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UNNAT KISAN APPLICATION

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ABSTRACT

The timely management of crop fields requires constant planning and monitoring because agriculture is a demanding profession. The main goal of our research is to increase awareness of a serious issue that affects farmer life. There is no need to highlight the importance of timely information access for decision-making in agricultural and related areas. There are several prospects for social empowerment and grassroots innovation in developing nations, thanks to the advancement of mobile communication technologies. The right direction and consideration are required while identifying distressing activities such as crop illnesses, pest invasion, assessing soil quality, etc.

Keywords – Agriculture, Organic farming, Unnat Kisan, Crops, Soils, Smart Farming**.**

[1] INTRODUCTION

Unnat Kisan is a cross-platform application created with the goal of revolutionizing farmers' lives and advancing them technologically. Since it consists of several modules, it offers all the functionalities in a single, integrated application. It's accessibility of numerous features, such as Community forum, guidance regarding Crop rotation based on seasons, Diseases, Soil quality enhancement, Organic farming, Market pricing and all the Schemes provided by the government enables farmers to fulfil their necessities while sparing time and money. This also assists them in selling their produce swiftly and for the proper price. Majority of Indians i.e. a whopping 60–70% of the population solely make a living from the agriculture sector. Farmers in our nation continue to harvest using conventional means, and the issue of agriculture due to climate change has gotten serious in many other nations.

Due to a lack of understanding, new agricultural technological innovations are not widely accessible to farmers. The main challenge for farmers is accessing and managing information owing to the volume of data and complexity of activities in precision farming. Many sources, including newspapers, printed media, audio and visual aids, mobile devices, TV, the internet,

and printed media, provide information for farming, including details about the crop life cycle, seeds, crop selection, crop processes, weather, pesticides, fertilizers, etc. The data's structures and formats, however, differ. Giving farmers the best technical options is vital to

update their way of life and hence one of the best ways to increase agricultural production nationally can be through mobile apps. Farmers can quickly download an agriculture mobile application to their smart phone to access a variety of services that weren't previously available to them.

With the idea of 'smart farming', farmers have an opportunity to manage their crops and maximize harvests using technology. Our app strategically uses digital technologies to identify crop variability and manage crops as needed, as opposed to making farming decisions based on theories and notions, to create labor-intensive, cost-effective farming judgements. Using a single codebase, this cross-platform application is created to run on different mobile operating systems. It is mostly constructed with Dart and Flutter, which produce a straightforward and appealing user interface for a variety of screen sizes and devices. The collection of distinctive widgets helped applications look native, rather than making iOS apps the Apple way or Android apps the Android way.

[2] LITERATURE SURVEY

Researcher [1] presented a comprehensive concept for developing a mobile phone-based solution that aids in farm management, leads to agricultural productivity improvement, and aids in farm upkeep. According to the researchers, ancient farming accepted unforeseen environments, whereas modern farming provides predictable environments through weather forecasting. Traditional farming necessitates a significant amount of labour and a variety of activities. Alternatively, modern farming does not necessitate a large amount of labour because mobile, equipment, and new technology take care of everything. This mobile application gives real-time weather information, news, and market prices in a variety of locales, all in local languages.

Researcher [2] provided reviews of Smartphone applications that leverage the built-in sensors of the smartphone to provide agricultural solutions. Applications are classified based on their agricultural role. A survey of the literature by researchers describes many types of agriculture applications such as farming applications, farm management applications, information system applications, and extension service apps. This application simplifies several farming functions such as disease detection and diagnosis, soil study, crop water needs estimation, HR management, information system applications, and extension service applications. This study paper focuses on GPS and cameras as the most popular sensors used in smartphone farming applications.

Researcher [3] examines the wide array of Information and Communication Technologies (ICTs) that are available in Agricultural Research Institutes (ARIs) and how farming researchers effectively utilize a wide array of ICT tools related to crop variety, land use, irrigation, soil nutrient requirements, weather reports, pest and disease control, crop awareness, pollution control, and new farming techniques.

Researcher [4] describes a software programme that is primarily for farmers' sustainable expansion. Farmers frequently struggle to make decisions on the choice of pesticide, fertilizer, and exact time to do particular farming tasks. So, this programme is quite helpful for farmers to reduce such a situation. Many crops have registered fertilizer schedules. Farmers receive reminders to use fertilizer as planned based on the crop's sowing date. Based on factors like soil type, climate, etc., additional guidance is also provided. This technology combines GPS with contemporary Internet and mobile communication methods for effective and efficient farming.

[3] RESEARCH AND ANALYSIS

Based on recent research and work in technology driven farming, the gap in market is studied and mentioned in the following modules.

3.1 GAP ANALYSIS

According to empirical data, there are surprisingly few apps available when compared to the importance of agriculture globally. The study suggests that reliable, verified, and validated content and services that consider regional differences should be provided as part of the creation of mobile apps to support agricultural activities. Also, state bodies and ministries must take a proactive role in promoting mobile apps for the same purpose.

Mobile applications are prospective digital tools that can be used to efficiently transmit agricultural information to many farmers in a relatively brief time frame. By giving truthful data, promoting improved input and farm management, making marketing simple, connecting with government agencies for policy support for farmers, and other methods, they can be utilized to increase farm income and productivity.

A wide range of articles on agriculture and the creation of farmer-specific mobile applications are examined by researchers. Many studies also found that there are numerous mobile applications created for farmers in various countries related to a variety of services, but it is advised that developing user-friendly mobile applications that offer multiple features in one app, such as a variety of information services, an interaction platform for farmers and agriculture people, as well as information about organic farming, in order to satisfy ruler farmers' demands.

3.2 SURVEY ANALYSIS

As late as 2003, for example, 60% of Indian farmers reported not having access to any source of information on modern technology related to farming practices (National Sample Survey, 2005). UP, Rajasthan and Maharashtra, with sizeable subscriber-base, were surveyed during July and November 2008.

In general, farmers were confident of the utility of the mobile phone in reducing costs and enhancing earnings. The biggest influence was reported from Maharashtra followed by Rajasthan and UP. Figure 1 shows the bar graph below, which depicts current patterns in the use of different mobile applications, that a lot of people use social networking and messaging apps. According to recent statistics, India is the nation with the highest levels of screen time

and mobile users. With this, we may conclude that many individuals utilize mobile applications for daily tasks including work, information and education.

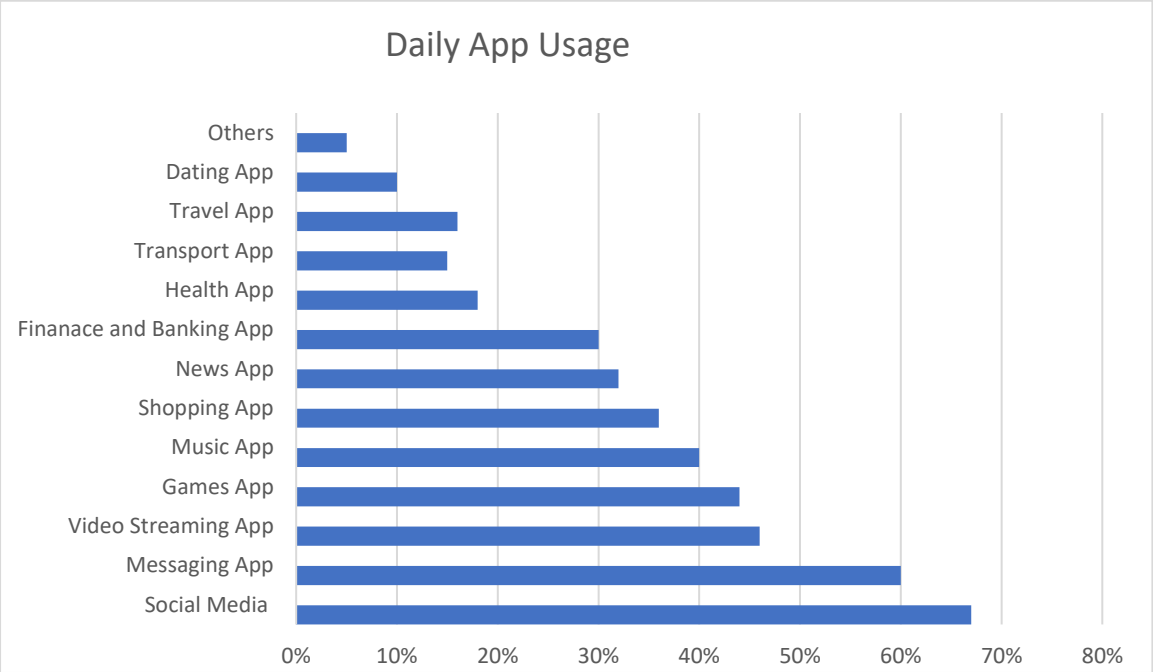

Fig:1 Daily App Usage

Through Fig.2 we can analyze the usage of mobile in rural and urban India. Additionally, a few agricultural apps have received more than 10 million downloads, and farmers actively use them to obtain information, contact helplines, and find answers to their questions. These trends demonstrate the urgent need for further agricultural applications that might simplify farmers' tasks and motivate them to become more knowledgeable and technically sophisticated.

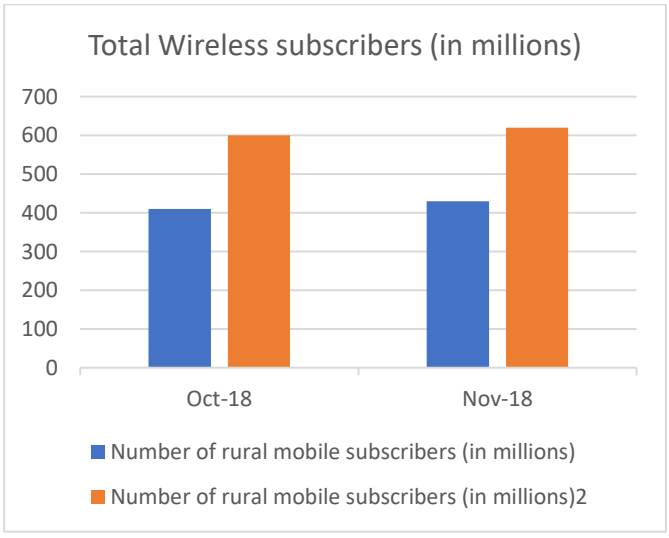

Fig: 2 Daily App Usage

[4] METHODOLOGY

4.1 BLOCK DIAGRAM

The block diagram of Figure 3 depicts the flow and functioning of 'UNNAT KISAN APP' from user login to data fetching. The block diagram shows the various modules that make up the app, along with the locations from which each module has fetched or saved its information.

As soon as the user logs in, many sections appear, including chat forum, advanced equipment, organic farming, market prices, and weather. Out of the sections listed above, the climate data is obtained through the weather API, and the remaining information is maintained in the backends' json file.

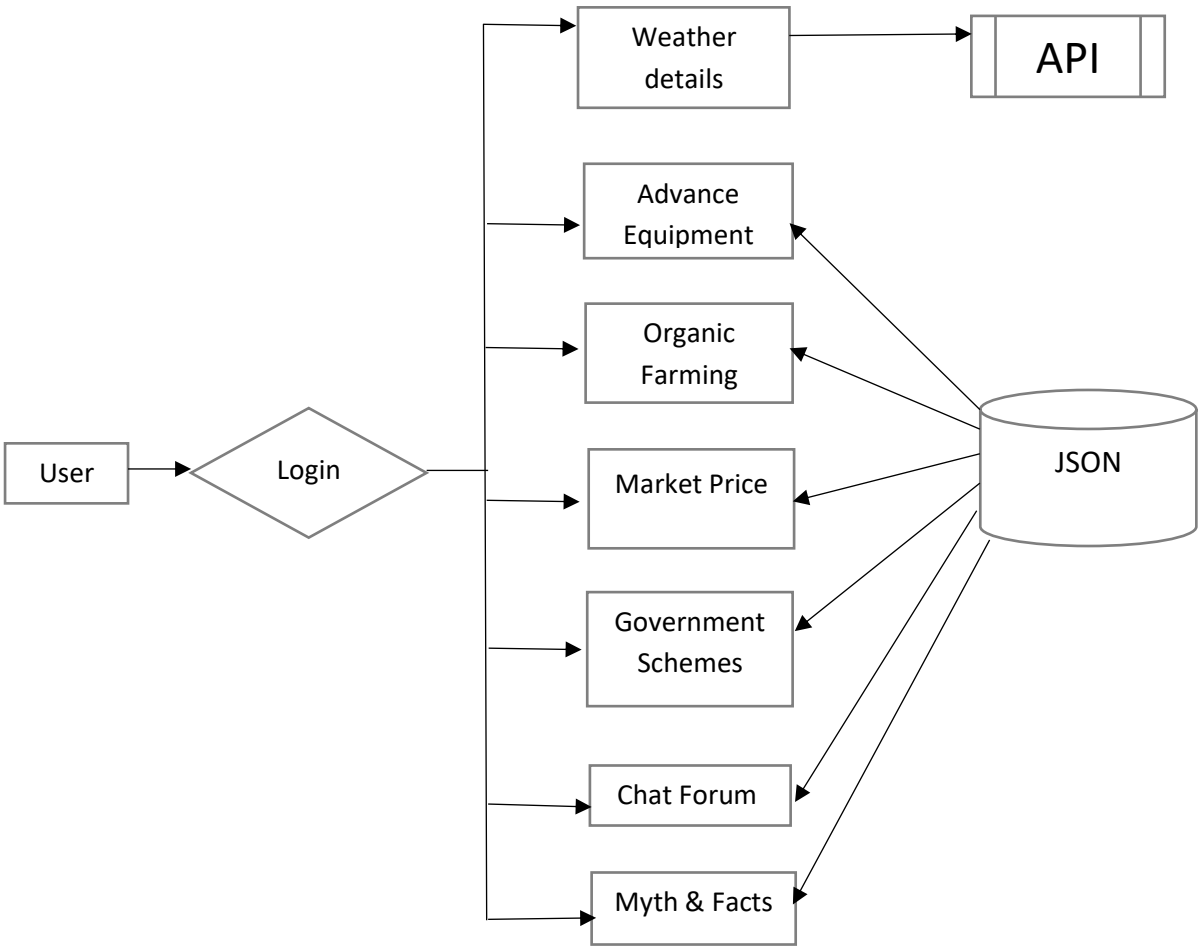

Fig: 3 Block Diagram

4.2 SEQUENCE DIAGRAM OF REGISTRATION AND LOGIN MODULE

As shown in Fig 4.1 and Fig 4.2 we can see how Registration and Login works.

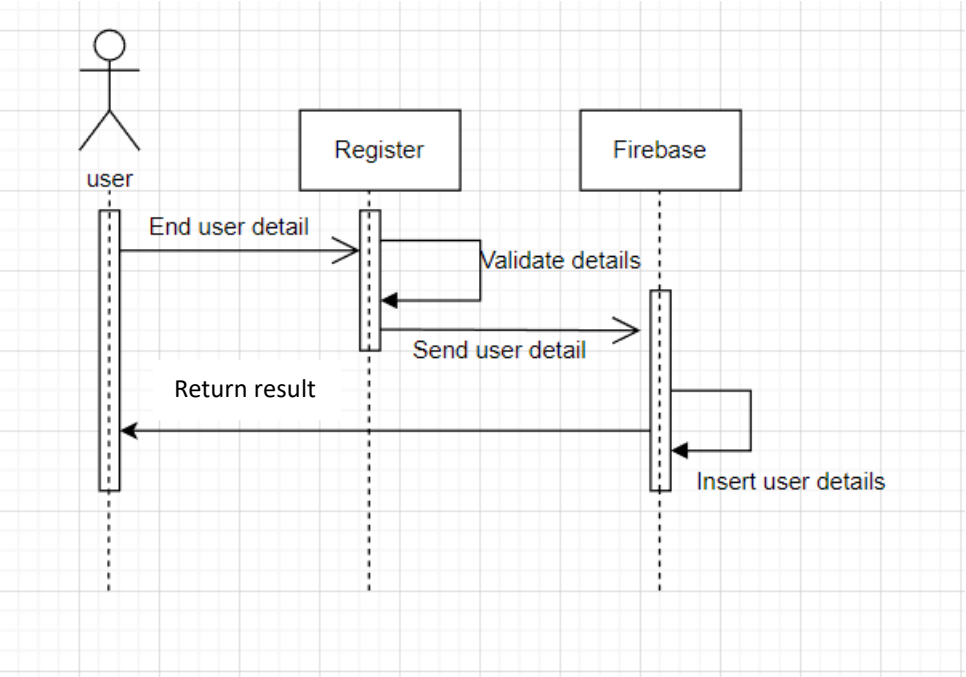

Fig: 4.1 Sequence diagram for Registration

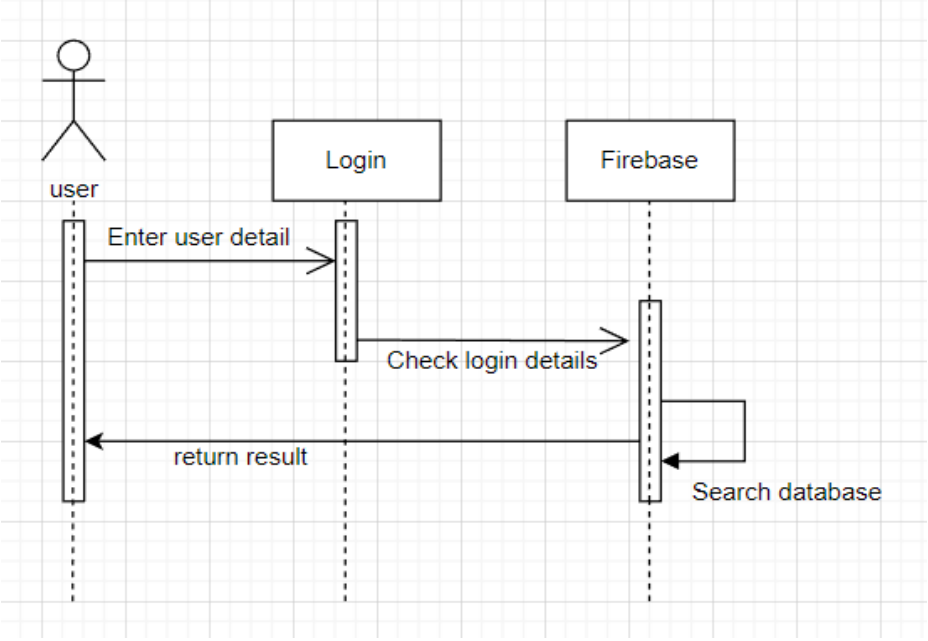

Fig: 4.2 Sequence diagram for Login

4.3 TECHNOLOGY USED

4.3.1 Flutter: -
Flutter is Google's portable UI toolkit for crafting beautiful, natively compiled applications for mobile, web, and desktop from a single codebase. Flutter works with existing code, is used by developers and organizations around the world, and is free and open source. For users, Flutter makes beautiful apps come to life.

4.3.2 Dart: -
Dart is an open-source, general-purpose, object-oriented programming language with C-style syntax developed by Google in 2011. The purpose of Dart programming is to create a frontend user interfaces for the web and mobile apps. It is under active development, compiled to native machine code for building mobile apps, inspired by other programming languages such as Java, JavaScript, C#, and is Strongly Typed.

4.3.3 JSON: -
JSON (JavaScript Object Notation) is an open standard file format for sharing data that uses human-readable text to store and transmit data. JSON files are stored with the. json extension. JSON requires less formatting and is a good alternative for XML. JSON is derived from JavaScript but is a language-independent data format. The generation and parsing of JSON is supported by many modern programming languages. application/json is the media type used for JSON.

4.3.4 CMake :-
CMake is an open-source, cross-platform family of tools designed to build, test and package software. CMake is used to control the software compilation process using simple platform and compiler independent configuration files, and generate native make files and workspaces that can be used in the compiler environment of your choice. The suite of CMake tools were created by Kitware in response to the need for a powerful, cross-platform build environment for open-source projects such as ITK and VTK.

4.3.5 Material UI: -
Material UI is the most powerful and efficient tool to build an application by adding Designs and Animations and using it with technical and scientific innovation. It is basically a design language that was developed by Google in 2014. It uses more Design and Animations, grid-system and provides shadows and lightning effects.

4.3.6 C++
C++ is a cross-platform language that can be used to create high-performance applications. It was developed by Bjarne Stroustrup, as an extension to the C language. C++ gives programmers a high level of control over system resources and memory. It is one of the world's most popular programming languages and can be found in today's operating systems, Graphical User Interfaces, and embedded systems.

4.4. ARCHITECTURE AND BASIC MODELLING

The Fig.5 below shows the whole flow of 'UNNAT KISAN APP', from Registration to Authentication and Display of required Data

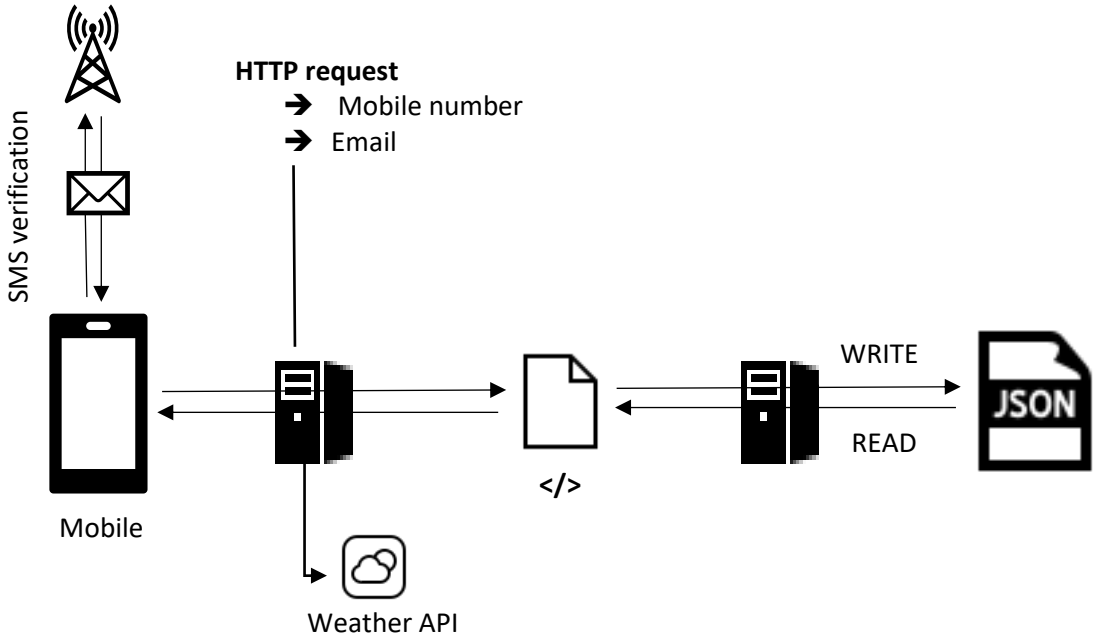

Fig 5: Registration and Sign-in Architecture

4.5 APPLICATION FEATURES

- **User Profile with proper Authentication-** In our application we are providing proper user authentication in which user will be receiving an OTP on the respective device and through that user can login into the application. Then user needs to fill in all the required details like Name, Email, Location and Age. Based on the provided details user profile will be created and can be accessed through the Home Tab.

- **Elementary and Comprehensible –** We have kept this App very simple and easy to understand so that anybody can use it and get clear cut overview of all the modules.

- **Weather Detection using API**- In the application Weather of the specified location (entered by the user while creating the account) along with the temperature is displayed on the Home Tab. We are using Weather detection API for the following purpose to get the accurate results.
- **Get precise information of various aspects and equipment of farming** – Our main motive is to provide the user with precise information so they don't have to look for the

required data from other sources. Updated price and usage of various agricultural equipment is also mentioned so that user does not find it difficult to purchase them.

- **Cost Affective –** This application is free of cost. Farmers can use it for longer period of time and they don't have to pay any money to access it.

[5] RESULTS

Authorization and Authentication is initiated upon clicking the Application. User can Sign in through his Phone Number or Register by clicking on 'Create'. User receives OTP on the provided Number through which they can Sign In. Firebase is used for the Authentication purpose. After entering OTP User can fill their details and choose the location from the dropdown menu. The information will be saved and displayed in the Profile screen. The user is then directed to the Home Page Fig 6.0, having different Tabs for different functionalities. The Home Page displays the Weather and Climatic conditions of the place which is selected by the user. User can select the crop from the upper tab by clicking on 'Add a crop'.

1. Add Crop: - When user selects a crop from the list of crops provided, they get a precise description of that crop and two options: 1) More Info, 2) Add to my crops. After clicking on More Info, we get detailed information about the soils in which they are grown and Diseases that may occur to that crop. Also, to cure those diseases the list of cures and pesticides are mentioned. When user clicks on Add to my crops, the crop will be displayed in the Home Page.

2. Advance Equipment: - The user will get list of various Advance Equipment available in the market and Price range for the same shown in Fig 6.1.

3. Organic Farming: -The main Aim of this module shown in Fig 6.2 is to encourage the farmers to go Organic. When user clicks on Organic Farming, different methods to adopt organic farming is displayed.

4. Market Prices: -The user can see the market prices of the different crops. In Fig 6.3, from minimum price to average price for the particular variety of crop is mentioned along with the date when the prices are last updated.

5. Government Scheme: -When user clicks on Government Schemes, different schemes and facilities provided by the government to the farmers are listed as shown in Fig 6.4. Upon click a particular scheme, user gets a precise description and a button to directly apply for the schemes.

6. Chat Forum: -Commonly asked queries are listed in the chat forum, user can select their query and precise solution is shared.

7. Myths & Facts: -There are lots of myths in the farmer's community; due to lack of awareness farmers blindly follow what their peers do. So, to burst such misconceptions various myths and facts about them are mentioned in this tab.

8. Profile: -All the details provided by the user are saved in the device hence creating their profile. The user can Logout or Delete their account through this tab.

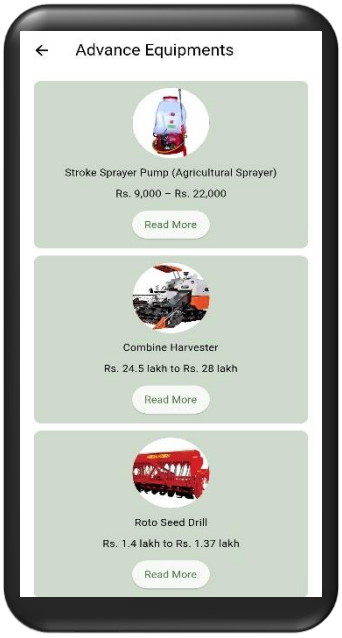

Fig: 6.1 Advance Equipment

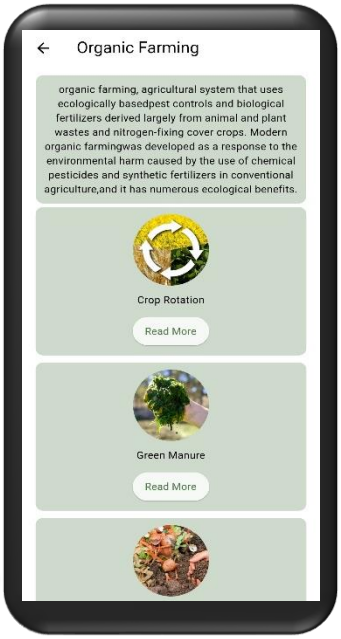

Fig: 6.2 Organic Farming

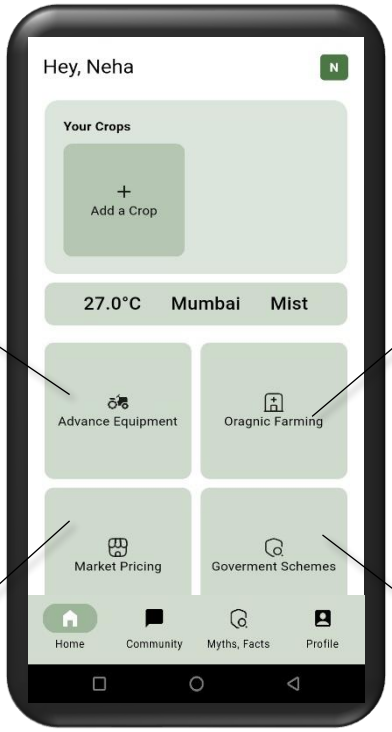

Fig: 6.0 Home Screen

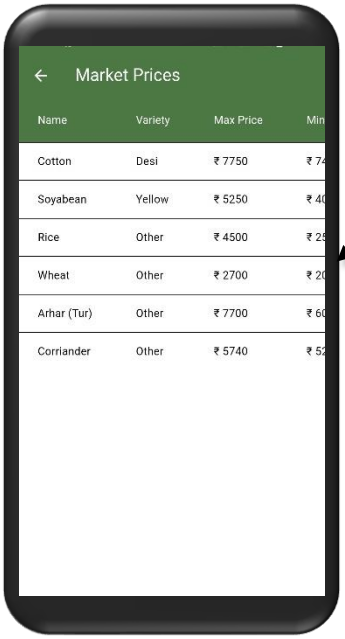

Fig: 6.3 Market Prices

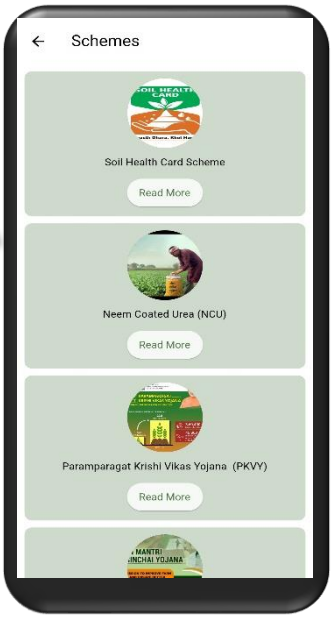

Fig: 6.4 Government Schemes

Fig: 6 Figures representing Home Screen and its various modules

[6] CONCLUSION

Technology and agriculture used to be on opposite extremes of the spectrum. We currently have a lot of evidence to support the use of mobile applications in agriculture, as well as numerous arguments to support their unavoidable dependence on farming activities. According to studies, the market for smart agriculture would increase from $12.4 billion in 2020 to $34.1 billion in 2026. If farmers in the 21st century do not use cutting-edge technology in their operations, such as mobile apps, they are less likely to be viewed favorably. Now that mobile applications for agriculture have been developed, they are fit for use at every stage of the food production supply chain because of the magnitude of unprecedented, fast industrial development. Due to the interconnected nature of challenges affecting agriculture, such as climate change, soil erosion, mineral depletion brought on by fertilizers, and water level degradation, novel solutions are needed. It is here that agriculture and technology get closer to resolving problems and improving farming practices.

Mobile apps are introduced to support the farming community and enhance the agriculture sector. India is the country most reliant on agriculture. Agriculture has witnessed the development of many new technologies, and the government also provides farmers with greater resources to increase productivity. All of the important information and plans pertaining to farming do not quickly reach the farmers as a result of unjust management.

The vast majority of farmers are not familiar with how current technology is applied to farming. Hence, this mobile application built using modern tools & programming languages helps to foster the expansion of agriculture by bridging the technological gap between farmers and modern technology. Its many features will outline the required process and approach to inform farmers about fresh, varied agricultural knowledge and also aid them to enhance the agriculture industry as a whole.

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