

Digital Farming Helper an Android-based system for Labor, Farmer, Tenant Farmer, Worker Network and Agri Resources, Vehicle Digital Market

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Peer Review Information	Abstract
Type: Article Received: 23 April 2026 Revised: 24 May 2026 Accepted: 22 June 2026 Published: 20 July 2026	The field of agriculture should be transformed into a digital way, like from purchasing seeds to agricultural vehicles. But before transforming the agricultural field, challenges faced by farmers need to be identified and solved. To identify those challenges previously we conducted a field survey in the villages of Verul and Verul tanda in the Chhatrapati Sambhaji Nagar district in Maharashtra. While doing the survey, a set of questionnaires were distributed among farmers. Those questionnaires were prepared in both the languages, English and Marathi, and responses were collected. Because of this survey we found many challenges. Some of them were described in the previous research paper and some of them will be presented through this study. The challenges such as shortage of laborers, unavailability of workers, shortage of tenant farmers, the high rent of agriculture-related vehicles, were identified. So, in this paper, a solution is presented called Digital Farming Helper, a user-friendly platform which is available with multi-language support. This Android-based platform aims to help farmers, laborers, tenant farmers and all people related to farming by acting as a job searching and finding portal and also acts as a digital platform for selling resources of agriculture, agricultural vehicle selling and buying platform using which farmers, laborers, workers, tenant farmers, agricultural shopkeepers, and agricultural vehicle shopkeepers can connect with each other. Keywords: Agriculture sector; Farmers; Labor; Workers; Sharecropper; Unified Platform; Digital Agro Helper; Upload; Resources; Buying; Selling

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Introduction

Currently, every sector is transforming and becoming digital, like purchasing and selling products using digital platforms, making transactions by using various digital platforms. Also, sectors like education, banking, and business have transformed. The agriculture sector is one of the most important sectors for any country, and farmers, workers, labor, and tenant farmer are the people who are the backbone of this sector. These farmers work every day to grow crops and produce grains. But these people face many challenges while doing farming, such as shortages of labor, shortages of workers, high rent of agricultural vehicles, unpredictable weather, storage unavailability, crops facing disease due to pest attacks on crops etc. Due to which all the hard work of farmers and the result of farming going to waste due to which people's interest in farming has been reduced. Those farmers who face these challenges either stop farming or some of them even attempt suicide, so solving the issues of those farmers is very essential.

In the market, there are various platforms available for farmers which help them to solve this issue, such as AI-based plant disease identification and prevention, apps related to various farming-related schemes, and an agriculture advisory app for farmers are also present. Various schemes are also present to cover the financial loss of crops. Also, other applications are also present to help farmers to buy seeds digitally and connect farmer with labor or farmer with tenant farmer, but a unified platform is not present which could help farmers to post vacancies for labor, workers or tenant farmer regarding farm work.

Also, not that same platform helps farmers, laborers or tenant farmer to post their details and check where hiring is started by the farmer for farming work. Also, in that same app or agriculture resources shopkeeper or agriculture vehicle shopkeepers should be able to post their products and farmer can contact them through the platform. So, if a single app could perform all these tasks, then it would save a large amount of time and increase the employment rate in the agriculture sector, since it has become easy to get job and no need to go to every place to ask for a job. It would also help to reduce the number of jobless people in terms of agriculture sector. So, through this paper we are presenting an overview of such a solution which could solve the issues of farmers. This proposed solution named is Digital Farming Helper, an android based application which is a unified platform which could perform tasks like providing a platform to farmers to post vacancies for labor, workers, tenant farmer related to their farm, also farmers can view labor details and contact them directly and farmers can see agriculture resources store products posted by shopkeeper on this platform and farmers can also see agriculture related vehicle details posted by shopkeeper and the farmer can directly contact them to buy or rent the products and vehicle. And also the tenant farmer, workers, workers, can find a job for them through this platform. Also, this platform is present in Marathi, English and Hindi languages, so every person who speaks a different language can easily use this application in their own language, so no language barrier can come in between.

This platform is designed in such a way that every age group can use it easily. The agriculture sector has to transform the way they work into a digital way because it would benefit them. The aim of this platform is to help farmers, labor, tenant farmers, workers and agriculture resources shopkeepers and agriculture vehicle shopkeepers to transform themselves digitally. This solution mainly acts as a digital job portal for labor, worker and tenant farmer, farmer, and the digital market for resources and vehicle buying, selling and renting.

Problem Statement

Farmers face major challenges such as shortages of laborers, workers and tenant farmers, high rent of agriculture related equipment and vehicle, laborers face several problems like difficulty in finding job or have to travel long distances to get work still unsure about getting a job, workers faces problems like unable to get jobs, while tenant farmer find difficult to get a place to work, agriculture equipment and vehicle shopkeeper lacks large market to sell or give products on rent, agriculture resources shopkeepers also faces lack of large market to sell their product, shopkeepers also face problems of not having enough employees. All this agriculture related people need a unified platform where all these issues can be solved.

Objective

1. Issues of farmers like shortage of labor, worker, and tenant farmers will be solved.
2. Agriculture resources or vehicle shopkeeper gets a digital platform to sell or given on rent their products and gain customers.
3. Issue of job finding will be solved.
4. Agriculture sector gets digital with the help of this platform.

Literature Review

[1] In this paper authors described that they conducted a field survey by visiting villages and distributed questionnaires to farmers and based upon the responses which they got they have found the challenges faced by farmers the challenges include limited resources, lack of awareness about schemes, the latest tools and technologies, financial losses, unpredictable weather, limited manpower, and the high cost of farming instruments etc. So through this paper they are also introducing a solution named Farm Protector an android based platform

which can help farmers to solve all the challenges faced by farmers.

[2] In this paper authors aims to synthesize the current knowledge of smart agriculture highlighting the current status, main components, latest application areas, advanced agriculture practices, hardware and software used, success stories, potential challenges, and countermeasures to them and future trends for growth of industry and acts as a reference for future research. This review paper gives a comprehensive overview of how the IOT is changing the traditional agriculture into smart agriculture.

[3] This paper provides a comprehensive review of the existing literature in AIOT and Federated Learning for SA. This paper also identifies current and potential challenges. This paper also describes that there is lack of comprehensive survey of AIOT from smart agriculture side. The goal of this paper was to survey the SA Landscape covering AIOT architectures and solutions, technologies as they apply to SA.

[4] In this paper authors clarify the benefits of few sub-branches of DA in increasing agricultural production efficiency, and discuss the challenges of practical DA in the field. And they also highlighted the future perspectives of DA. This review paper opens new directions to speed up the DA application on farm and links traditional agriculture with modern farming technologies.

[5] In this paper the authors has reviewed the digital adoption in terms of Indian Agriculture sector and presented a comprehensive account of major ICT initiatives. The author express that India adopted digital solution on a very small scale as compared to International usage of digital solution in agriculture sector. The authors found 28 FMIS solutions that are globally active and have produced the list of 29 local applications spread across 23 different agricultural sub domain. But the authors also mention that among all those applications many were replicating similar features and they were not unique only few were found to be crop-specific applications.

[6] In this paper author express the goal of this paper are to propose a conceptual framework for smart agriculture and digital twins, which takes into account the needs and characteristics of the farms, present the applications of the proposed conceptual framework as a case study, and highlight the challenges of and the future perspectives on smart agriculture. The author first propose a framework for the design of farm information systems consisting of four key phases. Then author applied the framework to present and discuss a field application of smart agriculture and digital twins on crop nitrogen fertilization. This case study and its cited literature highlighted the need to specify the optimal n fertilizer input defining the spatial variability of the land area, the soil characteristics and crop yield and integrate this with temporal variability then the authors discusses the future perspectives with particular focus on geographical areas characterized by small average farm size.

[7] In this paper author mentioned that they conducted this study in four district of Haryana state in different locations. This study aim to find how much mobile apps are used by farmers to increase the agriculture productivity. The authors also want to know the utilization patterns to checked app for general information about agriculture practices, to find market related information, to contact agriculture experts for finding solutions about agriculture related problems. The authors find out that more than half of the respondents have medium level of utilization pattern of agriculture mobile apps on agricultural practices. They conclude that to increase the rate of mobile app utilization in farming for farmers there is a need to conduct training and programs in villages for farmers.

[8] This paper results described that the uber for tractor models have the potential to reduce transaction costs for service providers, specifically the owners of several tractors by allowing the monitoring of tractors and operators through GPS devices. Farmers who use these services have got benefit from the new digital tools since they depend on analog solutions booking agents and phone calls instead of using a smartphone app to request services. Overall, the paper explains that uber for tractors is a good concept but investment in some conditions like digital literacy, network coverage is essential to use the full potential of such digital technologies for farmers in this developing world.

[9] The authors of this paper mentioned that they conducted study in Nashik and Sangli districts of Maharashtra by interviewing 800 grape growers during 2016-17. The result obtained from this study provides insights to extension agents to devise strategy for introduction of any technology.

[10] This study determines the effectiveness of mobile as an approach for providing targeted agri-advisory services to farmers at scale. A cross- sectional survey of farmers registered on CABI's Direct2Farm (D2F) user database was undertaken using a combination of telephone interviews, household survey at six states in India. The study express that D2F service was effective in reaching large number of farmers in different geographies. Here farmers expressed that they prefer text message over voice message because they could consult technical persons if the message were not clear.

Research Gap

After reviewing these papers, we found that there are several platforms present for various tasks like selling products online, advisory apps, plant disease identification apps, etc. But still there is an absence of a unified Android application where farmers can post job vacancies for their farm such as need of laborers, workers and tenant farmers. Farmers can also view the profiles of laborers, workers, tenant farmers

to find a suitable match for their farm work. Also, farmers can view products from agri-resource shops and agri-vehicle shops and with the help of the same platform they can find shopkeeper details and contact them for buying or renting the products. Laborers, workers, tenant farmers can create their profiles and upload their details and skills and also view the job vacancies so they can apply to the respective job, so finding a job becomes easier. Agri resources and Agri vehicle shopkeeper can upload their products and they can advertise their products and they can also hire labor, worker for their shop. So currently such unified platform is not yet available.

Methodologies

Survey Conducted

Previously, a survey was conducted in the Verul and Verul Tanda Villages in Chhatrapati Sambhaji Nagar. During this survey, a questionnaire was distributed among farmers. This questionnaire consisted of 45 questions. This questionnaire was prepared in English and Marathi, and based on the responses received from farmers, challenges faced by farmers were identified. Some of these challenges were mentioned in our previous research paper presented at and published in the conference proceedings. Some of these are mentioned in this paper and to address those challenges in this paper we are introducing a solution named Digital Farming Helper, an Android-based application. This paper mainly focuses on challenges such as labor, worker and tenant farmer shortages, and high rent of agricultural resources and vehicles.

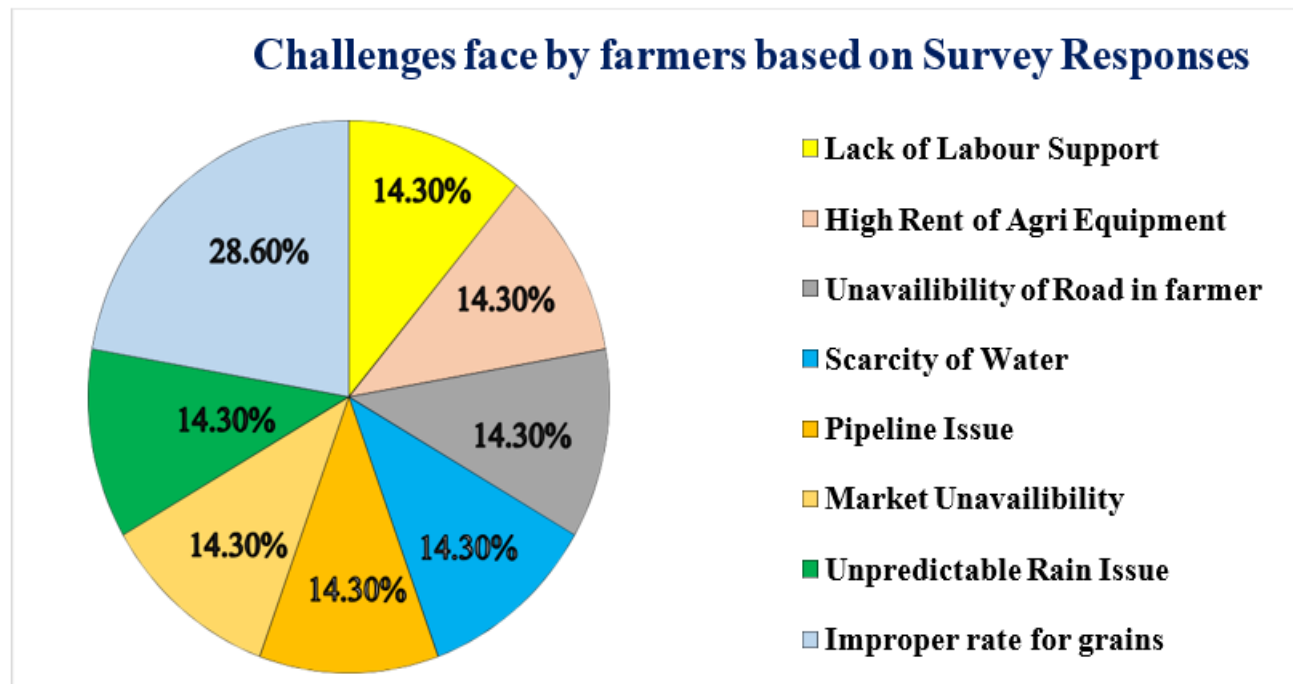


Fig. 1. Challenges face by Farmers based on Survey Responses

Figure 1 shows the statistical data representing challenges faced by farmers. Here, the improper rates for grains are the major challenge with 28.60% of the responses. Other identified challenges include lack of labor support, high rent of equipment, and unavailability of road on farmer's farm. Scarcity of water, pipeline issues, market unavailability, and unpredictable rain issue these challenges are present at 14.30% of the responses of farmers.

Application Developed based Survey Responses

Based on the responses received from farmers, Digital Farming Helper is developed to fulfill requirements and expectations of farmers. This platform is built using Android studio software and for storing database firebase is used. Also this application supports English, Marathi and Hindi. For backend java programming language is used, for frontend xml and drag and drop approach is used. This application is designed based on the expectation of farmers and to address the challenges mentioned by them.

Firebase Data Storing Platform

For this proposed solution firebase is a software which is used to store all the data such as login details like username and password, profile details, vacancy post data, agri vehicle and agri resources products data etc. all such data entered in this platform will be stored in firebase software.

Digital Farming Helper an Android-based system for Labor, Farmer, Tenant Farmer, Worker Network and Agri Resources, Vehicle Digital Market.

Android Studio

For development of this application android studio platform is used where all the frontend work of app is created using pick up and drop approach and xml and all the backend work of app is created using java language and for storing all the data firebase is used.

Proposed System

Architecture of Digital Farming Helper

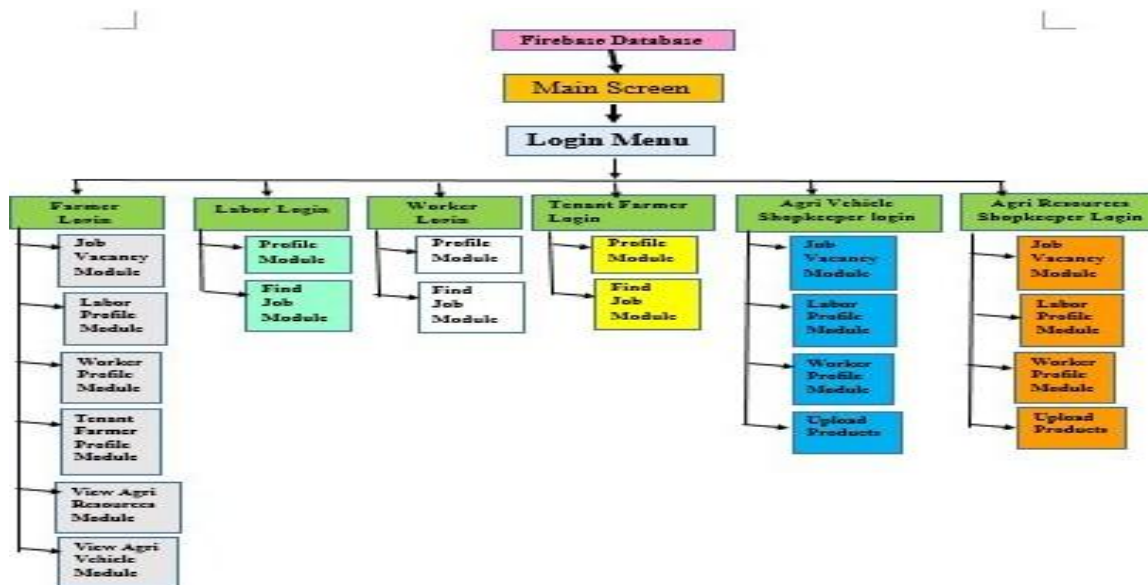


Fig. 2. Architecture of Digital Farming Helper

The figure represents the architecture of Digital Farming Helper, an Android-based platform. Here, the first, the Firestore Database block represents the layer which stores all the data of the app starting from login details to all data. The main screen represents the initial screen in which the app uses the splash screen. The Login Menu represents all the logs present in the app in which different people, like laborers, workers, tenant farmers, farmers, agri resources shopkeepers and agriculture vehicle shopkeepers, can log in themselves and use this application, Only authenticated user can access this application.

Farmer login is the module using which the farmer can use this app. There they get several options, like post job vacancies, checking various labor profiles, checking worker profile, checking tenant farmer profile, to find a suitable labor, worker or tenant farmer for their farm. Also, using this module, farmers can view agri resources shop products through this app and details of product so they can buy or rent them.

View agri vehicle shop vehicles through this app so they can buy or rent the vehicle for their farm work. Labor login is the next module where laborers can upload their profile data, and they can also view jobs available. Worker's login also provides facilities for workers to upload their profile data and find. Tenant job. Tenant farmers login also provides facilities for tenant farmers to upload their data and view job availability.

Agri-vehicle shopkeeper login also allows shopkeepers to upload their shop products and advertise their product, they can also post job openings in their shop, and they can also view labor profile, and worker profiles to find the perfect candidate for their shop work. Agri resources shopkeeper login module also contains the same functionalities as the agri vehicle shopkeeper login module.

Flowchart of Application

Figure represents flow of Digital Farming Application where first start state represent starting of application, then login by job written inside of diamond shape represent a decision that people can login in the app based on their job like if farmer then login in farmer login and enter farmers username and password, same for all the other job roles like labor, worker, tenant farmers, agri resources shopkeepers, agri vehicle shopkeeper etc.

If user is farmer and logins successfully, he can perform various task like post job vacancy for people, check labor profile to find perfect labor for their farm, same for worker, and tenant farmer, then farmer can view farming resources module and view agri vehicle module. Same for another login role.

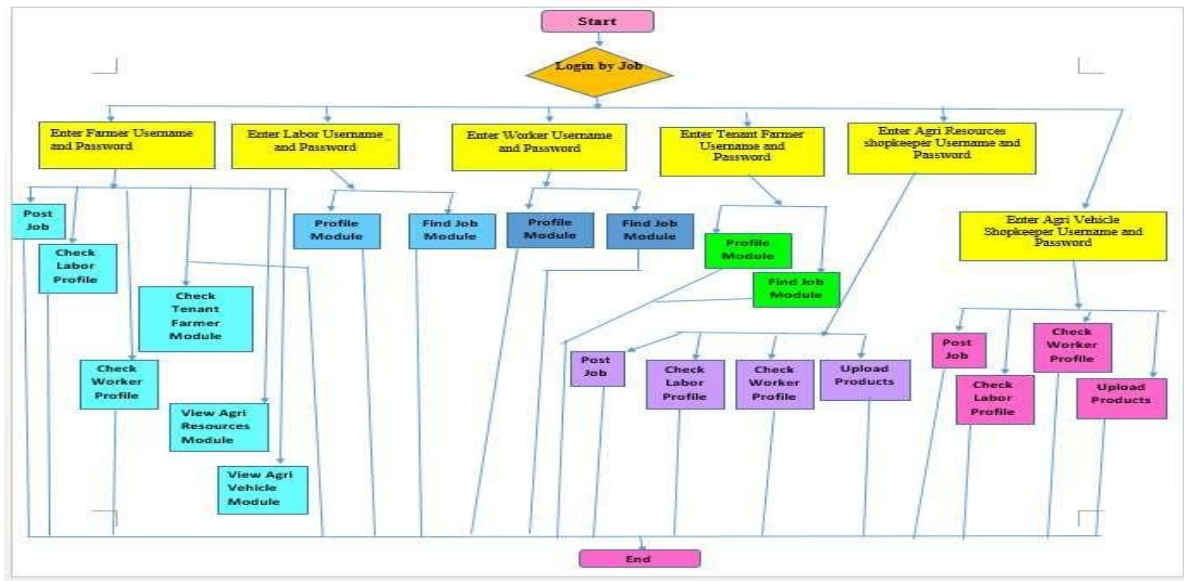


Fig. 3. Flow of Application

Result

Survey Result

To identify the real challenges faced by farmers previously we conducted a survey in the Verul and Verul Tanda villages of Chhatrapati Sambhaji Nagar there questionnaires were presented to farmers and based on the response achieved we have identified the challenges. To help farmers to solve those challenges in this paper we are presenting a proposed solution android based platform. This platform has the potential to help farmers to solve those challenges and this platform is created based on the expectation of farmers so our main aim is to fulfill farmers' expectation.

Screenshot of Application

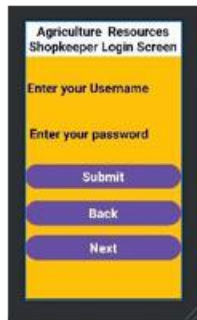


Fig. 4. Agriculture Resources



Fig. 5. Farmer Login

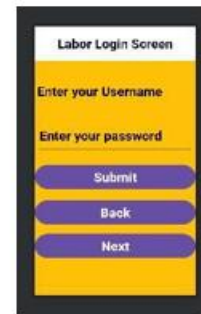


Fig. 6. Labor Login Shopkeeper



Fig. 7. Language



Fig. 8. Registration Screen



Fig. 9. Worker Module Selection Screen



Fig. 10. Labor Profile



Fig. 11. Agri-Resources



Fig.12. Login Menu Module

From fig 4 to 12 represents Digital Farming Helper Application. Once the application is installed the user will be redirected to Main Activity which acts as a splash screen later after 5 seconds the user will be redirected to Login Menu and looks exactly like Fig. 12 there user have to login based on their job role when they click on that specific button they will be redirected to that specific login screens suppose user clicks on farmers login button they will be redirected to farmer login screen there they have to login themselves using username and password.

If they are already registered candidate and has their username and password they can easily login the app and will be redirected to farmer main module there they will have several options such as post job vacancies, view labor profile, view worker profile, view agri- resources products, view agri- vehicle products, view tenant farmers profile etc. if they are not registered then they will have to click on register button and first register themselves then only they can use this application. In similar way labor, worker, tenant farmer and agri- resources shopkeepers and agri- vehicle shopkeepers have to register and login to use this application.

Conclusion

From the previous survey conducted, it has been identified that farmers need a platform through which the issues related to labor shortages, worker unavailability, and lack of tenant farmer help to resolved. They need a platform where they can post job vacancies and find suitable laborers, workers and tenant farmers for their farm. And laborers, workers, and tenant farmers need a unified digital job platform through which they can find a suitable job for themselves. The proposed solution presented in this paper represents an Android-based platform which provides farmer with a list of products related to agri resources and agri vehicles uploaded by shopkeepers, so farmer can rent or buy them by contacting the shopkeeper with the help of details shared by this platform. Farmers need an app which connects them with skilled laborers, workers and tenant farmers. This paper concludes that development of such a platform will definitely transform the agriculture sector into a digital mode.

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