

Access and Application of Mobile Agriculture Apps among Farmers in Tamilnadu

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Abstract

Agriculture is the primary source of food as well as a means of ensuring the population's existence. Agriculture is the principal source of income for the majority of Indians. However, the system for upgrading technology has to be reviewed and revitalized. Agriculture will undergo significant changes in the next years. Unlike the last "green revolution," which was based on improved insecticides and fertilizers, agriculture would now be revolutionized by technology. Agriculture is an important foundation in any developing economy, and India is no exception. India's agriculture industry accounts for about 20 percent of the country's GDP. Agriculture employs 58 percent of India's entire population, either directly or indirectly. The great majority of Indian farmers, even small-scale producers, lack access to knowledge and technical tools that may help them raise yields and get better prices for their crops and products. The widespread use of mobile phones may be the game-changer in this situation. It will bring the field of agriculture to its pinnacle. This descriptive research throws light on the nature and characteristics of agricultural mobile apps and the farmers' awareness, knowledge, application of these apps into their daily lives.

INTRODUCTION

Agriculture is the most important sector of the Indian economy, and for millions of farmers, agriculture is more or less a need for survival. Land and water supplies are nearly depleted, commodity prices fluctuate almost daily, profit margins are modest for the majority of marginal and small farmers, and acquiring information is difficult. Because agriculture employs the majority of the Indian people, it is necessary to assess and rejuvenate the technological update mechanism. The vast majority of Indian farmers are small-scale producers who lack access to information and technology resources that could help them boost yields and get better prices for their crops and goods. The widespread use of mobile phones came to the rescue in resolving this issue. The mobile phone-based solution aids in farm management, resulting in increased agricultural yield and farm care/maintenance, propelling agriculture to new heights. In today's

agriculture, soft resources such as knowledge and talent are just as vital as hard resources such as inputs, if not more so. Agriculture remains to be India's most important economic sector. Food production increased from 50 million tonnes in 1950-51 to an estimated 259.32 million tonnes in 2011-12, thanks to major contributions from research, extension, and farmers' efforts (GoI. (2013).

The mobile application would be a blessing to Indian farmers as it would cover the key issues of getting market updates for various goods, weather updates, and rain information, as well as providing numerous language support. Farmers will gain more if they are able to make better selections about where to sell their produce after receiving market pricing for a variety of local and distant markets. Karkhile, S. G., & Ghuge, S. G. (2015) In agricultural and related industries, timely access to information is critical for decision-making. Information and communication technologies (ICTs) enable

quicker information access and sharing. Mobile phones have been more popular among ICTs, with a variety of services supplied by numerous agencies. Government departments, agricultural organizations, and the business sector have developed a variety of mobile applications as a result of the penetration of mobile phones into rural India, bridging the digital divide. A variety of smartphone apps have been developed to especially address the problems of farmers.

Despite times of great development in the past, the Indian agriculture industry has been characterized by sluggish productivity growth. To attain a higher productivity increase, serious issues must be addressed. Infrastructure restrictions, supply chain inefficiencies, and major issues with information dispersion and access are among them. The government and policymakers face a difficult task in regaining agricultural dynamism. The next-generation green revolution in India must be preceded by the next generation of technology and infrastructural development to attain a greater agricultural growth rate. Small and marginal farmers, who make up the bulk of Indian farmers, frequently lack access to information that may help them raise yields and get better prices for their products. The industry is also beset by issues related to a lack of investment in rural infrastructure, which harms agricultural product development.

Mobile Applications and Farmers

In developing nations, the rise of mobile communication technology is opening up a slew of new prospects for social empowerment and grassroots creativity. The contribution of mobile applications to Agricultural and Rural Development (ARD) through giving access to information, markets, and services to rural residents is one of the areas with potential effects (World Bank, 2012). Farmers may obtain detailed information on a real-time basis via this mobile application, which allows them

to acquire information on all scheme components and subsidy patterns of support, as well as register for scheme benefits on a priority basis. Farmers who have registered under the Crop Insurance Scheme can access information on their application status until they receive the compensation amount under crop insurance, information on seed and fertilizer availability in government, private, and cooperative outlets closer to their residence, information on Customer Hiring Center for renting farm machinery, and information on pre-season crop insurance. Farmers will benefit from the mobile application since it will provide real-time information and encourage them to begin farming tasks at the appropriate moment. Seasonal adversities, non-availability of inputs on time, non-availability of agricultural machinery, and natural disasters will all be thrashed out by this Mobile Seva.

Farmers and other stakeholders have benefited from the development of new services and applications in agriculture as a result of the advent of mobile phones. Services that began with periodic messages have grown to multimodal and multimedia advice delivery, as well as m-agriculture apps for cellphones. These services bridge the knowledge and communication gap between farmers and extension staff while also providing farmers with a negotiating advantage (Saravanan, 2014). Availability of information on new varieties, inputs such as seed, fertilizers, machinery, pricing information, weather, pests and diseases, nutrient management at the correct time will assist farmers to obtain access to essential information to support operations from production to selling.

According to studies, mobile phones have a beneficial influence on long-term poverty reduction, with accessibility being the major barrier to realizing their full potential (Bhavnani et al., 2008). According to the Boston Consulting Group's report, "The Rising Connected Consumer in Rural India," up to 300

million Indian customers are anticipated to be online by 2020. Rural areas are anticipated to account for more than half of all new Internet users. Rural expansion and usage will be driven by cheaper mobile handsets, the development of wireless data networks, and changing customer tastes. (The Boston Consulting Group, 2016). Mobile phones have greatly decreased the cost of communication and information for rural residents. This technology has opened up new avenues for rural farmers to gain knowledge and information about agricultural challenges, problems, and applications for agricultural growth. Similarly, the use of ICTs in agricultural extension services, particularly mobile phone services in the agricultural sector, has offered information on the market, weather, transportation, and agricultural practices, as well as the ability to communicate with concerned authorities and departments. (Aker, 2011).

Smart farmers with smartphones are igniting a revolution in agriculture across the country. From pre-sowing through culture to post-harvest operations, we've got you covered. Farmers can make wise and lucrative decisions thanks to mobile phone-enabled technologies. Farmers in India are assisted at nearly every stage of the process, including pre-sowing information, sowing and crop management, harvesting and storage, and price discovery with market access. An increasing number of agri-tech start-ups are tackling various elements of the agricultural value chain. The spread of information and communication technologies (ICTs) in developing nations gives many opportunities for private enterprises and government departments to transmit expertise and information. Previously, mobile phones were largely used by the wealthy and those who lived in metropolitan areas. Rural and urban people in developing nations are now using mobile phones, and they are benefiting from the latest information on weather, markets, and other relevant concerns. (Aker and Mbiti, 2010). Farmers can now make

tentative decisions much more easily than before thanks to mobile phones. The use of mobile phones leads to better social cohesiveness and enhanced social ties among farmers and the business community. Short messaging service SMS and voice recording, on the other hand, have improved social connections. In developing nations, mobile phone-based social networking demonstrates the rising relevance of this element. Mobile phones are seen as critical to the advancement of agriculture. This technology has offered owners connectivity as well as advantages such as mobility and security. (Bayes et al., 1999, Goodman, 2005)

Farmers are rapidly adopting mobile phones and are communicating marketing, weather, and business information with one another. Farmers contact market brokers and nearby cities directly to sell their goods. Farmers, too, concentrate on finding valuable and up-to-date market information through social and commercial networks. (Ilahiane, 2007). According to an ICRIER research on the impact of mobile phones on farmers in different Indian regions, mobile phones play a critical role in decreasing transaction costs and increasing farmer revenue by efficiently addressing their urgent agricultural information needs.

Farmers may get this information from a variety of sources, including seed and pesticide company scientists, cooperative committee office-bearers, input dealers, government agriculture extension officers, market-commission agents/traders, veterinary physicians, and so on. But using their mobile phones, not only information is received when farmers need it, but also saves transaction costs and time. It also increases the value of the produce that farmers may sell. Agriculture employs more than half of India's workforce. Credit, insurance, and knowledge scarcity can all play a role in restricting agricultural output. There are a growing number of instances of mobile-enabled food and agriculture solutions.

(Accenture-Vodafone, 2011 and World Economic Forum, 2011) According to the World Bank, the benefits of mobile apps in the agriculture sector growth might be realized in the following ways:

Better information availability: Higher product pricing and demand are obtained by giving producers quick access to market information. Furthermore, improved risk management is obtained by having access to precise weather, pest, and disease information.

Improved access to agricultural extension services: Accurate information and help on appropriate agricultural practices may be offered. This might result in increased crop yields and more accurate pasture condition evaluations.

Better market and distribution network connections: As the relationships between producers, suppliers, and purchasers strengthen, value chains become more transparent and efficient, and middlemen are less influenced. Furthermore, improved accounting and traceability aids in improving efficiency and forecasting, as well as reducing administrative load and fraud.

Better access to financial opportunities: Farmers may enhance crop yields, diversify their output, and reduce economic loss by having better access to finance and insurance opportunities, as well as alternative payment methods.

Materials and Methods

This research was carried out in the rural regions of Villupuram and Cuddalore districts, Tamilnadu, India, which is an agriculturally developed district. Primary data

was obtained through well-structured questionnaires for this study. There are 110 farmers in the sample farm size groups that were categorized as marginal, small, medium, and large farms. As the study is on the usage of mobile phone apps for agriculture purposes, purposive sampling was employed in choosing the respondents with access to a smartphone either owned by them or by their family members. The primary motive behind conducting the survey was to measure and identify the mobile phone usage pattern among farmers for their profession of agriculture as well as to study whether these mobile applications are really helpful to them in one way or the other in helping them to get good produce.

RESULTS

Demographic Profile of Farmers

Gender, age, education, occupation, agricultural experience, monthly income, and household size were all included in the demographic profile. The results indicated that 110 farmers took part in the survey. It was discovered that the majority of the respondents were male respondents who took part in this survey. The age distribution of the respondents indicated that 31.8 percent were between the ages of 41 and 50, while 25.4 percent were between the ages of 31 and 40. However, 20.9 percent of the respondents were between the ages of 51 and 60, and 10.9 percent were below 20, with just 7.2 percent of the respondents being between the age of 20 and 30. (Refer to table 1).

Table 1 Demographic Profile of Farmers

Variable	Frequency	Percentage
Gender		
Male	98	89
Female	12	10.9
Age		
Below 20	12	10.9

20-30	8	7.2
31-40	28	25.4
41-50	35	31.8
51-60	23	20.9
Above 60	04	3.6
Education		
Upto elementary	17	15.4
High School	26	23.6
Higher Secondary	30	27.2
Under Graduate	27	24.5
Post Graduate and above	10	9
Monthly Income		
Below 10,000	9	8.1
11,000-15,000	16	14.5
16,000-20,000	51	46.3
Above 20,000	34	30.9
Occupation		
Full time Farming	77	70
Govt. job & Farming	12	10.9
Own Business & Farming	21	19
Experience in Agriculture		
Below 5 years		
6-10 years	8	7.2
11-15 years	31	28
16-20 years	53	48
Above 20 years	18	16.3

work for the government, while some

The respondents were

also asked about their education level the result indicated that 27.2 percent of the respondents were up to higher education level while 24.5 % of the respondents had their education up to under graduation. The high school level of the respondents was 23.6% while the respondents' education up to elementary was 15.4%. The remaining 9% of the respondents' education level was post-graduation and above. It was shown that most of the respondents' education level was high and higher secondary with 50.8%.

The respondents were also asked about their monthly income, and the results revealed that the majority of the respondents' income was between Rs.16,000 and Rs.20,000 with 46.3%, while 30.9 % had an income between 11,000 and Rs.15,000. Only 8.1% of respondents had an income of below Rs.10,000. The responders with incomes over Rs.20,000

have their businesses, including farming. Furthermore, respondents were asked about their occupation, and the results revealed that farmers made up more than half of the respondents (70%). 10.9 % of the respondents were doing government jobs as well as farming while 19% of the respondents were doing their own business and farming. Farmers were also asked about their farming experience, and the results revealed that 48 % of the respondents have 16 to 20 years of farming experience, while 28 % have been farming for 11 to 15 years. However, 16.3 % of the respondents have more than 20 years of farming experience, while only 7.2 % had 6 to 10 years of farming experience.

Mobile apps and Farmers

In the field of agriculture, there are hundreds of apps available today. The app's

utility is determined by the information, content, and purpose for which it was created. The majority of the applications are helpful for a single type of information, but some are multi-informant. These mobile applications provide information about agriculture and related industries. The major advantages of mobile applications for farmers are the ease with which they may obtain information on

their mobile devices. For simple access, the data is kept in the mobile device itself. Farmers want timely information tailored to their unique requirements. Mobile applications are available that give the most up-to-date agricultural information on trends, equipment, technology, and procedures. Following are the various types of topics covered in all the agricultural apps found in the Google play store.

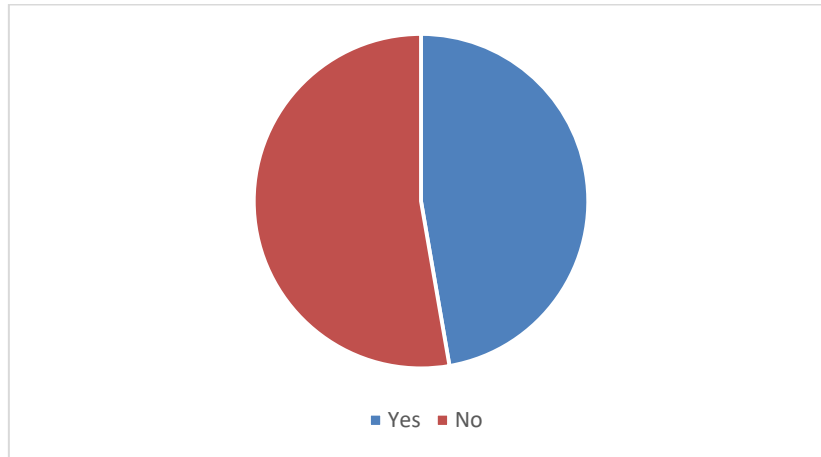
Table: 2 Mobile app categories with access frequency

Sl.No	Categories	Frequency	Percentage
1.	Cultivation tips	21	40.3
2.	Weather forecast	6	11.5
3.	Fertilizer Details	22	42.3
4.	Crop Information	25	48
5.	Soil and water testing	9	17.3
6.	Agriculture and farming news	22	42.3
7.	Market place	5	9.6
8.	Crop protection	18	34.6
9.	Crop calendar	7	7
10.	Government schemes	29	55.7
11.	Ask the Expert	13	25
12.	Networking with fellow farmers	4	7.6
13.	Market price	16	30.7

Table 2 above discusses the various types of topics covered under all the agricultural apps found in the google play app. As part of the survey, the respondents were asked about the access of these apps and the kind of content they search in the apps for their professional usage. They were also asked as to how frequently they access those content. Thus, the above table reveals the answers to the questions they were asked. The findings of the research expose

that the categories such as government schemes, fertilizer details, agriculture, and farming news and cultivation tips were the highly accessed categories with 55.7%, 42.5%, and 40.3 % respectively. Crop protection which explains the various process of safeguarding the crops, market place which is the buyer and seller meeting platform, where a buyer or a seller can register their buying or selling requirements, are accessed 34.6 % and 30.7 % respectively.

Figure: 1 Awareness of Agricultural Apps



As several studies both national and international level have pointed out the lack of knowledge to use mobile apps and illiteracy among farmers in rural India act as constraints on the use of mobile agri apps in their profession, This same point is reiterated in the research were the farmers, although having access to smartphones, almost more

than half of the respondents (57%) have either ignored or have lack of awareness about the agri apps available to be used in their agricultural practices. While the remaining 43% of the respondents do have a positive attitude towards the agri apps and thus they try to gain knowledge through agri apps for their profession.

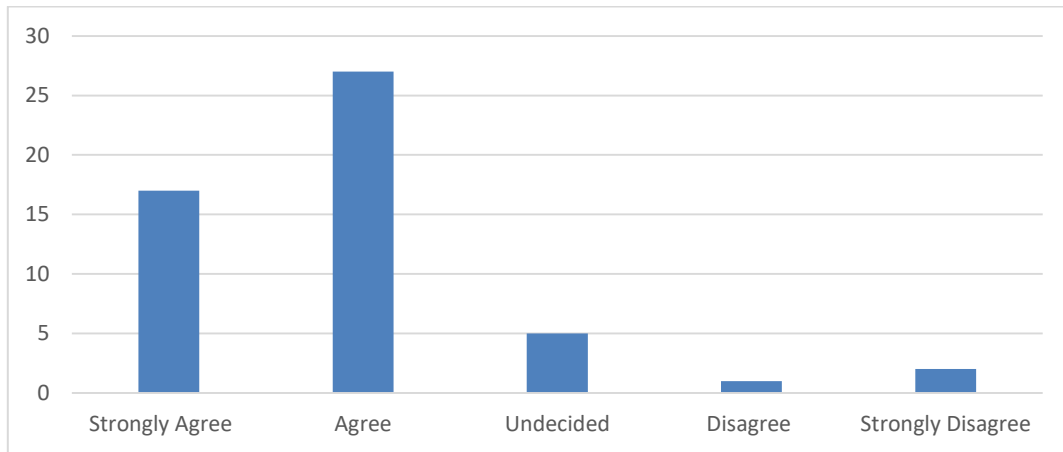
Table: 3 Mobile phone usage pattern among farmers

Variable	Frequency	Percentage
Entertainment	75	68.1
News	34	30.9
Social Media/ Whatsapp	87	79
Browsing	29	26.3
Music	76	69
Shopping	23	20.9

Table 3 demonstrates the mobile phone usage of phone patterns among farmers of Tamilnadu, particularly in Villupuram and Cuddalore districts. The findings of the study throw light that 79% of the respondents are familiar with social media apps such as Facebook and WhatsApp. Followed by social media usage, 69% of the respondents spend their time listening to music. Further, they also

point out that 68.1% of the respondents actively make use of mobile phones for entertainment purposes. Respondents who spend their time in the news, browsing, and shopping are 30.9%, 26.3%, and 20.9% respectively. Thus, it is observed that there is regular access and use of mobile phones and the internet in the day to day life of the farmers.

Figure: 2 Mobile apps for better farming



Above figure 2 explains the view of the farmers who make use of the mobile agri apps for better farming in agriculture. It has been observed from the study that the majority of the farmers (27%) agree with the statement that better farming is done with the help of mobile apps that deal with agriculture. Followed by the majority, 17 % of the farmers strongly agree to the above statement and thus the more than three

fourth of the respondents are of a positive view about the mobile agri apps. As the above response points positively for the use of mobile apps for better farming by the majority of the respondents it can be concluded that farmers do hold the view that agricultural apps are beneficial in the field of agriculture. It is only a very few respondents who are either undecided or disagree on the positive note of agri apps

Figure: 3 Hours spent in Agri Apps per week

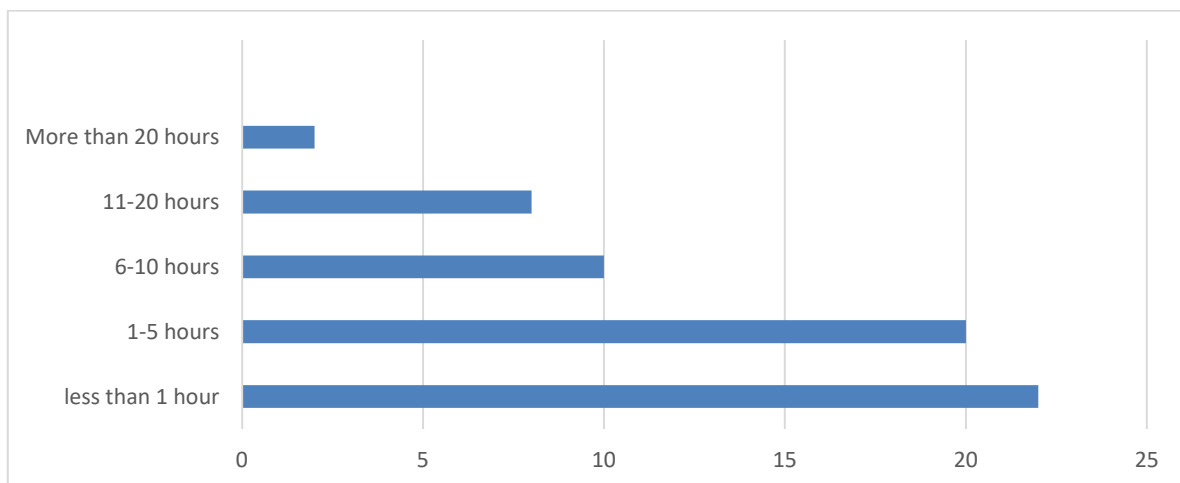
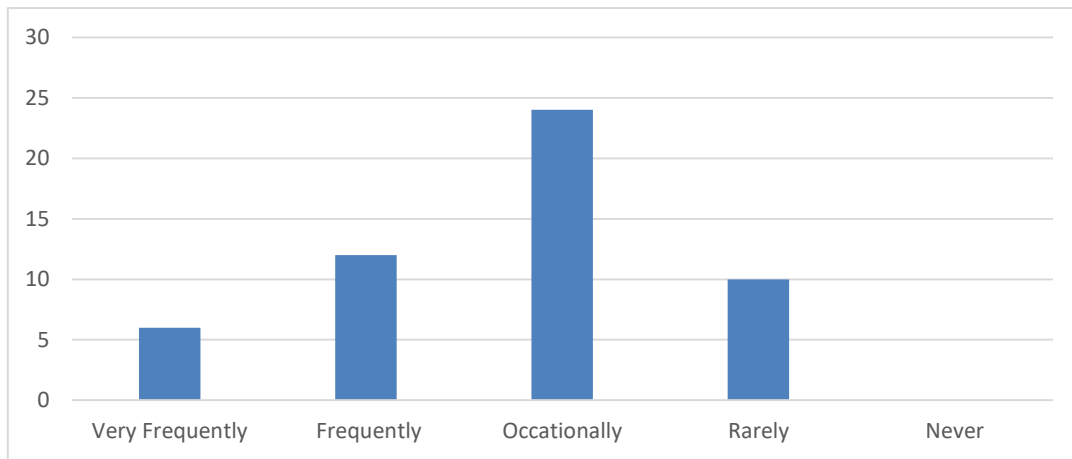


Figure. 4 demonstrates the number of hours farmers spend on mobile agri apps. It can be concluded from the table that 22% of the farmers spend less than one hour per week in agri apps and 20 % of the farmers spend at least 1 o 5 hours accessing information in agriculture apps. It can be deduced that

farmers do use the agri app on smartphones, but the number of hours spent in those apps is not more. It is also very interesting to note that 10 % of the farmers spend at least 20 to over 40 hours in a week in mobile agri apps.

Figure: 4 Frequency of using mobile apps for agriculture purposes



In figure 4, the respondents were asked about the frequency of using agricultural mobile apps. The finding of the study reveals that the majority of the respondents with 24% access the Agri apps only occasionally. The study also showed the positive attitude of the respondents towards the mobile agri apps with 12% of the respondents using it frequently and 6% of them very frequently. Though the farmers knew smartphones and Agri apps, it is observed that 8% of the respondents visited the apps only rarely. Thus, it can be concluded that farmers with access to smartphones do make use of the agri apps either occasionally or frequently.

Discussion and Conclusion

Mobile applications are a benefit to farmers and are revolutionizing agriculture, but they still have certain flaws that need to be addressed. Farmers are either ignorant of the app or have a small number of users because most of them are not user-friendly. Though some of the studies have reiterated that the farming-related mobile applications are assisting in improving overall business performance and decreasing negative environmental consequences, the current study demonstrates that the farmers of Tamilnadu lack the knowledge in the existence and usage of the Agri apps. But, as far as the farmers who have positively responded are benefitted most

from mobile apps since they provide current information tailored to their unique requirements. Thus, the study says that the farmers use mobile applications to know the cultivation tips, update fertilizer details, information about crops and their protection, and keeping themselves abreast of the latest government schemes.

Almost all small farmers indicated that they have the access to smartphones either as their gadget or through their family members, it is noted that nearly half of the respondents remain unaware of the mobile agri apps available freely in the google play store. As Shaikh (2017) in his study states, farmers still prefer to acquire information and counseling from Krishi Seva Kendras, farm university agricultural extension programs, television, newspapers like Agrowon, and family and friends. Many of the apps aren't found to be relevant or useful by farmers. Agricultural-related applications are surprisingly underutilized by farmers, despite their widespread availability and low cost. They do use smartphones to some extent, but the applications they utilize are the same ones that everyone else uses. In comparison to these general applications, agricultural-specific applications receive no preference. The findings of the present study too observe that the smartphone has reached almost all households. But, the knowledge and awareness of agri apps

are very much lacking among the farmers in Tamilnadu.

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