KisanConnect: A Unified Smart Service Platform for Farmers and Rythu Seva Kedram

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***Abstract*—Agriculture remains the backbone of rural India, yet farmers continue to face challenges in accessing timely information, essential agricultural inputs, and government welfare benefits. The Government of Andhra Pradesh has launched Rythu Seva Kendrams (RSKs) for farmer welfare. Rythu Seva Kendram is a place where farmers can get the necessary seeds, fertilizers, and other assistance. Here, all the requirements of farmers can be fulfilled. Farmers visit Rythu Seva Kendram located in their respective area. Until farmers physically visit the RSKs office, there is no means of knowing whether the required fertilizers are available or whether the office is open. There is no platform to connect RSKs staff and farmers. So, this paper presents progressive web app(app) to reduce the gap between RSKs staff and farmers. This system reduces the need for frequent visits to RSKs, as all communication takes place through the application. The app simplifies the work of both RSK staff and farmers. Farmers can access stock details, schemes information, request required fertilizers, pesticides. we included caching technique for providing offline accessibility. So, The data is available to users in offline mode. The RSK staff can make use of this app to monitor stock and sales data digitally, replacing the need for maintaining hard copies of records. Our aim is to reduces the gap between the farmers and RSK officials and make services available to farmers in few clicks. Additionally our innovative approach reduces the workload of the officials also.**

***Index Terms*—KisanConnect, Rythu Seva Kendram, Voice Assistant, web scrap , offline access, Progressive Web App.**

I. Introduction

In India, agriculture is the major source of livelihood. Approximately 47% of the population depends on agriculture for their livelihood. Most of farmer are illiterate and not much aware of handling advanced features of the smart phone. Farmers require seeds, fertilizers, pesticides, and other agricultural inputs. They heavily depend on private dealers, where they have to spend a lot of money to purchase them. The Government of Andhra Pradesh launched Rythu Seva Kendram (RSKs) to assist farmers financially and to supply quality seeds and fertilizers at low cost. Rythu Seva Kendram acts as a one-stop shop for supplying Agricultural Inputs (Seeds, Fertilizers, and Pesticides) to farmers. Approximately 10,778 Rythu Seva Kendrams were established adjacent to village secretariats, integrating an Agricultural Input Shop with a Farmer Knowledge Center. These all created to provide the services to farmers.

These shops create a great impact on farmers, as they can access everything from a single place. Farmers from distant locations must visit the village offices, and many of them do not know the available stock or which schemes they can apply for. If this information is available through an application, it helps farmers stay better informed and prepared. Currently, to request agricultural inputs, farmers must physically come to the office. Providing these services virtually makes it easier for farmers. Most farmers are familiar only with their mother tongue therefore, most solutions developed for them must be localized so that they can easily use them. RSK officials maintain hard copy record of their sales information and availability of fertilizers and quantity of crop.

Bringing all these services into a single mobile application would be beneficial for both farmers and officials. This application helps farmers keep track of stock data through their mobile phones, reducing the need to visit the village office regularly. It reduces the regular visits of farmers while allowing RSKs officials to easily monitor stock and sales data through the app, replacing manual hard copies. Officials can access this information anytime and anywhere, and they can also communicate it easily with higher authorities.

The app stores RSK officials and farmer data using MongoDB, and React is used to build interfaces for both farmers and the RSKs officials. The application can also be accessed in offline mode, which makes farmer's lives easier, this feature achieved using cache mechanism technology. This app takes into consideration about most farmers have low literacy levels. This app have designed to handle any kind of literacy level of farmer, so that it can easily handled by the farmers. The proposed system developed as user friendly interface. Especially for farmers can easy to understand and use the app.

II. Literature Survey

This section provides review of the existing literature and research conducted in the field of agriculture.

[5] This paper aims to provide assistance for farmers. The application includes features such as access to the latest government schemes, crop prediction, and real-time weather updates. However, it does not explain multilingual support for easy understanding of farmers, and the complexity of the application makes it difficult to use. Moreover, although the paper mentions bridging farmers to agricultural inputs, it does not provide information about seeds, fertilizers, or pesticides.

The application is limited to schemes, where as farmers require many additional resources.

[1] Another paper reports that the application was developed to provide farmers with easy access to market prices, crop detection, and a chat bot, along with a multilingual feature. However, the training dataset is limited to specific crops only. There is a possible to not able to predict the unknown sample. In addition, interaction with the chat bot is restricted to manual text input, which makes it difficult for farmers to use the application.

[6] Another application developed for farmers provides crop recommendations through chat bot assistance. Here they included voice base input for the farmers to make it easy for the farmers. Its major drawback is that it is a web-based application, which is not easily accessible to all farmers. Additionally, the chat bot is available in only a single language and does not support local languages.

[10] Another app developed to support RBK officials by simplifying stock and sales monitoring tasks. However, the application does not connect farmers and is limited to office-level monitoring. The system is implemented only in Kankipadu, Andhra Pradesh. The paper itself mentioned that the app is difficult for farmers to use. They have not include any Multilingual features in the their app.

[11] This paper highlights how to connect farmer to retailers to sell their products along with the technologies such as Progressive Web Applications (PWA), blockchain, and integration platforms with WhatsApp can improve transparency, market access, and farmer–buyer connectivity. But their limition is interface is limited to web pages only no mobile based interface is developed. It may helpful to buyers but seller that is farmers may face difficult in accessing the portal.

In [8] paper represents farmers connected to retailer where they get up to date information about pesticide and fertilizers. It is designed as mobile app along with cache mechanism for data in offline mode. They developed into mobile app but limited to only fertilizer and pesticide information only.

III. Proposed Methodology

To develop an application that bridges the gap between farmers and RSKs, a system with the following features is proposed. This system have two interface one for farmers and another RSK Officials:

A. Stock Management

The stock details such as quality seeds, pesticides, and fertilizers are uploaded into the app by officials. These details are made available to farmers through their interface. The data is uploaded only when the stock is currently available at the office. The stock information includes the name, type of product, price, and currently available quantity. The data can be managed only by officials, while farmers can view the information but do not have permission to edit it.

B. Schemes Information

The latest government schemes information are uploaded into the app by the officials. The data includes the category of the scheme (State level or Central level), eligibility details, required documents, and application dates. Farmers can view this information in their interface so that they can come to the office with the necessary documents.

C. Sales Management

The details of products sold to farmers are updated in the app. This helps officials keep track of the quantity of products sold. The information can be managed only by officials, and farmers have no access to this information. Officials can communicate this information with their higher officials easily.

D. Farmers Request Handling

Farmers can send their requests to officials through the app. This enables officials to fetch the requested stock in advance and update the stock details accordingly. The request along with the farmer's details is sent to the officials, helping them identify the requester and contact them if needed.

E. Market Access

Market data is made available to farmers, providing real-time updates on market prices in their local area. The farmers receive the market information specific to the Poranki region since the proposed solution is limited to Poranki region. This data is taken from official website. This page contains real time daily market data.

Other Features:

F. Change Language

The application supports two languages are Telugu and English. The default language is Telugu. They can switch the language based on their requirement.

G. Voice Assistance

Farmers can submit their requests through voice commands, supported in both Telugu and English, it depends on which language is chosen. This feature improves accessibility, especially for farmers who may find typing difficult.

H. Offline Accessibility

The application provides offline access, allowing users to retrieve essential data even without an internet connection. This is particularly useful to users. The data is stored in cache, when the app is accessed in offline then the data is retrieved from local cache. This is especially helpful to farmers.

The below figure describes the architecture of Kisan Connect. It gives basic idea about the working of the system. The system basically include two interfaces.

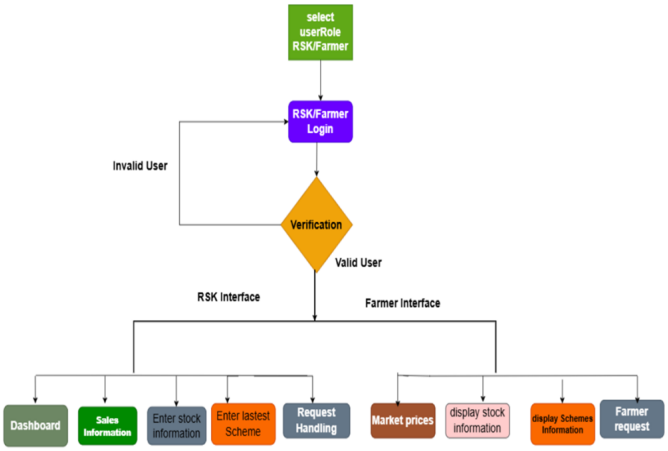

Fig. 1: Architecture Diagram of KisanConnect

IV. Results

The proposed system was implemented and before mentioned features were incorporated in the system. On selecting their role and logging. They access their respective interfaces. Here mainly two interfaces are there. They are Farmer interface and Officials interface.

Below figure shows the RSK Officers Interface Modules.

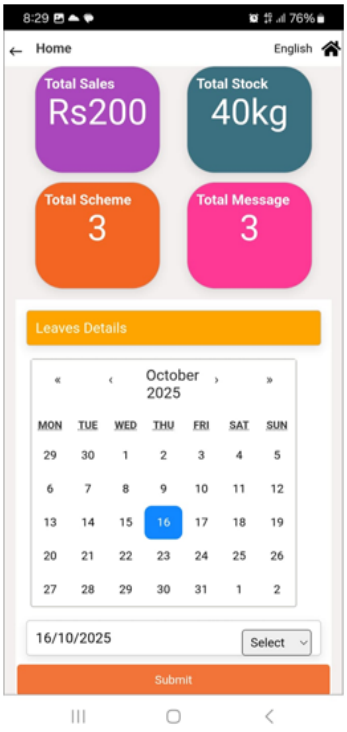

Fig. 2: Dashboard / Home Page

Fig 2 display the available data in statistical form, such as total amount of stock, total sales, number of schemes, and number of requests received. This screen also allows users to upload their leave and holiday information. The statistical information is not displayed for farmers. This information is displayed for the officials only.

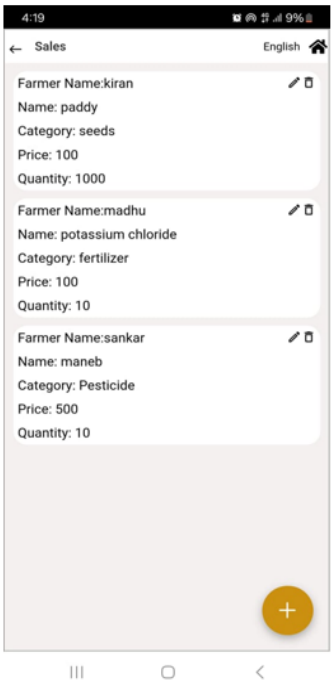

Fig. 3: Sales Management

Fig 3 screen is available for RSK staff only. It enables them to add sales data in the mobile app so they can access information at any time. This allows RSK staff to keep track of sales information.

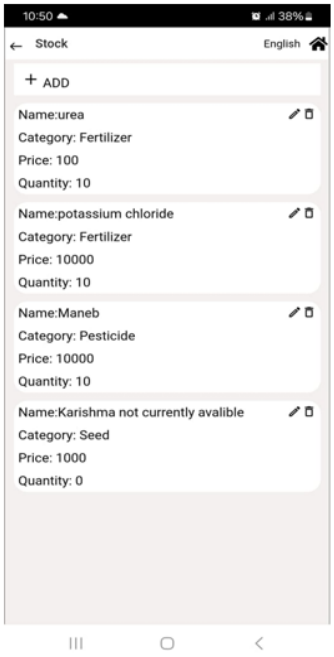

Fig. 4: Stock Management

Fig 4 is the main function of this module is to add new fertilizer/pesticide stock and view current stock levels. Users fill stock data to help monitor inventory. They can update or delete details as needed.

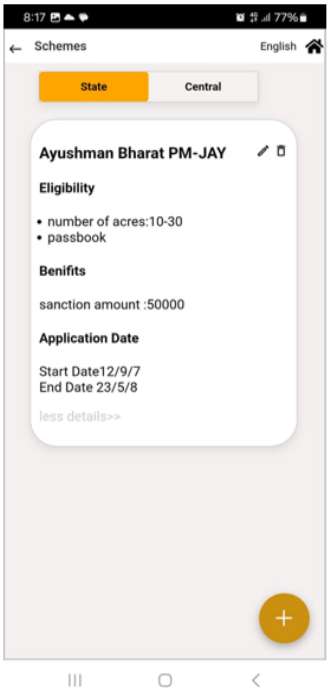

Fig. 5: Scheme Information

Fig 5 page enable Officials upload the latest schemes information released by the government into the app, making it available to farmers. This enables efficient communication of eligibility, benefits, and required documents to farmers.

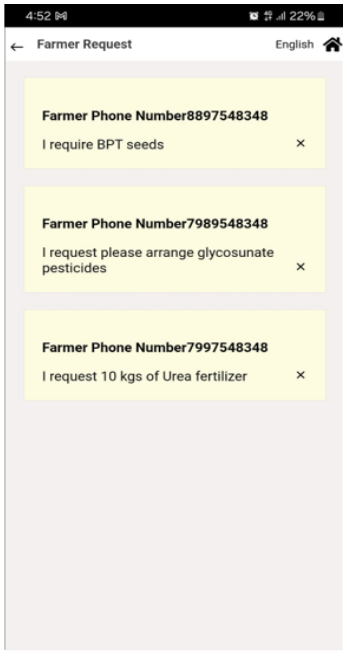

Fig. 6: Farmers Request Handling

Fig 6 is the page officials can view the requests from farmers. Requests sent by farmers are identifiable by RSK staff so they can prepare the requested fertilizers and pesticides in advance. Received requests include farmer details such as phone number.

The below figure shows farmer interface modules. Instructions are included in all farmer modules for easy access.

Fig. 7: Market Price Page

Fig 7 screen provides farmers with up-to-date market details of agricultural products. Along with the closing dates of office is also available in advance from officials.

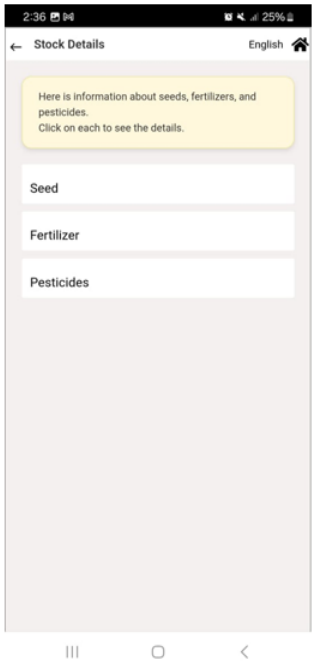

Fig. 8: Stock Page

Fig 8 enable Farmers can view fertilizer, pesticide, and seed options on the screen. They can select an option to view details

such as quantity and price. They have read-only permission.

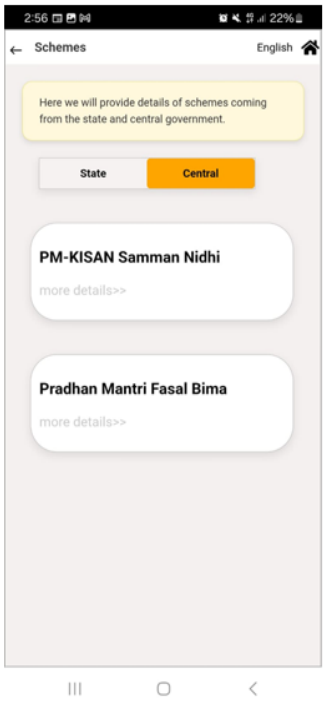

Fig. 9: Scheme Information Access Page

Fig 9 module helps farmers quickly find eligibility criteria, benefits, and application processes. It allows them to arrange the documents in advance. It is categorized into central and state schemes, all latest government schemes information is provided to farmers by officials.

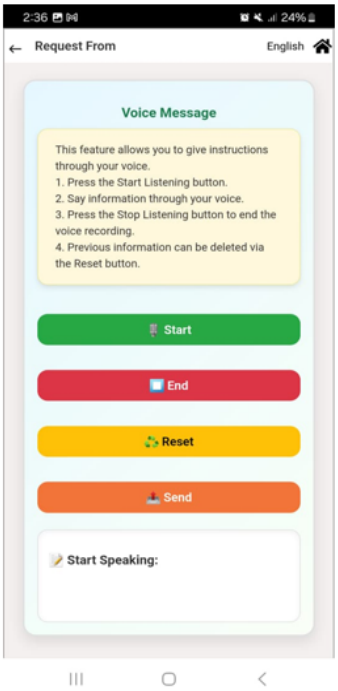

Fig. 10: Request Form of Farmers

Fig 10 represents one way communication where farmers can send their request. Farmers can also request in their local language. The input is given through their voice.

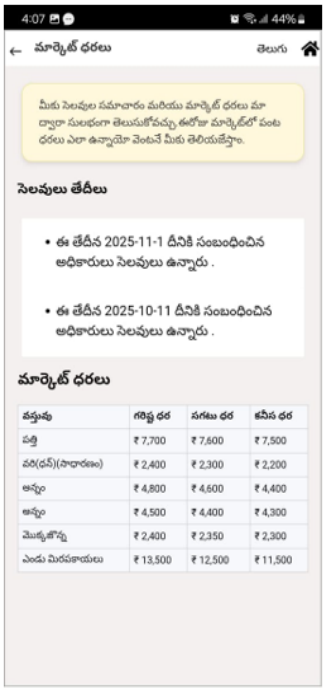

Fig. 11: Market Price Page in Telugu

Fig 11 represents the multilingual feature of the app. It shows the user access page in telugu which was the language chosen by selecting the language from the drop down menu located at the top right position of the appbar.

V. Gap Analysis

TABLE I: Feature comparison among different agriculture applications

Features	**AgriApp [15]**	**Smart-Agri [13]**	**Smart Kisan [1]**	**D-Krishi [14]**	**KisanConnect (our app)**
Offline Accessibility	No	No	No	No	Yes
Connect RSKs and Farmers	No	No	No	No	Yes
Voice Assistance	No	No	No	Yes	Yes
Scheme Information	No	No	No	No	Yes
Pesticides & Fertilizers Info (RSKs)	No	No	No	Yes	Yes
Market Prices	Yes	Yes	No	No	Yes
Multilingual	Yes	Yes	Yes	Yes	Yes
Weather Update	Yes	Yes	Yes	No	No

In the above table compares our app with existing apps such as Agri App, Smart agri , Smart kisan, D-krish. Out of 8 features, 7 features are satisfied. Weather update is not included in our proposed application. Offline accessibility, connecting to RSK, and scheme information from government officials are unique features not present in existing apps.

VI. Conclusion and Future Work

KisanConnect serves as a unified mobile application that bridges farmers and Rythu Seva Kendrams (RSKs) by offering easy and direct access to real time agricultural input and government schemes information. By reducing delays, minimizing manual paperwork and increasing transparency, the application helps farmers to access services very easily. It enables them to get up-to-date information from RSKs. It also helps the RSK staff to easily monitor their stock and sale data through the app. This app is very easy to understand, especially for farmers can learn in less time to use app. On studying various paper we found the gap between the farmers and officials there is exactly no proper app that connect both of them. By on our study we developed this solution.

In the future, we plan to integrate map-based navigation to help farmers easily locate the nearest RSKs. Additionally, SMS-based alert notifications will be introduced to ensure important updates and information reach farmers. We also include image-based searching to allow farmers to upload images and quickly retrieve relevant information. The currently app limited to poranki region in Andhra Pradesh, in future it can extend to any region in Andhra Pradesh and also include farmer assistance through chat bot without involving officials.

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