sl. No.	Statements	Respondents (n=43)	
		Frequency	Percentage
1	Unsatisfactory market price to oranges	42	97.67
2	High cost of cultivation and interculture operations	37	86.04
3	Unavailability of water at appropriate time	27	62.79
4	Prefer to grow other crops instead of orchard	12	27.90
5	Decision in frustration	08	18.60
6	Old age of orchard	03	6.98

### **Suggestions to overcome fruit drop and removal of orchard**

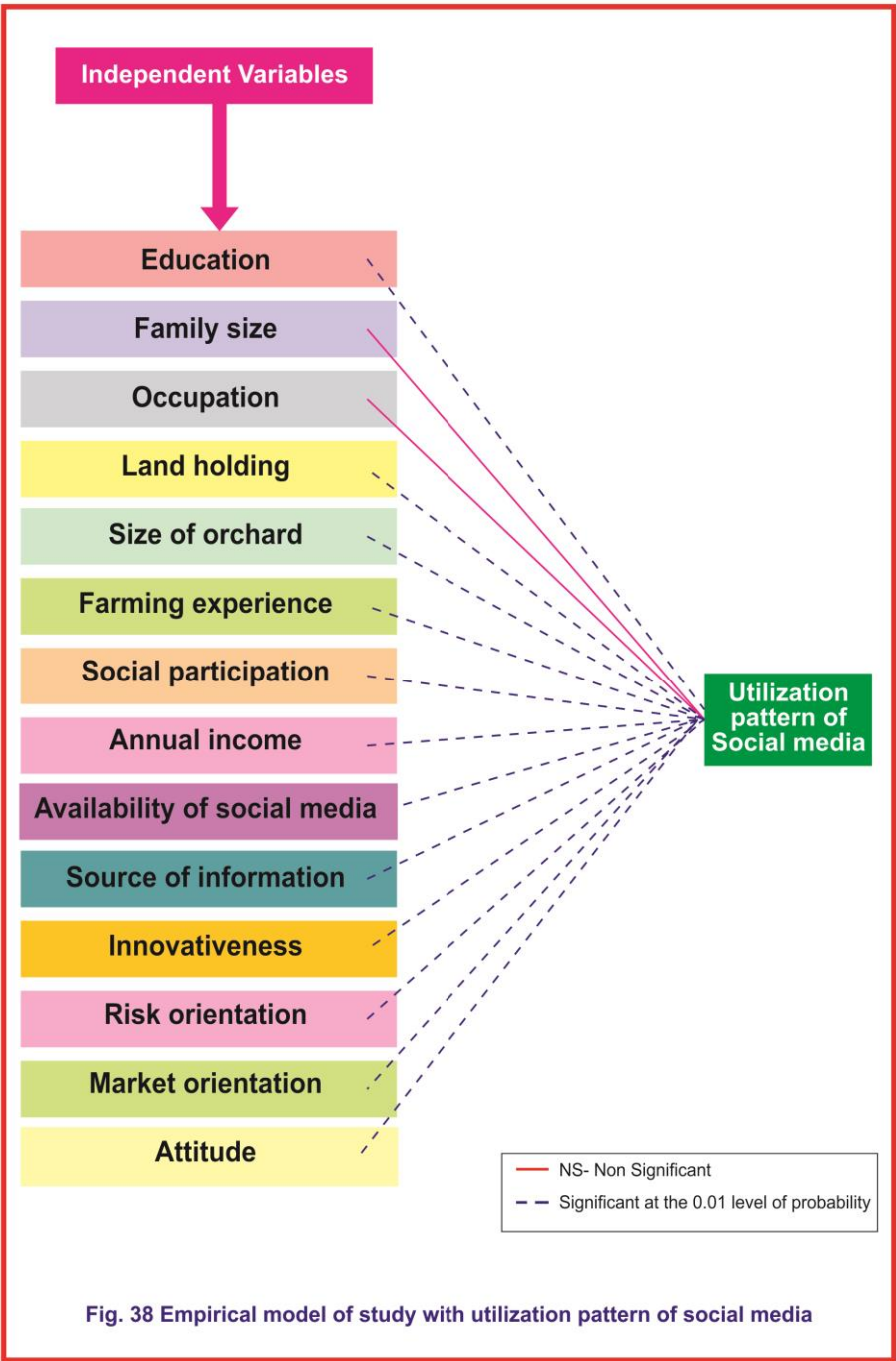
It can be suggested as control measures on orange fruit drop that, orange growers should try to follow cent per cent of the suggested recommended doses of fertilizers and insecticides and other recommendations given by scientist for cultivation of orange crop. They should take benefit of various online workshops through social media organized by agriculture research stations in every month. In some cases the services felt unreach to the orange growers that can be managed by increasing number of staff or experts. Beside this, orange grower himself should be aware and concentrate on technical orchard management.

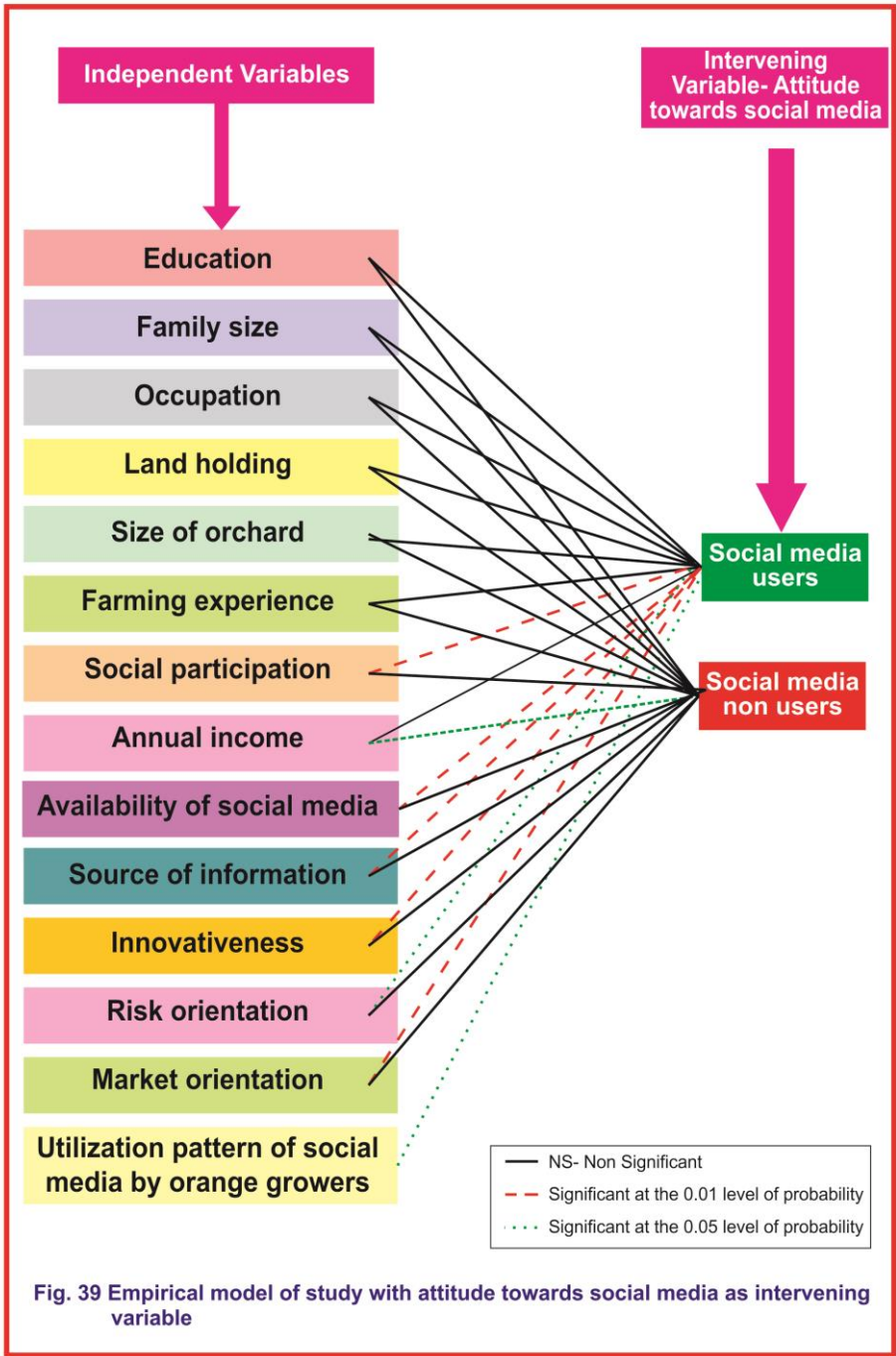
### **4.9 Empirical model of research**

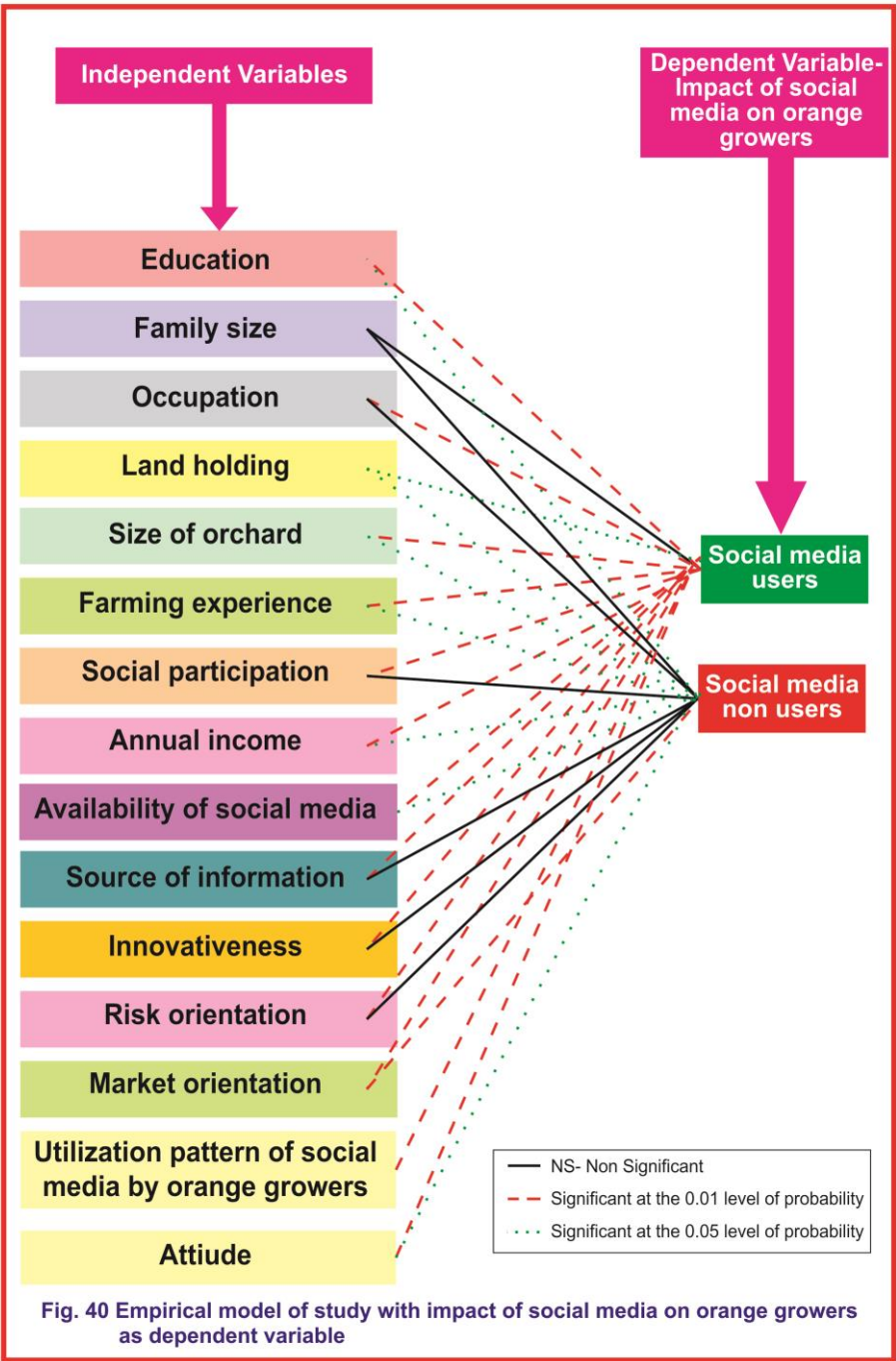
Considering the tested relations amongst the independent and dependent variables the empirical model was prepared and the relationship has been depicted in Fig. 59 the empirical model shows the observed relation of independent variables with the dependent variable.



**Fig. 37 Distribution of respondents according to reasons behind removal of orchards as perceived by orange growers**







## CHAPTER V

### SUMMARY AND CONCLUSIONS

The study entitled as “Impact of Social Media on Orange Growers” was conducted in Amravati and Nagpur district of Vidarbha region in Maharashtra state. The study was conducted with the following specific objectives.

#### 5.1 Objectives of the study

1. To study the personal, socio-economic, communicational and psychological characteristics of orange growers
2. To study the utilization pattern of social media by orange growers
3. To develop and standardize attitude scale for measurement of attitude of orange growers towards social media
4. To measure the attitude of orange growers towards social media
5. To study the impact of social media on orange growers
6. To study the relationship between the personal, socio-economic, communicational and psychological characteristics of orange growers with attitude and impact of social media on orange growers
7. To study the constraints faced by orange growers in use of social media and suggestions obtained from orange growers to overcome the constraints
8. To identify the reasons behind the fruit drop in oranges and removal of orchards as perceived by orange growers

#### 5.2 Methodology

The study was carried out in Vidarbha region of Maharashtra state. From Vidarbha region, two districts namely Amravati and Nagpur district was selected purposively on the basis of maximum area under orange cultivation. For the evaluation of impact of social media an ex-post-facto research design of social research was used. Total 300 orange growers, 150 social media user and 150 social media non user orange growers having same size of orchard (minimum 1 acre) were selected from

30 villages of six selected talukas of two districts namely, Warud, Morshi and Achalpur from Amravati and Katol, Kalmeshwar and Narkhed from Nagpur district of Vidarbha region by simple random sampling method. These selected orange growers were personally interviewed with help of structured interview schedule. Each of the respondent was interviewed personally. Interview for data collection with the help of interview schedule was generally conducted at the orange grower's farm and occasionally also at their houses when they were free to talk with researcher. The researcher had to make repeated visits to study area with the view to develop enough rapport with the orange growers. The collected data were then analyzed and findings emerged out of the investigation and conclusion drawn there upon.

### **5.3 Findings**

The conclusions of findings of the present study were summarized in succeeding paragraphs.

#### **5.3.1 Personal, socio-economic, communicational and psychological characteristics of orange growers**

It was observed that more than one third (34.00%) of the overall respondents, social media users and non users had higher secondary school level education (11<sup>th</sup>+12<sup>th</sup>), nearly half (44.00%) of the respondents had medium family size (5 to 6 members), more than one third (38.67%) of the respondents were engaged in agriculture + Horticulture +allied occupation, respectively.

Nearly half of the overall respondents, social media users and non users (46.33%) had semi medium size of land holding (2.01 to 4.00 ha), majority (60.67%) of the respondents had small size of orchard (Up to 1.33 ha), more than two fifth (40.67%) of the respondents had medium experience in orange cultivation (15.36 to 26.66 years), majority (57.33%) of the respondents had medium level of social participation (2 to 3), respectively.

Nearly half (45.67%) of the respondents had annual income up to Rs. 7,96,000/-, the great majority, 88.00 per cent of social media user

orange growers had high availability of social media (Above 6) among the available social media most of the social media user respondents were using WhatsApp (97.33%), YouTube (90.66%), Facebook (74.66%) and Telegram (69.33%) and overall 44.00 per cent of the orange growers had higher availability of social media. The majority (55.67%) of the social media user and non user respondents had medium sources of information (47.84 to 54.39) and majority (59.67%) of the respondents had medium innovativeness.

Majority (56.67%) of the respondents had medium risk orientation (17.92 to 26.35). majority (60.00%) of the respondents had medium market orientation (18.75 to 25.00) and 70.00 per cent of the social media user orange growers had high utilization pattern index (62.93 to 71.36).

From the observations of personal, socio-economic, communicational and psychological characteristics of orange growers concluded that orange growers had sound educational background, financial background and awareness about importance of small family size. They had good farming experience were engaged in Agriculture + Horticulture + allied occupation as a main occupation for earning. Maximum orange growers had semi medium land holdings with small size of orchards (1.93 ha). Majority of the respondents had medium social participation. They were received information from personnel of their social system as well as modern mass media sources like WhatsApp, YouTube, facebook and computer with internet. Orange growers had higher availability of social media and moderately innovative hence earlier in adopting technologies, taken moderate risk to maximize profit. They had medium market orientation and social media user orange growers had higher the index of social media utilization pattern.

### **5.3.2 Attitude towards social media**

In case of overall attitude of orange growers towards social media, 50.34 per cent of the respondents had highly favourable attitude towards social media followed by moderately favourable attitude (29.33%).

The 87.33 per cent of the social media user respondents had highly favourable attitude towards social media.

As a result of social media utilization for orange cultivation by orange growers in the study area, they had derived satisfactory benefits regarding guidance about profitable orange cultivation and management practices from available social media. Therefore it is concluded that attitude of the orange growers towards social media was seen to be positive.

### **5.3.3 Impact of social media**

The impact of social media was discovered by taking into consideration the following eight parameters under study and findings are summarized as follows.

#### **5.3.3.1 Per cent change in knowledge**

It is observed that nearly half of the respondents (54.00%) experienced medium level of change in knowledge (14.73 to 72.5%) of social media user orange growers for orange cultivation. The 26.67 per cent of the respondents reported high per cent (above 72.5 %) change in knowledge. 38.17 per cent change was observed in knowledge of social media user over non user. Though knowledge of social media user respondents was increasing day by day as it helps to increase the knowledge of respondents specially in agriculture area.

Therefore, it is concluded that there was increase in knowledge of social media user orange growers. But as it can be improved applying more efforts by the facilitators. Therefore, there is scope to increase knowledge of social media user by developing social media applications in effective manners by facilitators. Also the reason behind this is that, there are so many effective media available in the system through which also the orange growers may be getting knowledge.

#### **5.3.3.2 Per cent change in adoption**

It is depicted that more than half of the orange growers (58.00%) experienced medium change in adoption (12.96 to 46.07) of social media user orange growers. The 30.27 per cent change was observed.

Hence it is concluded that there was little increase in adoption of social media user orange growers in comparison with knowledge. The reason behind this result was availability of practically applicable practices as well as good guidance through social media about orange cultivation practices though some practices may not be affordable and may not be followed due to time constraint. The orange grower's trust on the applicability of the social media knowledge need to be carefully increase by ensuring them about full advantage of particular practices scientifically which the orange grower can understand and apply it on small scale on his field.

#### **5.3.3.3 Per cent change in production**

As a result of social media use for orange cultivation it is observed that nearly three-fourth of the respondents (71.33%) were experienced medium level (06.16 to 17.67 %) of change in orange production due to use of social media. The 11.96 per cent change was observed in production due to use of social media by orange growers.

Therefore it is concluded that there is increase in production due to adoption of innovative orange cultivation practices shared through social media and information. There is indirect effect of social media knowledge and utilization by farmers for marketing and orchard management on economic variables due to which there was considerable amount of positive change was observed in case of social media user as compared to social media non user orange grower.

#### **5.3.3.4 Per cent change in orchard management**

It is clearly concluded that more than three-fourth of the respondents (76.67%) were experienced medium level (8.61 to 16.20%) of change in orange management due to use of social media. The 12.39 per cent change was observed in orchard management.

Therefore it is concluded that there is increase in orchard management. The reason behind this may be the orange growers are getting well experienced and following and modifying orchard management practices suggested on social media for getting better quality orange

produce. Still there is opportunity to increase their orchard management by motivating orange growers about proper application of practices through knowledge social media.

#### **5.3.3.5 Per cent change in annual income**

After implementation of social media in collaboration with orange cultivation near about three fourth of the respondents (71.33%) were experienced medium level (6.07 to 19.72) of change in annual income due to use of social media. The 28.73 per cent change in annual income of social media user was observed.

Hence it may be concluded that due to huge advertisement of agricultural produce in required areas, these progressive orange growers in the study area are getting better market prices due to uniqueness of the orange produce by selling their produce outside the country for processing purpose through better marketing channels virtually. Yet very few of the orange growers had experienced highest per cent change in annual income as compare to knowledge and adoption of the practices.

#### **5.3.3.6 Per cent change in family expenditure**

It is apparent that more than half of the respondents (66.00%) were experienced medium level (09.45 to 31.82) of change in family expenditure. The 19.41 per cent change in family expenditure of social media user was observed. The reason behind this result may be as many of the farmers started adopting organic cultivation practices inspiring from social media knowledge, the adoption of newer farm inputs, and trying newer things in day to day life by inspiring through social media.

#### **5.3.3.7 Per cent change in material possession**

It is observed that more than half of the respondents (79.33%) were experienced medium level of change in material possession from 10.92 to 28.37 per cent due to use of social media. The 19.32 per cent change in material possession was observed. It is ensured that increase in material possession was seen more in case of big orange growers rather than of small orange growers.

By the influence of advertisement many times individual gets motivated to buy the specific materials. So, many of the orange growers purchased farm mechanization implements like, brush cutter, solar operated weeder, machinaries for dairy and other business, garden tractor, rotavator and other household appliances.

#### **5.3.3.8 Per cent change in self confidence**

It is concluded that majority (75.33%) of the orange growers were experienced medium level of change in self confidence from 34.87 to 65.92 per cent because of social media. The 49.34 per cent change in self confidence of social media user orange growers was observed. For that, reason may be the various motivational literature available in the form of images, videos, speeches, articles and success stories others., referred by the orange growers to stay self motivated.

#### **5.3.3.9 Impact of social media on orange growers**

As a result of social media user for orange cultivation majority (65.33%) of the respondents were found in medium category of increase in impact of social media from 19.52 to 30.73 per cent. The social media user respondents were experienced 25.12 per cent average increase in impact of social media.

Therefore, it has been concluded that, utilization of social media in study area showed positive impact on social media user orange growers.

### **5.3.4 Relational analysis**

The results of correlation analysis of various characteristics of the orange growers with utilization pattern, attitude and overall impact is summarized as follows.

#### **5.3.4.1 Correlates of utilization pattern of social media**

Variables related to social media user orange growers namely, education, land holding, size of orchard, farming experience, social participation, annual income, availability of social media, sources of information, innovativeness, risk orientation market orientation and attitude

showed positive and highly significant relationship with utilization pattern of social media at 0.01 per cent level of probability about utilization pattern of social media. While family size and occupation showed non significant relationship with utilization pattern of social media.

#### **5.3.4.2 Correlates of attitude towards social media**

In case of social media user orange growers variables namely, social participation, availability of social media, sources of information, innovativeness, risk orientation, market orientation and utilization pattern of social media showed positive and highly significant relationship with attitude of social media user orange growers at 0.01 per cent level of probability. While education, family size, occupation, land holding, size of orchard, farming experience and annual income showed non significant relationship with attitude of social media user orange growers respectively.

In case of social media non user orange growers the variable namely, annual income was having positive and highly significant relationship with attitude at 0.01 per cent level of probability. The variables namely education, family size, occupation, land holding, size of orchard, farming experience, social participation, availability of social media, sources of information, innovativeness, risk orientation, and market orientation showed non significant relationship with attitude towards social media of non user respondents.

#### **5.3.4.3 Correlates of overall impact of social media**

In case of social media user orange growers characteristics namely, education, occupation, size of orchard, farming experience, social participation, annual income, availability of social media, sources of information, innovativeness, risk orientation, market orientation, utilization pattern of social media and attitude were positively and significantly related with overall impact of social media at 0.01 level of probability.

Land holding was positively significant with impact of social media at 0.05 per cent level of significance.

Family size showed non significant relationship with impact of social media.

In case of social media non user orange growers market orientation showed positive and significant correlation with impact of social media at 0.01 per cent level of probability. Whereas, characteristics, education, land holding, size of orchard, farming experience, annual income, availability of social media and attitude showed positive and significant correlation with impact of social media at 0.05 level of probability. The characteristics of respondents, family size, occupation, social participation, sources of information, innovativeness and risk orientation showed non significant relationship with impact of social media.

#### **5.3.4.4 Multiple regression analysis**

Coefficient of determination ( $R^2$ ) of the independent variables was 0.56. The 56.00 per cent of total variation in the impact of social media was explained by the selected 14 independent variables. The unexplained variation may be due to the factors not included in the study.

It is observed that the 't' test of significance indicates that the regression coefficient ( $\beta$ -value) were found to be significant for education, occupation, social participation, annual income, availability of social media, sources of information market orientation, utilization pattern and attitude towards social media. The regression coefficients of these variables were 0.461, 0.881, 1.424, 1.119, 1.180, 0.800, 0.279, 0.172 and 0.411 respectively. Which indicates that one unit change in the variables namely education, occupation, social participation, annual income, availability of social media, sources of information market orientation, utilization pattern and attitude towards social media would affect 0.461, 0.881, 1.424, 1.119, 1.180, 0.800, 0.279, 0.172 and 0.411 unit change in impact of social media respectively.

#### **5.3.5 Constraints**

The constraints faced by the orange growers while deriving benefits from social media for orange cultivation and other farming activities were studied. It was observed that most important constraint as considered

by great majority of the respondents was irregular internet connectivity with Garret value 78.60 and given I<sup>st</sup> rank followed by constraints in decreasing order of ranking were sometimes contents are not need based and irrelevant with the individual needs (71.40), authenticity of agricultural information shared through social media is less due to unavailability of professionals (60.68), very few social media services are available in agriculture (57.32), diversion of mind and consumption of more time on unwanted things (49.50), due to engagement in farm operations there is very less time to use social media (45.50), practical applicability and customization of messages received through social media is less (38.46), irregular electric supply at rural area (26.09) and high cost of social media services (23.24) having II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup>, VIII<sup>th</sup> and IX<sup>th</sup> ranks, respectively.

In case of social media non user orange growers, under the cultural constraints majority of the respondents had constraint as complex nature of social media and language barrier to use social media assuming II<sup>nd</sup> and VI<sup>th</sup> ranks with Garret score 69.36 and 36.38 respectively. There was no faith in social media information due to traditional belief in existing system was the cultural constraint and secured III rank among the total constraints with Garrent value 59.20. Irregular internet connectivity was the major infrastructural constraint among overall constraints with Garret value 78.64 assuming I<sup>st</sup> rank. Shortage of expertise to use the social media and lack of time to utilize the social media were the psychological constraints with Garret value 53.79 and 46.34 securing IV<sup>th</sup> and V<sup>th</sup> ranks respectively. High cost of social media services and irregular electric supply at rural area were the other constraints with Garret values 24.34 and 23.86 obtained VII<sup>th</sup> and VIII<sup>th</sup> ranks among the overall constraints respectively.

It is concluded from the above findings that ignorance of technical specification and lack of monitoring and evaluation while providing social media services to the orange growers in the study area caused difficulties to orange growers in deriving benefits from social media for orange cultivation and other farming activities.

### **5.3.6 Suggestions**

The suggestions offered by the orange growers overcome difficulties while using social media were recorded. Majority of the respondents were suggested that, provide the regular strong internet connectivity in rural area (74.33%) and social media should provide right information at right time in right format covering the emergency messages like climate changes / natural calamities (70.66%) and assigned I<sup>st</sup> and II<sup>nd</sup> ranks, respectively. The suggestions like practically applicable solutions with minimum input cost should be provided through social media was reported by 65.33 per cent of the respondents securing III<sup>rd</sup> rank followed by the respondents had suggested social media groups of farmers should be actively run by the state agricultural departments by providing instant and proper solutions to the farmer's field problems (63.66%), contents of social media applications should be developed and updated as per need, preference and geographical conditions (62.33%), Social media contents should be available in local/ regional languages (56.00%), orange growers should be motivated to use social media for adopting innovative agricultural practices (55.00%), technological cost should be mentioned in the message delivered (52.00%), daily interaction of experts with farmers of that area should be arranged regarding farm discussion through social media (50.66%), reliable farm literature should be made available through social media (44.39%), awareness must be created about using social media in agriculture (40.66%) and regular electricity supply should be provided (40.66%) securing IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup>, VIII<sup>th</sup>, IX<sup>th</sup>, X<sup>th</sup>, XI<sup>th</sup> and XII<sup>th</sup> ranks respectively.

Suggestion offered by the orange growers should be considered by policy making agencies, facilitators and authorities for fruitful application of social media in the field of agriculture and favourable outcome from future plan of action.

### **5.3.7 Reasons behind the fruit drop in oranges and reasons behind removal of orchard as perceived by orange growers**

Reasons specified by orange growers behind the fruit drop in oranges as perceived by them were recorded. 97.33 per cent of the

respondents given major reason of high temperature with water stress for longer duration, followed by high humidity due to continuous rainfall (94.33%), Phytophthora (Dinkya) (88.00%), fruit sucking moths (83.33%), dieback (Shendemar) (79.33%), fruit rot (due to fungus) (78.67%), fruit flies (Fal mashi) (74.33%), ineffective water management during Ambiya Bahar (Type of irrigation used) (72.67%), nutrient deficiency (65.33%), root rot (59.33%), declining sources of water and ground water level (48.67%), greening disease (44.33%), physiological fruit drop due to hormonal imbalance (39.00%), while fly and black fly (Kolshi) (34.67%) and 34.66 of the respondents expressed the reason behind fruit drop was poor drainage due to improper site of selection/ unsuitable soil, respectively.

In case of reasons behind removal of orchard as perceived by the respondents were, 97.67 per cent of the respondents had given the reason, unsatisfactory market price to oranges followed by high cost of cultivation and interculture operations (86.04%), unavailability of water at appropriate time (62.79%), prefer to grow other crops instead of orchard (06.98%), respectively.

Reasons stated by the respondents should be considered and should take necessary efforts to provide solutions on these reasons by government authorities, extension functionary and policy making agencies to overcome the reasons behind the fruit drop and removal of orchards.

## CHAPTER VI

### IMPLICATIONS

The implications emanated from the findings of the present study, “Impact of Social Media on Orange Growers” were reported in this section. The implications were presented in two parts. The first is related with the implications for action, while second part deals with the implications for the future research work. Based on the findings of the present study the following suggestions in the forms of implications are offered.

#### **6.1 Implications for action**

Implications for action have been presented as follows,

There is still a large gap persisting between the delivering and accessing of social media application in agriculture by the farmers. The central and the state government should take necessary steps to start more social media information service centers with adequate facilities by way of preparing long range, needful, useful and authentic information to needed to the farmers to reduce the existing operational deficiencies and problems in agriculture sector. It needs to provide latest agricultural technology at door step of every farmer. The basic requirements for successful implementation of social media applications in agriculture are electricity, hardware, appropriate software, telephony, network connectivity and policy guidelines.

1. The findings of the present study revealed that there is more contribution of mostly young orange growers with good experience in modification of orange cultivation practices in the study area. There are number of social media services available for agriculture, which are unknown to farmers and still many of them are not utilizing them properly. Therefore, it is implies that, state agriculture department and extension fonctionnaries in the field of agriculture should make efforts to involve and retain the interest of innovative orange growers in adopting modern agricultural practices by use of social media services. Also

majority of the extension functionaries should reach at root level and guide the farmers regarding adoption of social media tools.

2. It was understood from the analysis of personal, socio-economic, communicational and psychological characteristics of orange growers were impartially aware about significant contribution of education. Educated social media user orange growers had derived benefit from social media for orange cultivation and other farm operations and allied occupations also. They had knowledge of borduex paste application, crop regulation, weed management, harvesting and yield, nutrient management, insect pest and disease management through social media. Full adoption of improved orange cultivation practices was seen more among educated orange growers. Therefore, it implies that, extension agencies must involve educated orange growers in dissemination, familiarize and acquisition of newer practices/technologies through social media.
3. It is apparent from the findings of the present study that, majority of the orange growers had agriculture+horticulture+allied occupation as their main occupation. Orange growers had allied occupations like small scale dairy, krishi seva kendra for which purpose they were using social media like WhatsApp groups for advertising and selling their produce. The upshot of social media use is clearly perceptible. Therefore, it implies that, facilitators should implant such kind of services i. e. customized social media services in rural areas selling facilities of farm produce by smallest farmers on social media so that farmers can take advantage from the services and improve their socio-economic conditions.
4. The result of the present study depicted that majority of the social media user respondents had higher availability of social media like WhatsApp, YouTube, Facebook, Telegram and Kisan SMS portal through which they reap benefit for their orange cultivation. Similar type of other applications developed by private and government agencies should be updated as per needs from time to time and popularize them for bringing

into maximum use by orange growers. The state department of agriculture and other extension agencies mainly for farmers specifically for orange growers should provide latest orange cultivation technology, orange marketing technology specifically how to produce export quality oranges, post harvest related technology and also daily market rates for oranges in different markets and accurate information about climate change also.

5. The findings of the present study reported that, majority of the respondents in the study area had better social participation in shetkari sanghatana and co-operatives. Therefore, it implies that, authorities should pivot on their participation as nearly three fourth of the social media user respondents were agreed to the statement that, social status is increased due to use of social media. They should be motivated for more social participation in different organization through social media for their personal, socio-economic, communicational and psychological improvement.
6. From the findings of the present study, it is revealed that majority of the respondents were regularly taking information from sources like smart phones, television, radio, neighbours, agricultural supervisors and agricultural assistants. Similarly, it is proved from results of the study that, the utilization pattern of social media was higher to moderate level. Therefore, it implies that, state agricultural departments should focus more on online broadcasting of various orange cultivation related programmes regularly with more frequency to fill the gap of assistance through manpower to the orange growers as majority of the respondents using smart phones as a source of information.
7. The findings of the present study indicated that majority of the orange growers had highly favourable attitude towards social media. Majority of the social media user orange growers were strongly agreed that, it provides weather forecasting updates by single click, audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form, multimedia features attracts the

use of social media in farming, it provides information in regional/local languages and through social media I can learn from other farmers and agricultural experts. Thus, social media services are really useful for the orange growers. Therefore; study suggested that service providing agencies and state agriculture department and extension functionnaries in the field of agriculture should make available such type of services on different social media platforms for the orchard growing farmers as it is main fruit crop grown in the Vidarbha region of Maharashtra.

8. The results of impact of social media reported that, changes were observed in all eight impact parameters under study over social media non user in study area. The 38.17 per cent change was observed in knowledge level over social media non user, whereas 30.27 per cent change was observed in adoption of improved orange cultivation practices, 11.96 per cent change in production, 12.39 per cent change in orchard management, 28.73 per cent change in annual income, 19.41 per cent change in family expenditure, 19.32 per cent change in material possession and 49.34 per cent change in self confidence, respectively. The highest changes were observed in self confidence (49.34%), followed by knowledge level (38.17%) and adoption (30.27%). The overall change in impact of social media was 26.19 per cent. From these findings, it is concluded that, social media is one of the important connecting link between orange growers and technology. As it helps to increase the knowledge and self confidence, so increase in self confidence helps for overall development of human being specially the orange growers. Therefore, it is suggested to use social media with more modification in the field of agriculture.
9. The findings of the present study indicated that social media has positive impact on orange growers but it has seen that despite of increased level of adoption and self confidence was observed to be relatively less while making use of social media for agriculture. Therefore to harvest more benefits from social media; services extension functionnaries should motivate orange growers to take advantage of available social media services.

10. Maharashtra state experiencing lowers rates of orange and sometimes the available produce fails to get better prices even if the quality is good due to unawareness about available marketing facilities which may be available through social media. There is need to give maximum focus on utilization of social media for advertising and marketing purpose and establishment of faith among the orange growers by providing trustworthy facilities specifically in rural villages and make judicious use of available social media. It is observed from research findings that orange growers in the study area had higher availability of active social media like YouTube, Facebook and WhatsApp groups reached upto maximum farmers in the last five years since the mobile recharge with data packs were available at cheap rates. Therefore, extension agencies should create awareness to increase efficient use of social media and popularize modern technologies such as Israel technique of orange cultivation and others, in such areas and also provide special agricultural services by facilitators at reasonable rates to the farmers so that small farmers should be able to afford those services.
11. The findings of the multiple regression analysis revealed that education, occupation, social participation, annual income, availability of social media, sources of information, market orientation, utilization pattern of social media and attitude towards social media had significant contribution in influencing impact of social media. Henceforth, policy makers should focus on these parameters while planning and formulating future training programmes and services for orange growers.
12. The majority of the social media user orange growers from study area experienced the major constraints irregular internet connectivity, sometimes contents are not need based and irrelevant with the individual needs, authenticity of agricultural information shared through social media is less due to unavailability of professionals. Also practicability of technological messages with cost are not known or clearly mentioned. In case of social media non user orange growers, major constraints were irregular internet connectivity, complex nature of

social media and no faith in social media information due to traditional belief in existing system. Therefore, facilitators and government authorities should make provision of better and highly customized services through social media and improve the network issue and regular supply of electricity in rural area for better development of orange growers and successful use of social media to reap maximum benefits indirectly by means of social media. While delivery of technical messages through social media, message sending agency should conform it's practical applicability on farmers field and also it's cost should be clearly mentioned. Orange growers should be motivated and encouraged to use social media. Proper updation of available social media applications on the basis of current need and geographical area. In addition to this for successful implementation and proper utilization of guidance taken from social media there should be regular monitoring and evaluation or follow up of services should be provided by social media with farmer's feedback mechanism.

13. The results from the study area revealed that, majority of the orange growers facing difficulty in better production of orange due to major problem of fruit drop in the study area due to various reasons such as high temperature with water stress for longer duration, high humidity due to continuous rainfall, phytophthora, fruit sucking moths, dieback, fruit rot, fruit flies and nutrient deficiencies. Also, in some area orange growers were removed their orchard due to different reasons such as unsatisfactory market prices, high cost of cultivation and interculture operations, unavailability of water at appropriate time, prefer to grow other crops instead of orchard, decided in frustration and due to old age of orchard. Therefore, it is suggested to give more emphasis on this sensitive issue regarding reasons behind fruit drop and removal of orchards, also special messages should be provided by using multimedia on social media, how to control fruit drop and how to maintain better orange orchards to the orange growers with proper solution to withstand, recover and substitute the losses due these reasons.

14. State agriculture departments or social media service providers for agriculture purpose should keep record of registered farmers for better evaluation of provided services and future investigation with feedback mechanism.

#### **14.2 Implications for future research**

1. Similar studies can be designed and worked out for other locations across Maharashtra, where majority of the fruit crop with modernization of techniques is being carried on.
2. It is suggested to carry out comparative study of orange growers with before and after use of social media in orange cultivation or any other fruit crop or major profit making crops.
3. Social media is designed and its applications for use of agriculture are emerging day by day as per the suggested and required facilities to make it available to the targeted users. In the present study, investigator has studied mainly knowledge, adoption, production, orchard management, annual income, family expenditure, material possession and self confidence of orange growers using social media therefore there is scope to future researcher to consider contribution in decision making and detail evaluation of content regarding agriculture offered by different social media.
4. Similar study can be carried out with the experimental research design with multistage sampling procedure, by training the respondents and studying the impact after specific period.
5. It is observed that the selected personal, socio-economic, communicational and psychological characteristics of the orange growers have explained low variation in the change in impact parameters. Hence, it is necessary to undertake research on different profile characters of the orange growers.

6. Success stories of orange grower can be documented who made proper use of social media for orange cultivation and gained more profit in his orange production and quality production.
7. Content analysis of different social media can be studied by future researchers.
8. Close and frequent interaction between orange growers and extension officials and research system for diagnosing problems of farmers and formulating need based e-Agriculture policies to make them reach upto farmers.
9. There is need to conduct indepth research, how to control fruit drop in oranges and to stop the orange growers from removal of orchards (except old orchards) and also need to focus on post harvest technology in orange, orange export, marketing technology and how to get more remunerative prices/ rates for oranges.

## CHAPTER VII

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## VITA

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Sl. No	Name of Degree Awarded	Year in which obtained	Division/ Class	Name of Board/ awarding University	Subjects
1	M.Sc. (Agri)	2017	Distinction	Dr. PDKV, Akola	Extension Education
2	B.Sc. (Agri.)	2015	First Class	Dr. PDKV, Akola	Agriculture
3	H.S.C.	2011	First Class	Amravati Board	Science
4	S.S.C.	2009	First Class	Amravati Board	General

6. **Research papers published** : 7
7. **Field of interest** : Teaching, Research and Extension Activities

**Place:** Akola

**Date:** / /2022

Signature of student

**(Datir Preeti Rambhau)**



## COLLEGE OF AGRICULTURE

DR. PANJABRAO DESHMUKH KRISHI VIDYAPEETH  
MUL (SOMNATH), Ta. Dist. CHANDRAPUR

Dr. Vishnukant S. Tekale,  
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No. AD/Mul/PRD/Ph.D. / 103 /2021

Date: 16 / 06 /2021

To,

Respected Sir/ Madam,

I am pleased to inform you that, Miss. Datir Preeti Rambhau, Ph.D. Scholar of Deptt. of Extension Education has undertaken the research study entitled "Impact of Social Media on Orange Growers" as a part of her Ph. D. Programme under my guidance. As a part of her research study she is developing Attitude Scale to measure the Attitude of Orange Growers towards Social Media.

In this connection now she wants to finalize statements of each main parameter. So she has prepared statements and presented in Annexure-A. The each of these attitude statements has been provided to facilitate your judgments. Based on review of literature and discussion with experts, various possible and important attitude statements have been identified.


In this regards, considering your high academic qualification and vast experience in the field of Extension Education, we are pleased to seek your valuable judgment on the relevancy of these statements for development of attitude scale given in Annexure- A.

It is also requested to record your valuable judgment by putting (✓) mark in the appropriate column to say **Most Relevant, Relevant** and **Not Relevant**. If you feel any other statement are important, kindly add the same or those statement not important you can delete it with your judgment and also offer your critical comments for improvement.

The filled Annexure- A may please be send as early as possible to Miss. Datir Preeti Rambhau, Ph.D. Scholar, Department of Agricultural Extension and Communication, Dr. PDKV, Akola-444104 (MS) or Mailed back in the enclosed self – addressed stamped envelope or send on following email address, [preetidatir44@gmail.com](mailto:preetidatir44@gmail.com), WhatsApp No. +91 9356208072.

Your kind cooperation in the academic endeavor is highly solicited.

Yours Sincerely

  
Chairman & Associate Dean  
College of Agriculture,  
Dr. PDKV, Mul (Somnath), Chandrapur

Encl: 1) Annexure-A

### Appendix-I

**DEPARTMENT OF EXTENSION EDUCATION, Dr. PDKV, AKOLA**

**Researcher's Name : Datir Preeti Rambhau**

#### **Statements for developing scale to measure attitude of orange growers towards social media**

(Please indicate relevancy to the following statements by putting tick mark (√) in one of the column)

(**Note:** Blank rows are kept if the expertise want to add statements)

<b>Sl. No.</b>	<b>Statements</b>	<b>MR</b>	<b>R</b>	<b>NR</b>
1	I am well aware about modern technologies in orange cultivation through social media			
2	Social media makes me aware about current happenings in agriculture			
3	Use of social media for orange cultivation purpose is misutilization of time and money			
4	It is effective media than any other media for accessing agricultural information			
5	Information provided by social media is at relatively low cost			
6	I acquired recent agricultural technological knowledge by attaining different online trainings, workshops, group discussions, conferences and demonstrations, etc			
7	Multimedia feature attracts the use of social media in farming			
8	Social media encourages the use of improved crop production practices and post harvest technologies			
9	There is need of skill and expertise for using social media			
10	Agricultural information received through social media is difficult to use at grass root level			
11	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.			
12	Information received through social media is many times not specific, unwanted and vague			
13	Internet connectivity is one of the problem in use of social media			
14	Social media is not compatible as that of traditional media			
15	It is possible to discuss in detail about orange related			

	topics through social media			
16	I found quick access to agricultural inputs through social media			
17	Social media provides information in regional/local languages			
18	It makes possible to collect agricultural data from different geographical areas			
19	Feedback of social media is faster than other media			
20	Change in production and productivity are easily observable due to social media			
21	Social media immediately provides information about pests and disease management			
22	It provides weather forecasting updates by single click			
23	Social media directs orange growers to stay updated about orchard management practices			
24	Social media contents are authentic, complete and interactive			
25	Sometimes the market prices are non-reliably presented through social media			
26	It is resourceful tool to disseminate orange related latest technologies			
27	Time management with quality output is possible			
28	It is useful as it provides information in audio-visual form			
29	Social media is easy to operate and tackle by farmers			
30	I can post audio-visuals of farming practices and experiences on social media			
31	Through social media I can learn from other farmers and agricultural experts			
32	Economic transaction should be possible on social media			
33	Social media is useful in providing opportunities to reach to unreach farmers			
34	It encourages towards agribusiness and explore myself			
35	Social media creates network with stakeholders for marketing oranges			
36	It helps in making groups of farmers having common interest			
37	It is powerful tool for e-marketing of oranges			
38	I started grading, packaging of oranges after I knew it's benefits from social media			
39	Social media helps to prepare production plan and value addition			

40	Direct selling of oranges is possible through social media without middleman			
41	It helps to get knowledge about orange export			
42	Product branding is possible due to social media			
43	Economic benefit is possible due to social media			
44	Social status is increased due to use of social media by orange growers			
45	Social media increases confidence among the orange growers.			
46				
47				
48				
49				
50				

**MR-** Most Relevant, **R-** Relevant, **NR-** Not Relevant

**Final Comments**

---



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Thanks a lot for completing the questionnaire and sparing your valuable time.

**Sign** :

**Name** :

**Designation** :

## Appendix-II

### Relevancy percentage and Mean relevancy score of selected scale statements

Sl. No.	Statements	Relevancy %	MRS
1	I am well aware about modern technologies in orange cultivation through social media	81.88	2.45
2	Social media makes me aware about current happenings in agriculture	86.95	2.60
3	Use of social media for orange cultivation purpose is misutilization of time and money	63.40	1.90
4	It is effective media than any other media for accessing agricultural information	54.34	1.63
5	Information provided by social media is at relatively low cost	85.14	2.55
6	I acquired recent agricultural technological knowledge by attaining different online trainings, workshops, group discussions, conferences and demonstrations, etc	64.49	1.93
7	Multimedia feature attracts the use of social media in farming	86.23	2.58
8	Social media encourages the use of improved crop production practices and post harvest technologies	82.60	2.47
9	There is need of skill and expertise for using social media	82.97	2.48
10	Agricultural information received through social media is difficult to use at grass root level	73.55	2.20
11	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.	85.14	2.55
12	Information received through social media is many times not specific, unwanted and vague	62.31	1.86
13	Internet connectivity is one of the problem in use of social media	84.42	2.53
14	Social media is not compatible as that of traditional media	71.73	2.15
15	It is possible to discuss in detail about orange related topics through social media	78.62	2.35
16	I found quick access to agricultural inputs through social media	64.13	1.92
17	Social media provides information in regional/local languages	82.97	2.48
18	It makes possible to collect agricultural data from different geographical areas	80.79	2.42
19	Feedback of social media is faster than other media	63.04	1.89
20	Change in production and productivity are easily	63.40 <sup>312</sup>	1.90

	observable due to social media		
21	Social media immediately provides information about pests and disease management	90.21	2.70
22	It provides weather forecasting updates by single click	88.40	2.65
23	Social media directs orange growers to stay updated about orchard management practices	65.94	1.97
24	Social media contents are authentic, complete and interactive	72.46	2.17
25	Sometimes the market prices are non-reliably presented through social media	63.76	1.97
26	It is resourceful tool to disseminate orange related latest technologies	82.97	2.48
27	Time management with quality output is possible	77.89	2.33
28	It is useful as it provides information in audio-visual form	64.49	1.93
29	Social media is easy to operate and tackle by farmers	76.44	2.29
30	I can post audio-visuals of farming practices and experiences on social media	61.59	1.84
31	Through social media I can learn from other farmers and agricultural experts	83.33	2.50
32	Economic transaction should be possible on social media	60.86	1.82
33	Social media is useful in providing opportunities to reach to unreach farmers	84.42	2.53
34	It encourages towards agribusiness and explore myself	82.24	2.46
35	Social media creates network with stakeholders for marketing oranges	84.78	2.54
36	It helps in making groups of farmers having common interest	84.78	2.54
37	It is powerful tool for e-marketing of oranges	85.14	2.55
38	I started grading, packaging of oranges after I knew it's benefits from social media	57.60	1.72
39	Social media helps to prepare production plan and value addition	80.07	2.40
40	Direct selling of oranges is possible through social media without middleman	85.14	2.55
41	It helps to get knowledge about orange export	86.23	2.58
42	Product branding is possible due to social media	81.88	2.45
43	Economic benefit is possible due to social media	81.88	2.45
44	Social status is increased due to use of social media by orange growers	77.53	2.32
45	Social media increases confidence among the orange growers.	82.60	2.47

### Appendix-III

Attitude scale for item analysis (Based on relevancy percentage >66% and MRS >2.00)

Sl. No.	Statements	SA	A	UD	DA	SDA
1	I am well aware about modern technologies in orange cultivation through social media					
2	Social media makes me aware about current happenings in agriculture					
3	Social media encourages the use of improved crop production practices and post harvest technologies					
4	Multimedia feature attracts the use of social media in farming					
5	Information provided by social media is at relatively high cost (*)					
6	It is resourceful tool to disseminate orange related latest technologies					
7	Agricultural information received through social media is difficult to use at grass root level					
8	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.					
9	Social media is not compatible as that of traditional media (*)					
10	Internet connectivity is not a problem in use of social media (*)					
11	Social media provides information in regional/local languages					
12	It is possible to discuss in detail about orange related topics through social media					
13	It makes possible to collect agricultural data from different geographical areas					
14	Social media is useful in providing opportunities to reach to unreachable farmers					
15	It provides weather forecasting updates by single click					

16	It encourages towards agribusiness and explore myself					
17	There is no need of skill and expertise for using social media (*)					
18	Time management with quality output is possible					
19	Social media is easy to operate and tackle by farmers					
20	Through social media I can learn from other farmers and agricultural experts					
21	Social media immediately provides information about pest and disease management					
22	Social media contents are not authentic, complete and interactive (*)					
23	It helps to make group of farmers having common interest					
24	Social media creates network with stakeholders for marketing of oranges					
25	It is powerful tool for e-marketing of oranges					
26	Social status is increased due to use of social media by orange growers					
27	Direct selling of oranges is possible through social media without middleman					
28	It helps to get knowledge about orange export					
29	Product branding is possible due to social media					
30	Economic benefit is possible due to social media					
31	Social media helps to prepare production plan and value addition					
32	It increases confidence among the orange growers.					

## Appendix-IV

### t value of selected attitude scale statements after item analysis

Sl. No.	Statements	‘t’ value
1	I am well aware about modern technologies in orange cultivation through social media	2.910
2	Social media makes me aware about current happenings in agriculture	2.979
3	Social media encourages the use of improved crop production practices and post harvest technologies	-0.191
4	Multimedia feature attracts the use of social media in farming	3.250
5	Information provided by social media is at relatively high cost (*)	4.230 1
6	It is resourceful tool to disseminate orange related latest technologies	-0.184
7	Agricultural information received through social media is difficult to use at grass root level	1.909
8	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.	2.049
9	Social media is not compatible as that of traditional media (*)	0.582
10	Internet connectivity is not a problem in use of social media (*)	2.049
11	Social media provides information in regional/local languages	4.024
12	It is possible to discuss in detail about orange related topics through social media	1.00
13	It makes possible to collect agricultural data from different geographical areas	1.755
14	Social media is useful in providing opportunities to reach to unreach farmers	1.523
15	It provides weather forecasting updates by single click	2.861
16	It encourages towards agribusiness and explore myself	1.320
17	There is no need of skill and expertise for using social media (*)	4.431
18	Time management with quality output is possible	2.703
19	Social media is easy to operate and tackle by farmers	3.579
20	Through social media I can learn from other farmers and agricultural experts	3.464

21	Social media immediately provides information about pest and disease management	2.928
22	Social media contents are not authentic, complete and interactive (*)	2.928
23	It helps to make group of farmers having common interest	2.060
24	Social media creates network with stakeholders for marketing of oranges	1.797
25	It is powerful tool for e-marketing of oranges	2.138
26	Social status is increased due to use of social media by orange growers	3.160
27	Direct selling of oranges is possible through social media without middleman	3.157
28	It helps to get knowledge about orange export	2.529
29	Product branding is possible due to social media	3.806
30	Economic benefit is possible due to social media	4.365
31	Social media helps to prepare production plan and value addition	1.251
32	It increases confidence among the orange growers.	2.449

**Appendix-V**  
**Final selected statements of attitude scale (Based on t value >1.75, @**  
**5% level of significance)**

Sl. No	Statements
1	I am well aware about modern technologies in orange cultivation through social media
2	Social media makes me aware about current happenings in agriculture
3	Multimedia feature attracts the use of social media in farming
4	Information provided by social media is at relatively high cost (-ve)
5	Agricultural information received through social media is difficult to use at grass root level (-ve)
6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.
7	Internet connectivity is not a problem in use of social media (-ve)
8	Social media provides information in regional/local languages
9	It makes possible to collect agricultural data from different geographical areas
10	It provides weather forecasting updates by single click
11	There is no need of skill and expertise for using social media (-ve)
12	Time management with quality output is possible
13	Social media is easy to operate and tackle by farmers
14	Through social media I can learn from other farmers and agricultural experts
15	Social media immediately provides information about pest and disease management
16	Social media contents are not authentic, complete and interactive (-ve)
17	It helps to make group of farmers having common interest
18	It is powerful tool for e-marketing of oranges
19	Social status is increased due to use of social media by orange growers
20	Direct selling of oranges is possible through social media without middleman
21	It helps to get knowledge about orange export
22	Product branding is possible due to social media
23	Economic benefit is possible due to social media
24	It increases confidence among the orange growers

**Appendix-VI**  
**Final format of the attitude scale**

Sl. No.	Statements	S A	A	U D	D A	SD A
1	I am well aware about modern technologies in orange cultivation through social media					
2	Social media makes me aware about current happenings in agriculture					
3	Multimedia feature attracts the use of social media in farming					
4	Information provided by social media is at relatively high cost (-ve)					
5	Agricultural information received through social media is difficult to use at grass root level (-ve)					
6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.					
7	Internet connectivity is not a problem in use of social media (-ve)					
8	Social media provides information in regional/local languages					
9	It makes possible to collect agricultural data from different geographical areas					
10	It provides weather forecasting updates by single click					
11	There is no need of skill and expertise for using social media (-ve)					
12	Time management with quality output is possible					
13	Social media is easy to operate and tackle by farmers					
14	Through social media I can learn from other farmers and agricultural experts					
15	Social media immediately provides information					

	about pest and disease management					
16	Social media contents are not authentic, complete and interactive (-ve)					
17	It helps to make group of farmers having common interest					
18	It is powerful tool for e-marketing of oranges					
19	Social status is increased due to use of social media by orange growers					
20	Direct selling of oranges is possible through social media without middleman					
21	It helps to get knowledge about orange export					
22	Product branding is possible due to social media					
23	Economic benefit is possible due to social media					
24	It increases confidence among the orange growers					

## Appendix-VII

### INTERVIEW SCHEDULE

**Research Title : IMPACT OF SOCIAL MEDIA ON ORANGE GROWERS**

**Name of Researcher : Datir Preeti Rambhau**

Ph.D. Scholar,  
Department of Extension Education,  
Dr. PDKV, Akola

### GENERAL INFORMATION

**Name of orange grower:** \_\_\_\_\_

**Age:** \_\_\_\_\_ **years**

**Village:**

\_\_\_\_\_ **Taluka** \_\_\_\_\_

**District:** \_\_\_\_\_ **Mobile No.:**

### PART – I

**1) Education:** \_\_\_\_\_ **std**

**2) Family Size:** Male: \_\_\_\_\_ Female: \_\_\_\_\_ Children: \_\_\_\_\_ Total: \_\_\_\_\_  
members

**3) Occupation :**

Please indicate activities in which you and your family members are regularly engaged and get major income out of it.

Sr. No.	Category	Specify (√)
1.	Agriculture + Horticulture + labour	
2.	Agriculture + Horticulture	
3.	Agriculture + Horticulture + allied occupation	
4.	Agriculture + Horticulture + business	
5.	Agriculture + Horticulture + services	

**4) Land holding :**

a) Rainfed \_\_\_\_\_ ha. c) Barren \_\_\_\_\_ ha.

b) Irrigated \_\_\_\_\_ ha. d) Total \_\_\_\_\_ ha.

5) **Size of orchard:** \_\_\_\_\_(ha)

6) **Farming experience:** \_\_\_\_\_ years

7) **Social participation:**

Please indicate whether you are member or office bearer of any of the following social organization.

Sr. No.	Organization	Member	Office bearer
<b>A)</b>	<b>Formal organization</b>		
1	Grampanchayat		
2	Panchayat Samiti		
3	Zilla Parishad		
4	School Committee		
5	Credit Co-operative Society		
6	Dairy Co-operative Society		
7	Other		
<b>B)</b>	<b>Informal organization</b>		
1	Shetakari Sanghatana		
2	Self-Help Group		
3	Bhajan Mandal		
4	Youth Club		
5	Other		

8) **Annual Income:** Rs \_\_\_\_\_

9) **Availability of social media**

Please indicate which of the following social media available in your smart phone.

Sl. No	Social Media	Yes/No
1	Whatsapp	
2	YouTube	
3	Kisan SMS portal	
4	Facebook	
5	Twitter	

6	Telegram	
7	Snapchat	
8	Other	

### 10) Sources of Information

Please indicate your frequency of contacts with the following sources of information for getting information.

Sl. No.	Source of information	Frequency of contact		
		Regular (2)	Occasional (1)	Never (0)
<b>A)</b>	<b>Localite sources</b>			
1	Sarpanch			
2	Friends/Relatives			
3	Neighbours			
4	Progressive farmer/Krishimitra			
5	Other			
<b>B)</b>	<b>Cosmopolite sources</b>			
1	Gramsevak			
2	Talathi			
3	Agricultural Assistant			
4	Agricultural Supervisor			
5	Mandal Agriculture Officer			
6	Taluka Agriculture Officer			
7	Sub Divisional Agriculture Officer			
8	District Superintendent Agriculture Officer			
9	University scientist			
10	KVK scientist			
11	Representatives of NGO's			
12	Technology resources: National Research Centre for Citrus (ICAR), Dr. PDKV, Akola			
13	Regional Fruit Research Station, Katol, Dist-Nagpur			
14	Research station, Achalpur, Dist-Amravati			
<b>C)</b>	<b>Mass media</b>			
1	Radio			
2	Television			
3	Newspaper			
4	Farm magazine			
5	Smartphone			
6	Computer with internet			

### 11) Innovativeness (Singh, 1972)

Please give the response to the following statements from any of three options given against each statement.

Sl. No.	Statements	Agree	Undecided	Disagree
1	I feel restless till I try out new activities, I have heard or read or seen on social media (*)			
2	They talk of many new activities these days, but who knows, if they are better than old ones.(*)			
3	After all our forefathers were wise in their farming practices and I did not see any reason for changing these old methods (*)			
4	Often new activities are not successful however, if they are promising, I would surely like to adopt them			
5	From time to time, I have heard of several new activities and I have tried most of these in the last few years			
6	Somehow I believe that the traditional ways of farming are the best			

### 12) Risk Orientation (Supe, 1969)

Please give the response to the following statements from any of five options against each statement.

Sl. No.	Statements	SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
	<b>Positive</b>					
	<b>Negative</b>					
1	A orange grower should rather take more of a chance in making a big profit than to be contented with a smaller, but less risky profit.					
2	A orange grower who is willing to take greater risks than the average farmer, usually do better financially.					
3	It is good for orange growers to take risks when he knows his chance to success is fairly high					

4	Trying an entirely new method in farming by a orange grower involves risk, but it is worth doing it.					
5	A orange grower should grow large number of crops to avoid greater risks involved in growing one or two crops(*)					
6	It is better for a orange grower not to try new farming method unless most other farmers have used them with success (*)					

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

### 13)Market orientation (Samanta, 1977)

Please state your response to the following statements from any of five options given against each statement.

Sl. No.	Statements	SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1	Market news is not important for farmers to know when to send his produce to the market*					
2	One should know different forms of produce and its prices in the market					
3	Orange growers can get good prices by grading his produce					
4	One should purchase his inputs from the shop where his relative purchases					
5	One should grow those intercrops which have more market demand					
6	One should sell his produce to the nearest market irrespective of risk					

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

#### 14) Utilization pattern of social media

Please state your frequency, extent of reach and perceived satisfaction level in relation with utilization pattern of social media

##### A) Frequency of use of social media

Sl. No.	Statements	Daily (6)	More than 2 times a week (5)	Once a week (4)	Once a fortnight (3)	Occasionally (2)	Rarely (1)
1	WhatsApp						
2	YouTube						
3	Kisan SMS portal						
4	Facebook						
5	Twitter						
6	Telegram						
7	Snapchat						
8	Other						

##### B) Extent of reach

Sl. No.	Statements	Per day (4)	Per week (3)	Per fortnight (2)	Per month (1)
1	Messages delivered in the form of text, audio and video				
2	Messages received by orange grower				
3	Messages utilized by the orange grower				
4	No of phone calls made				
5	No of online programmes/ workshops participated				
6	No of call back facilities availed				
7	No of help line services availed				

### C) Perceived satisfaction

Sl. No.	Statements	HS (4)	S (3)	UD (2)	U (1)	HU (0)
1	Services provided by social media are timely					
2	Social media services provide all the needed information					
3	Services provided by social media are highly useful					
4	The Social medias contain enough knowledge to solve field problems					
5	Social medias provides problem specific advisories					
6	Advices provided by social media are highly relevant					
7	The advices provided by social media are worth paying					

**HS- Highly satisfied, S- Satisfied, UD- Undecided, U-Unsatisfied, HU- Highly Unsatisfied**

### Part -II

#### Attitude of orange growers towards social media

Please indicate your agreements/disagreement to the following statements from any five options given against each statement.

Sl. No.	Statements	SA	A	UD	DA	SDA
1	I am well aware about modern technologies in orange cultivation through social media					
2	Social media makes me aware about current happenings in agriculture					
3	Multimedia feature attracts the use of social media in farming					
4	Information provided by social media is at relatively high cost (-ve)					
5	Agricultural information received through social media is difficult to use at grass root level (-ve)					

6	Audio-visual feature of social media helps to demonstrate complex farm technology into an easy and understandable form.					
7	Internet connectivity is not a problem in use of social media (-ve)					
8	Social media provides information in regional/local languages					
9	It makes possible to collect agricultural data from different geographical areas					
10	It provides weather forecasting updates by single click					
11	There is no need of skill and expertise for using social media (-ve)					
12	Time management with quality output is possible					
13	Social media is easy to operate and tackle by farmers					
14	Through social media I can learn from other farmers and agricultural experts					
15	Social media immediately provides information about pest and disease management					
16	Social media contents are not authentic, complete and interactive (-ve)					
17	It helps to make group of farmers having common interest					
18	It is powerful tool for e-marketing of oranges					
19	Social status is increased due to use of social media by orange growers					
20	Direct selling of oranges is possible through social media without middleman					
21	It helps to get knowledge about orange export					
22	Product branding is possible due to social media					

23	Economic benefit is possible due to social media					
24	It increases confidence among the orange growers					

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

### Part -III

#### Impact of social media on orange growers

##### A) Knowledge

##### B) Adoption

Sl. No	Name of practices	Recommended practices by Dr. PDKV, Akola	Knowledge		Adoption		
			Yes	No	F A	P A	N A
1	<b>Varieties cultivated</b>	Nagpur orange, Nagpur Seedless, PDKV Orange-5 etc.					
2	<b>Suitable land</b>  <b>Land preparation</b>	i. Soil type- (Medium black with good drainage) ii. Soil P <sup>H</sup> - (P <sup>H</sup> 6.5 to 7.5) iii. CaCO <sub>3</sub> - (Below 10%)  Ploughing, Levelling and removing weeds Pit size-					
3	<b>Planting material</b>	i. Recommended rootstock- (Jamberi, Rangpur & Olimo) ii. Quality budding- a. Budding on 20 to 30 cm height b. Budding should be pencil size thickness c. Budding height-75 to 100 cm d. Budding should be healthy and disease free e. Source of planting material (From registered nursery)					

		of Maharashtra/ Accrediated by central government- NHB)					
I)	<b>Planting season</b>	Rainy season- in the month of July-August / October-November					
II)	<b>Spacing</b>	(6m x 6m) or 6m x 3m In pits of 50 cm. X50cm.X50cm. size (1m x 1m x 1m)					
4	<b>Nutrient management</b>	i.Doses a.FYM- 50kg FYM+ 5kg Neem cake b. Fertilizer-1200 g N, 400 g P and 400 g K c.Micronutrients (Cuso <sub>4</sub> , Znso <sub>4</sub> , Mgso <sub>4</sub> ) soil application- 100 g/plant each and spraying-0.2% each ii.Time of application-After bahar treatment Mrig Bahar- June, Ambia Bahar- January iii.Method of application- By ring method					
5	<b>Irrigation management</b>	a. Drip irrigation – 51 to 198 liter/day/plant b. Double ring method- 12-15 days during winter, 8-10 days interval in summer c. Furrow					
6	<b>Training and pruning</b>	i.Time- After harvesting of fruit ii.Practices- a. Initially shoots upto 40-50 cm from the ground level should be removed. b. Cross twigs and water sucker to be removed early					

		<p>c. All diseased, injured and drooping branches and dead wood are to be removed periodically.</p> <p>d. After deadwood removal, fungicide application over it</p>					
7	<b>Intercropping</b>	<p>i. Recommended crop- Leguminous crop, vegetable crop.</p> <p>ii. Recommended time- During the initial 3 to 4 years after planting.</p>					
8	<b>Borduex paste application</b>	<p>i. Preparation of Borduex paste- 1% Borduex paste: 1 kg lime= 1kg <math>\text{CuSO}_4</math> + 10 liter water</p> <p>ii. Time of application- Twice in a year: June and October</p>					
9	<b>Use of bio-fertilizers and bio-fungicides</b>	Azotobactor, PSB & trichoderma					
10	<b>Crop regulation (Ambia, Mrug, Hast Bahar treatment) Water stress treatment</b>	<p>Feb flowering-Amba, June flowering-Mrig, Oct flowering- Hast bahar In bahar treatment roots are exposed to sun by removing upto 7-10 cm soil around 40-60 cm radius of tree trunk</p> <p>i. Mrig Bahar- 50 days (25 April to 15 June)</p> <p>ii. Ambia Bahar- 30 days(15 December to 15</p>					

		January)					
10	<b>Fruit drop control</b>	<p>i. Fungal fruit drop- Spraying carbendazime 1gm in 1 ltr of water</p> <p>ii. Hormonal deficiency-NAA 10ppm (1gm) + Urea 1% (10kg) + 100 liter water</p>					
12	<b>Insect pest management</b>	<p>i.Citrus psylla- Spraying with Thiyomethoxin 25 WG 1gm in 10lit water or imidacloprid 17.8% 1.5ml in 10 lit water.</p> <p>ii.Bark eating caterpillar- Clean affected portion of trunk/branch, Inject petrol in the bore hole and plug the hole with mud.</p> <p>iii.Fruit sucking moth- Dispose all fallen and decaying fruit, create smoke, Set up light trap, Spray neem oil 100 ml in 10 lit water</p> <p>iv.Black fly- Spraying with 5% nimboli extract at 15 days interval.</p>					
13	<b>Disease management</b> (twig blight, gummosis, damping off, root and collar rot)	<p>i.Phytophthora-</p> <ul style="list-style-type: none"> <li>• Open the root zone in October</li> <li>• Remove decayed roots and leave it as such for a day</li> <li>• Drench 15 lit of Rodomil solution (3g/lit)</li> <li>• Refill the root zone with soil free from infestation.</li> <li>• Apply 300g Urea +</li> </ul>					

		<p>300g SSP + 300g MOP + 5 kg Neem cake. Repeat after 15 days the Rodomil application</p> <ul style="list-style-type: none"> <li>• Cut all the branches 30-45 cm from tip and spray immediately with Alliate 2g/lit.</li> </ul> <p>ii. Tip drying</p> <ul style="list-style-type: none"> <li>• Cut the dried branches</li> <li>• Apply Carbendazime 50 wp on it.</li> </ul>					
14	<b>Weed management</b>	<p>i. Weeding</p> <p>ii. Spraying on weed- Glyphosate 1%(100ml)+ Urea 2%(20gm) in 10 liter of water</p>					
15	<b>Thining</b>	Thining of extra fruits for maintaining better quality- 700 to 900 fruits per plant					
16	<b>Supporting/Staking</b>	Giving support to bearing trees with the help of bamboo					
17	<b>Harvesting and yield (after 4-6th year)</b>	<p>i. Harvesting time 200 to 240 days after flowering</p> <p>Mrig bahar- Feb- Mar, Ambia bahar-Oct-Nov</p> <p>Scientific characteristics</p> <p>Colour of fruit- Yellowish orange</p> <p>Average yield-4.8 tonnes/acre</p>					
		PKV citrus harvester for harvesting of citrus fruits					
18	<b>Post harvest</b>	Treatment with					

	<b>management</b>	Bavistin(1000ppm) to develop attractive yellowish green to orange colour fruits					
	<b>Grading</b>	On the basis of size and colour					
	<b>Storage</b>	Evaporative cool chamber at 8-10 <sup>0</sup> C and 90-95% humidity					
	<b>Packaging (wash with chlorine (1000ppm), coated with stayfresh wax (2.5%) containing Bavistin (4000ppm))</b>	Wooden box for distance market, bamboo/mulbery baskets for local marketing. Chopped dry grass for padding. Use of ventilated corrugated fiber boarded cartons in place of wooden box is highly beneficial					
	<b>Transportation</b>	By rail or road as ordinary cargos without refrigeration					
	<b>Marketing</b>	Grower-Pre-harvest constructor-commission agents-retailers-consumers Grower-Wholesalers-Commission Agents-Retailers-Consumers					
		Growers-Processing Industries-Commission agents-Retailers-Consumers					
		Growers-Retailers-Consumers					
		Growers-Producer Representatives-Exporters					

**FA**-Full Adoption, **PA**- Partial Adoption, **NA**- No Adoption

### C) Production

Sl. No.	Crop	Ton/Qtl
1	Orange	

#### D) Orchard management

Please give your response which orchard management practices do you follow.

Sl. No.	Statements	
1	Clean cultivation	
2	Soil management	
3	Use of NSKE 5% or Spray of neem oil 100ml+10g detergent in 100 lit water for control of black fly	
4	Type of drainage	
5	Timely fertilizer management	
6	Canopy management	
7	Raised bed cultivation	
8	Mechanization in orchard like use of brush cutter for weed control, boon sprayer & fruit harvester	
9	Application of growth regulator	
10	Organic cultivation	
11	Mulching with plastic or organically	
12	Cleaning area around orchard like removing alternate hosts like gudvel & chandvel	

#### E) Annual income

Sl. No.	Annual income	Amount in Rs.
1	Orange	
2	Other source	

#### F) Family expenditure

Sl. No	Particulars	Amount in Rs.
1	Food	
2	Housing	
3	Education	
4	Clothing	
5	Health	
6	Purchase of farm inputs	
7	Travel	
8	Lighting	

9	Foot wares	
10	Religious function	
11	Others	

**G) Material possession**

<b>Sl. No.</b>	<b>Particulars</b>	
<b>A)</b>	<b>Lightening facility for home</b>	
1	Kerosene lamp/petromax (1)	
2	Electricity (Provided by Govt.) (2)	
3	Inverter (3)	
<b>B)</b>	<b>Furniture</b>	
1	Chair (1)	
2	Tea poy (2)	
3	Table (2)	
4	Cot/Diwan (3)	
5	Cupboard (4)	
6	Sofa (4)	
7	Dining table (5)	
<b>C)</b>	<b>Kitchen material</b>	
1	Stove (1)	
2	Cooker (2)	
3	Mixer grinder (3)	
4	Refrigerator (4)	
5	Oven (4)	
6	Water purifier (5)	
<b>D)</b>	<b>Transport vehicle</b>	

1	Bullock cart (1)	
2	Cycle (2)	
3	Motorcycle (3)	
4	Three wheeler (4)	
5	Four wheeler (5)	
6	Tempo/Truck (6)	
<b>E)</b>	<b>Recreational/communicational material</b>	
1	Radio (1)	
2	Television (2)	
3	Smart phone (3)	
4	Computer/laptop (4)	
<b>F)</b>	<b>Luxurious equipment</b>	
1	Fan (1)	
2	Air cooler (2)	
3	Geyser (2)	
4	Washing machine (3)	
5	Air conditioner (4)	
<b>G)</b>	<b>Farm mechanization implements</b>	
1	Electric pump (1)	
2	Sprayer/duster (2)	
3	Drip/sprinkler irrigation set (3)	
4	Tractor (5)	
5	Harvestor (4)	
<b>H)</b>	<b>Animal possession</b>	
1	Goat/Sheep (1)	
2	Cow/Buffalo (2)	

3	Bullock (2)	
<b>I)</b>	<b>Other</b>	
1	House repairing (1)	
2	Flat (2)	
3	Land (3)	

#### H) Self confidence (Basavanna 1974)

Sl. No.	Statements	SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1	I am always confident that whatever I do, it is right					
2	If I fail in performing a task, I never try again on the next time even if I get a chance					
3	I have belief that one day I will become a successful person					
4	I do not like to face failure in my work situation					
5	I can understand the problems of the members of the group and I like to help them in solving them					
6	I do not like to take new challenges in my life					
7	I hesitate to speak in front of a mass of people					
8	I am satisfied with whatever I have achieved in my life till now					

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

#### Part - IV

##### Constraints faced by social media user orange growers in use of social media

Please rank the constraints faced by you while using social media.

Sl. No.	Constraints	Rank
1	Very few social media services are available in agriculture	
2	Sometimes content are not need based and irrelevant with the individual needs	
3	Irregular internet connectivity	

4	Due to engagement in farm operations there is very less time to use social media	
5	Authenticity of agricultural information shared through social media is less due to unavailability of professionals	
6	High cost of social media services	
7	Practical applicability and customization of messages received through social media is less	
8	Diversion of mind and consumption of more time on unwanted things	
9	Irregular electric supply at rural area	

**Constraints faced by social media non user orange growers in use of social media**

<b>Sl. No.</b>	<b>Constraints</b>	<b>Rank</b>
1	Complex nature of social media	
2	Language barrier to use social media	
3	No faith in social media information due to traditional belief in existing system	
4	Irregular internet connectivity	
5	Lack of time to utilize the social media	
6	Shortage of expertise to use the social media	
7	High cost of social media services	
8	Irregular electric supply at rural area	

## Part - V

### Suggestions obtained from orange growers to overcome the constraints in use of social media

Please mention your suggestions to improve social media services

Sl. No.	Suggestions
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

## Part - V

### Reasons behind fruit drop in oranges as perceived by orange growers

Please enlist the reasons behind fruit drop in oranges.

Sl. No.	Statements	Yes (√)	No (√)
1	High temperature with water stress for longer duration		
2	High humidity due to continuous rainfall		
3	Fruit rot (Due to fungus)		
4	Greening disease		
5	Root rot		
6	Phytophthora (Dinkya)		
7	Dieback (Shendemar)		
8	Fruit flies (Fal mashi)		
9	Fruit sucking moths		
10	White fly and black fly (Kolshi)		
11	Physiological fruit drop due to hormonal imbalance		

12	Nutrient deficiency		
13	Ineffective water management during Ambiya Bahar (Type of irrigation used)		
14	Poor drainage due to improper site of selection/unsuitable soil		
15	Declining sources of water & ground water level		

**Reasons behind removal of orchards as perceived by respondents**

Please mention the reasons behind removal of orchards

<b>Sl. No.</b>	<b>Reasons behind removal of orchards</b>
1	
2	
3	
4	
5	