“Kheti Sahayak”: Ek Desh, Anek Kisan, Ek Saath

An Engineering Project in Community Service

Final Report

Submitted by

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in partial fulfillment of the requirements for the degree of Bachelor of Engineering and Technology





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Bonafide Certificate

Certified that this project report titled **"Kheti Sahayak" : Ek Desh, Anek Kisan, Ek Saath"** is the bonafide work of

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This project report (Phase II - Final Review) is submitted for the Project Viva-Voce examination held on 09th May 2024.

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1. INTRODUCTION

Empowering Agriculture with “Kheti Sahayak”: A Vision for Growth and Unity

In the heart of India's vast agricultural fields lies an abundance of untapped potential, waiting to be unlocked for growth, prosperity, and unity. "Kheti Sahayak" stands as a beacon of hope, bridging the gaps between seasons, farms, and aspirations. More than just a tool-sharing platform, our project represents a transformative force in India's agricultural landscape.

Driven by the vision of ensuring every farmer's access to the right tools at the right time, "Kheti Sahayak" is dedicated to empowering the backbone of our nation—the farmers. Envision a future where a farmer's success transcends seasonal limitations, propelled by a collective spirit of resource-sharing, knowledge exchange, and mutual support.

We firmly believe that by fostering a culture of collaboration, we can revolutionize traditional agricultural practices in India. "Kheti Sahayak" transcends being a mere project; it is a movement, a compelling call to action for every farmer to be part of a larger collective endeavor.

In this transformative journey, "Kheti Sahayak" aims to create a sustainable and interconnected farming ecosystem. Through collaborative efforts, we aspire to redefine the narrative of Indian agriculture, where farmers are not isolated entities but integral contributors to a shared vision of growth and resilience.

Join us as we cultivate this spirit of unity and progress, planting the seeds of change that will shape the future of agriculture in India. "Kheti Sahayak" is not just a project; it is a commitment to building a community where farmers thrive collectively, overcoming seasonal challenges and ushering in an era of shared prosperity and agricultural excellence.

1.1 Motivation

We conducted a comprehensive survey across four key agricultural states—West Bengal, Uttar Pradesh, Maharashtra, and Madhya Pradesh—and uncover compelling insights that motivate the development of our tool lending platform, “**Kheti Sahayak**”

As per our survey (in fig 1.1) reveals a diverse landscape in current tool usage among farmers. While 30% regularly use tools throughout the year, 28% adopt tools seasonally, emphasizing the importance of adaptable agricultural practices. Notably, 42% of farmers do not utilize tools year-round, underscoring a significant opportunity for our tool lending platform to optimize resource utilization and

facilitate collaborative farming efforts.

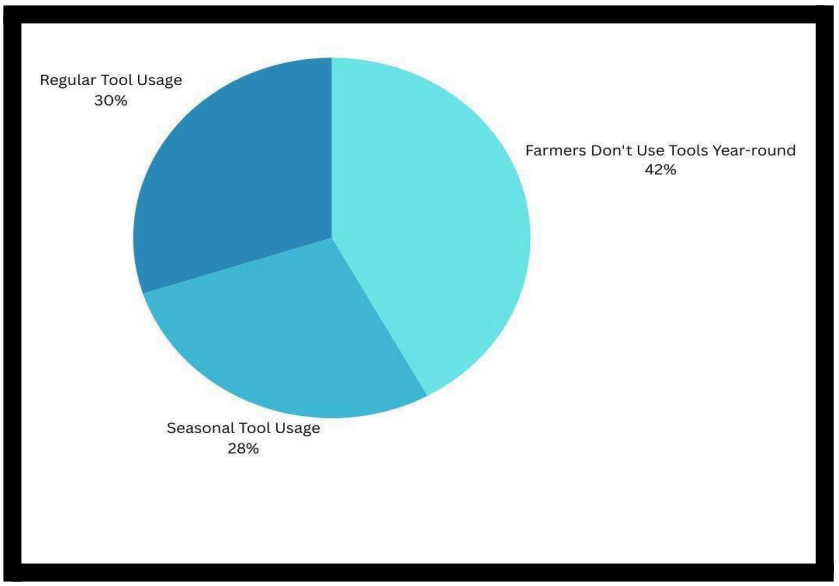


Fig 1.1 Distribution of Tool Usage Across Different User Groups

In Fig 1.1, it is visualizing the distribution of tool usage across different user groups, and stakeholders can gain insights into user behavior and preferences. This information can inform strategic decisions related to product development, marketing strategies, and customer support initiatives to better cater to the diverse needs of each user segment.

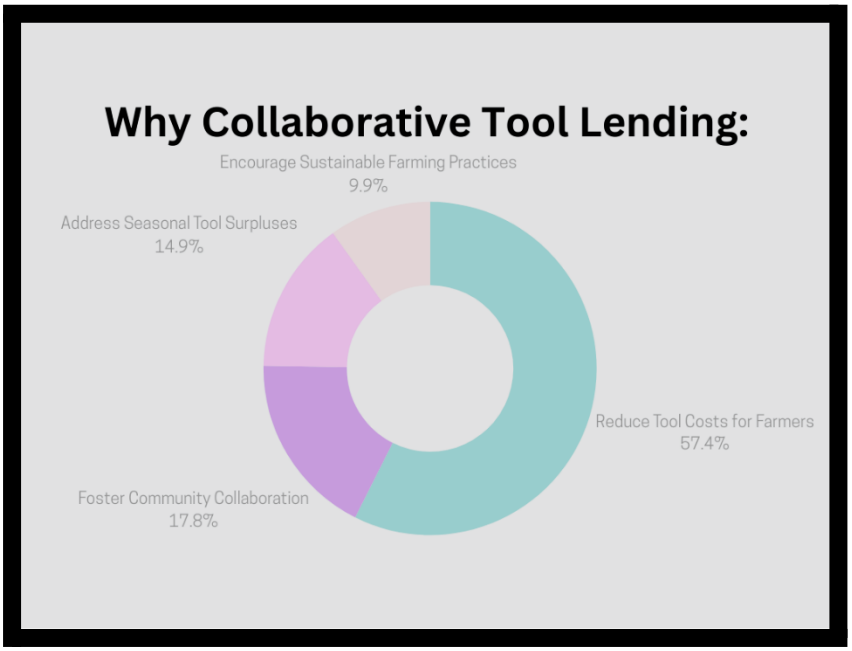


Fig 1.2 Statistical Data About Collaborative Tool Lending

Fig 1.2 shows the statistical data about collaborative tool lending [2]. Collaborative tool lending is a powerful solution, resonating with 57.4% of farmers who aim to reduce tool costs. Beyond financial benefits, it embodies a shared commitment, with 17.8% emphasizing community collaboration, 14.9% addressing seasonal tool surpluses, and 9.9% contributing to sustainable farming

practices. This synergy creates a platform not only for economic efficiency but also for fostering a united and sustainable agricultural community.

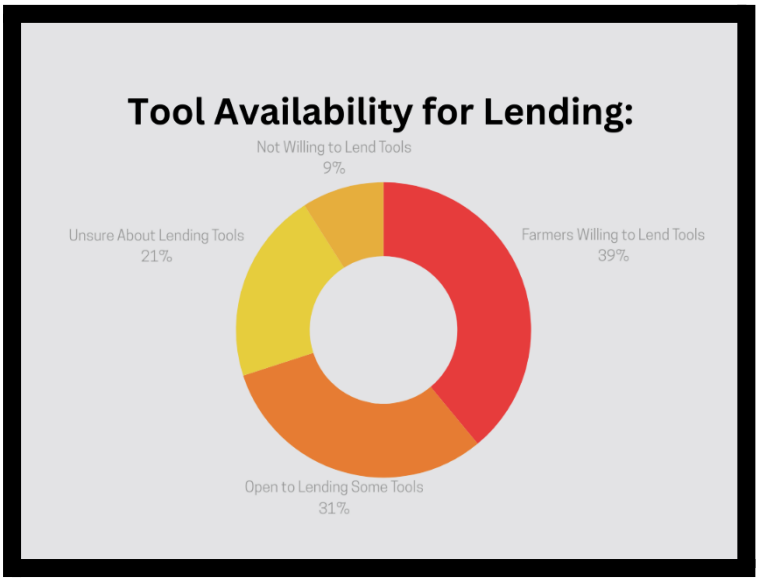


Fig 1.3 Statistical Data for The Availability of Tool for Renting

Fig 1.3 shows the statistical data for the availability of tools for renting. People not willing to lend tools comprise 9% of the total number of people in our survey. The ones willing 39% and unsure are 21% and the farmers open to lending tools are 31%.

Our most compelling motivation stems from the enthusiastic response to tool lending [2]. An encouraging 70% of farmers express a willingness to share resources: 39% are ready to lend tools, while an additional 31% are open to lending some. This overwhelming interest reflects a substantial reservoir of untapped collaborative potential, reinforcing our conviction that "**Kheti Sahayak**" can seamlessly connect farmers willing to lend with those in need, fostering a culture of mutual support and resource optimization.

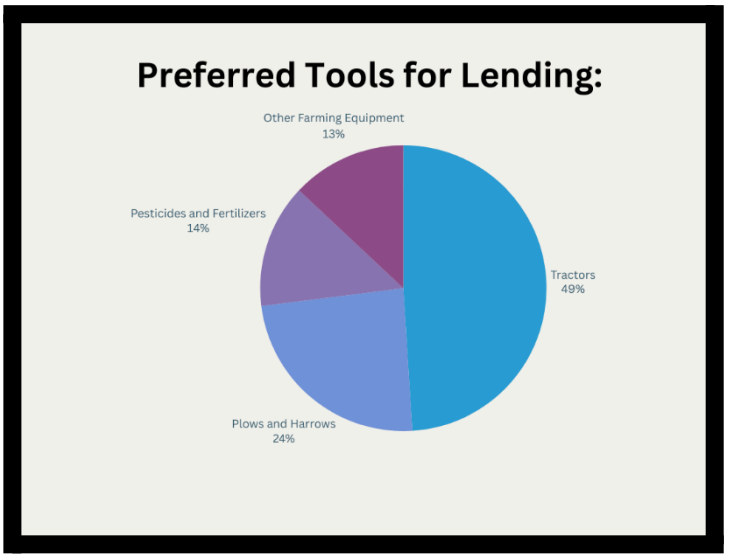


Fig 1.4 Preferred Tools for Renting

In Fig 1.4, you can see that the farmers overwhelmingly prefer lending key tools, with 49% favoring tractors, 24% opting for plows and harrows, and 14% choosing pesticides and fertilizers [9] [12]. This data underscores the significance of these essential tools in collaborative farming practices, guiding the focus of "**Kheti Sahayak**" to facilitate efficient sharing of these crucial resources among the agricultural community.

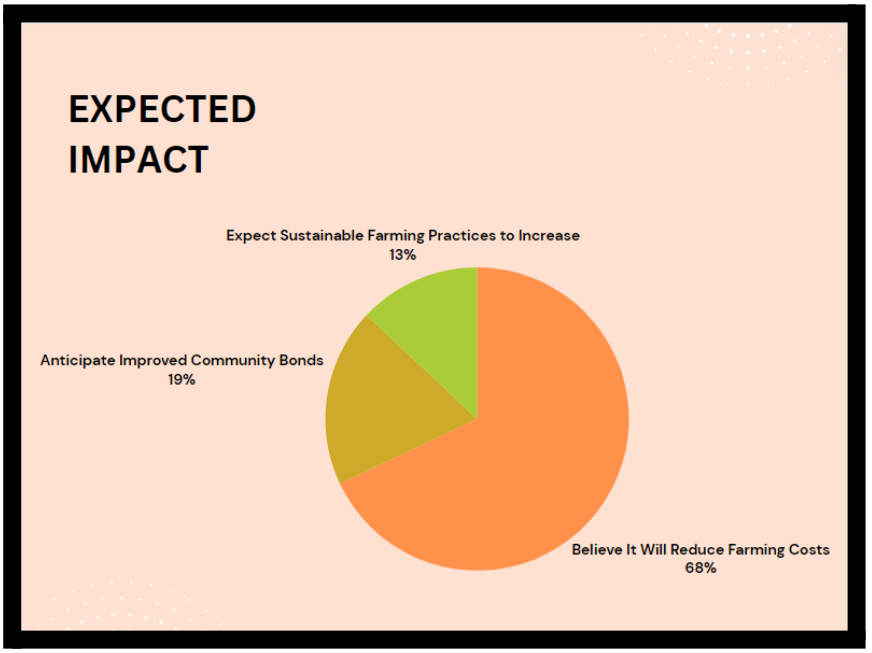


Fig 1.5 Expected Impact

In Fig 1.5, the anticipated impact of "**Kheti Sahayak**" resonates strongly with surveyed farmers, as 68% believe it will significantly reduce farming costs [14]. Beyond financial benefits, 19% foresee improved community bonds, and 13% expect a notable increase in sustainable farming practices.

This collective optimism reinforces our main motivation: to create a transformative platform where farmers collaboratively lend tools, fostering economic efficiency, community cohesion, and sustainable agricultural practices.

1.2 Objective

Our mission lies in a multifaceted approach aimed at revolutionizing agriculture. Our primary objective is encapsulated in a set of commitments, each designed to address crucial aspects of farming practices:

i. **Optimized Tool Access:** We pledge to streamline access to a diverse range of agricultural tools, delivering tailored and cost-effective solutions to farmers nationwide, in alignment with seasonal demands.

ii. **Cross-Seasonal Collaboration:** Our vision is to cultivate vibrant, cross-seasonal networks where farmers seamlessly share tools, fostering collective productivity and success irrespective of geographical boundaries.

iii. **Empowering Individuals:** Our mission is to empower individual farmers by providing timely access to essential tools, alleviating financial burdens, and enhancing overall productivity to promote sustainable agriculture.

iv. **Unity Through Collaboration:** We are dedicated to breaking down traditional barriers, fostering a sense of unity among farmers, and promoting mutual support for shared prosperity within the agricultural community.

v. **Advocacy for Sustainability:** We aim to promote sustainable practices by optimizing tool usage, minimizing waste, and championing eco-friendly farming methods to make a positive impact on agriculture and the environment.

vi. **Awareness and Education:** Our commitment extends to increasing awareness about the benefits of collaborative farming and resource-sharing, providing educational resources to empower farmers with knowledge for informed decision-making.

vii. **Enhancing Financial Inclusion:** With a focus on supporting the financial inclusion of small and marginal farmers, we aim to grant them access to high-quality tools without the burden of ownership, contributing to economic empowerment.

viii. **Continuous Impact Assessment:** We commit to regularly measuring and assessing the social, economic, and environmental impact of our project, ensuring alignment with broader goals of sustainable agriculture and community development.

ix. **Promote Digital Inclusion:** Bridge the digital divide in rural areas by providing access to technology and digital platforms, empowering farmers with tools for success in an increasingly digital world.

x. F**acilitate Skill Development:** Facilitate skill development and capacity building among farmers by providing access to training materials, tutorials, and expert advice on farming techniques, technology adoption, and best practices.

1.3 PROPOSED WORK:

- For our project, "**Kheti Sahayak**," we have planned out the essential steps to make it work smoothly connecting farmers and making farming tools accessible when and where they're needed.
- We're creating an easy-to-use platform where farmers can quickly sign up and share details about their farming needs.
- Developing a smart system that pairs up farmers with the right tools based on what they need and what's available.
- Making sure farmers get job opportunities nearby, so they don't have to travel much, saving time and money.
- Spreading the word about "**Kheti Sahayak**" in communities to get more farmers on board, helping each other out.
- Adding a simple rating system so everyone knows who's reliable and accountable in the community.
- Actively supporting farmers in sharing tools, focusing on making farming practices more sustainable and efficient.
- Implementing robust security measures to ensure that user accounts are protected and only accessible by authorized individuals.
- Conveniently browse and sort through available tools based on specific categories, streamlining the tool selection process
- Digital wallet functionality, enabling users to securely store funds and conduct seamless transactions within the platform.
- An admin panel equipped with robust security features and comprehensive management functionality, empowering administrators to oversee platform operations effectively and ensure seamless functioning.
- Providing access to agricultural experts or advisors who can offer guidance and support to farmers on best practices, crop management techniques, etc.

2. Literature Review

Sr no	Title	Author	Findings	Dataset Used	Drawbacks
1	An Analytical Study of the Types of Implements used by Farmer in Mechanized Agriculture	M. Rakhra *et al*	1.The research report offers a thorough classification and categorization of the many kinds of tools used in mechanized agriculture [1]. 2.It emphasizes how important these tools are in forming agricultural processes and how much of an impact they have on the productivity and efficiency of contemporary farming methods. 3.By examining how agricultural tools and machines work, the study sheds light on how technical improvements have changed throughout time. 4.The study highlights the ongoing innovation in farming equipment, demonstrating how technology is constantly evolving in the agricultural industry [8]**.** 5.The need of keeping up with technological advancements in mechanized agriculture is emphasized in the conclusion, along with their critical role in resolving issues and guaranteeing long-term success in supplying the world's food needs.	1.Data gathering Technologies: To obtain information on implement usage, agricultural methods, and field conditions, the research may have made use of a variety of data gathering technologies, including sensors, IoT devices, or drones. 2.Geospatial Technologies: It would have been possible to map and examine spatial patterns of implementation and their effects on agricultural landscapes by using Geographic Information System (GIS) and Global Positioning System (GPS) technologies. 3.Statistical Software: R or Python statistical software may have been used for data processing, analysis, and visualization during the data analysis process.	1.Scope Limitations: The research may suffer from limitations in scope, focusing on specific aspects of mechanized agriculture and potentially neglecting crucial dimensions, such as economic or environmental impacts. 2.Methodological Ambiguity: Insufficient details on the methodology employed for implementing classification may undermine the paper's credibility, as readers may find it challenging to assess the robustness of the study. 3.Geographical Bias: If the research primarily examines a specific region or type of agriculture, it might lack generalizability to diverse agricultural contexts, limiting its broader applicability. 4.Incomplete Stakeholder Engagement: The absence of perspectives from farmers, policymakers, or other stakeholders may result in a one-sided analysis, overlooking critical insights and experiences relevant to the study.

				5.The need of keeping up with technological advancements in mechanized agriculture is emphasized in the conclusion, along with their critical role in resolving issues and guaranteeing long-term success in supplying the world's food needs.	4.Farm Management Software: To combine and analyze data on crop yields, implement usage, and other pertinent agricultural metrics, the research may have made use of farm management software. 5.Communication Technologies: Mobile apps and internet platforms are examples of Information Communication and Technology (ICT) tools that could	5.Data Bias and Reliability: If there is a lack of transparency regarding data collection methods or potential biases in data sources, the reliability and objectivity of the research could be compromised, affecting the validity of its conclusions.

2	**Computational perspective on organic farming — A survey**	N.Thilagavathi, T. Amudha and N. Sivakumar	2017	1.The report emphasizes how important organic farming is to maintaining agriculture in a way that is environmentally benign. 2.The advantages of organic manures over chemical fertilizers and contemporary farming practices are emphasized. 3.A detailed list of the nutrients found in different organic manures, green manures, and green leaf manures is given in the paper. 4.Reducing reliance on artificial fertilizers and boosting usage of on-farm and green manures are calls for promoting organic farming. 5.A crucial element in the development of instruments and software for maximizing nutrient distribution, quantifying soil nutrients, and improving overall crop management is information, communication, and technology (ICT).	1.ENVIRO-GRO Model: Specifically for maize and wheat, the ENVIRO-GRO model simulates the effects of salt, irrigation, and nitrogen on crop output. It was created by Pang and Letey in 1998. It takes into consideration elements that affect both plant development and evapotranspiration, such as insufficient nitrogen or water. 2.Software called FERTIAGRIBIO: Developed by the Technical Institute for Organic Farming in France, FERTIAGRIBIO is a tool for managing nitrogen supplies in organic farming. It includes information from intercrops, organic amendments, and leguminous crops. 3.In the context of organic farming, remote control systems are being investigated as a means of facilitating wireless data collecting and controlling crop output through mobile laboratories. 4.With the use of GPS and Geographic Information System (GIS), technologies such as those used by Ravensdown in New Zealand can accurately record application. 5.In developing	1.Data accessibility and quality: Compared to conventional farming, organic farming methods are frequently more diversified and site-specific. Because of this, gathering consistent, high-quality data that works well in computational models may be difficult. 2.Ecological system complexity: The intricate relationships between soil, plants, insects, and microbes are essential to organic farming. It can be challenging to accurately capture these dynamics in a computational model, which might not entirely reflect reality. 3.Prioritise yield or efficiency over sustainability: Computational models may emphasize these objectives above everything else, which may not necessarily be in line with the more general objectives of organic farming, such as maintaining biodiversity or soil health. 4.Restricted scope: It may be difficult for computational methods to take into account the social and economic facets of organic farming,

3	**The Role of Digital Platforms in Disrupting Agricultural Value Chains in Developing Countries**	Bookie Ezeomah & Richard Duncombe	2019	1. Digital platforms have significantly disrupted traditional agricultural value chains in developing countries. 2. Increased efficiency in resource allocation, leading to improved agricultural productivity. 3. Enhanced market access for farmers, reducing dependency on intermediaries. 4. Digitalization facilitates real-time data exchange, optimizing decision-making processes in farming. 5. Digital platforms are reshaping traditional agricultural value chains in developing nations, yielding transformative outcomes. 6. The study identifies increased operational efficiency, leading to a tangible boost in overall agricultural productivity. Farmers experience improved market access, reducing dependency on traditional intermediaries.	1. Comprehensive data on the adoption of digital platforms by farmers in multiple developing countries. 2. Economic indicators reflecting changes in agricultural productivity and income. 3. Surveys capturing user experiences and challenges faced during the transition to digital platforms. 4. Adoption patterns of digital platforms by farmers across diverse developing countries. 5. Economic indicators reflecting shifts in agricultural productivity and income in response to digitalization. 6. In-depth surveys capturing user experiences, shedding light on challenges encountered during the transition to digital platforms.	1. Connectivity challenges in remote areas hinder widespread adoption. 2. Limited access to smartphones and digital literacy pose barriers for some farmers. 3. Privacy concerns regarding data security and ownership on digital platforms. 4. Unequal access among farmers, potentially exacerbating existing socio-economic disparities. 5. Connectivity challenges persist in remote regions, hindering the widespread adoption of digital platforms. 6. Limited access to smartphones and varying levels of digital literacy pose barriers for certain segments of the farming community. 7. Privacy concerns regarding data security and ownership emerge as potential obstacles. 8. Unequal access to digital resources among farmers may exacerbate existing socio-economic disparities.

				7. Real-time data exchange facilitated by digitalization enhances decision-making processes across various facets of farming.		

4	Integration of Information and Communication Technologies in Agriculture for Farm Management and Knowledge Exchange	C. Chas Chatzis	2022	1.Cross-Discipline Approach in Agriculture: The changing demands of the agricultural sector call for a multidisciplinary approach that places a strong emphasis on integrating information and communication technology (ICT) tools into every step of the farming process. 2.ICT Tools for Comprehensive answers: ICT tools are essential for addressing many facets of contemporary agriculture and offer comprehensive answers. These solutions range from data gathering and processing to visual analytics and AI algorithms. 3.Advice for Farmers Using Cutting-Edge Equipment: The necessity for organized support systems is highlighted by the rising demand for guidance to maximize profit and productivity as farmers use more sophisticated technology. 4.The role of ICT platforms: ICT platforms come into play as a solution, allowing farmers to consult with experts and create a collaborative environment for ongoing learning and problem-solving.	1.Information and communication technologies (ICT): Throughout the agricultural lifecycle, considerable emphasis is placed on data collecting, processing, visual analytics, and AI algorithms. 2.The PestNu architecture incorporates blockchain technology to guarantee the confidentiality and integrity of incoming data. 3.In precision livestock farming, artificial intelligence (AI) and computer vision (CV) are used to monitor animal welfare, increase productivity, and improve food quality. 4.A feature of the PestNu architecture is the cloud-based farm management system, which offers a user-friendly platform for applying different AI algorithms and guaranteeing ongoing intelligence on the state of farm management. 5.Through web interfaces, social media features, and collaboration tools, the SmartRoot OpenHub Knowledge Exchange Platform enables collaboration between professionals, farmers, and stakeholders in the agriculture domain.	Limited Focus on Real-World Applicability: While discussing the integration of ICT tools in agriculture, the paper does not offer enough proof of real-world application, which could restrict the usefulness of the suggested solutions. Neglect of Privacy and Security considerations: There may be possible problems with the safeguarding of sensitive agricultural data if privacy and security considerations related to the compilation of various data sources are not fully addressed in the research. Insufficient Comparison with Current Solutions: It is difficult to evaluate the uniqueness and efficacy of the suggested PestNu architecture and OpenHub platform because the report does not provide a thorough comparison with current agricultural information platforms or technologies. Underestimation of the Difficulties in Farmer Adoption: Although the article acknowledges that farmers utilizing cutting-edge equipment need rules, it does not investigate the potential challenges and barriers to adoption.

5	Development of manually operated seed planter machine	A.O.Hannure , S.P.Kshirsagar , V.S.Kodam, O.N.Patange , V.S.Nakod	2016	Objective: The primary goal of the seed planter machine design is to achieve precise sowing operations, ensuring proper depth, seed-to-seed spacing, soil coverage, and compaction for optimal crop yields. Factors Affecting Seed Emergence: Consideration of mechanical factors is crucial, impacting seed germination, including uniformity of seed depth placement and distribution along rows. These factors vary for different crops and agro-climatic conditions. Power Transmission Mechanism: The machine utilizes a power transmission mechanism, employing components like seed meter mechanisms, plunger mechanism, and more. The power wheel, driven as the machine is pushed, rotates and transmits power to the plunger through a chain and sprocket mechanism. Working Mechanism: As the machine is pushed, the rotating power wheel transmits power to the plunger via a chain and sprocket. A cam mounted on the sprocket shaft pushes the plunger downward. During the backward stroke, a flapper opens, allowing seed separation from the plunger and insertion into the soil.	1. Design modification in a multipurpose sewing machine for efficient sowing operations. 2. Addressing issues with bulkier, costlier imported machinery for sowing purposes. 3. Components include a hopper, seed metering mechanism, ground wheel, power transmission system, seed distributor, and tiller. 4. Main shaft with a disc and scoops inside the hopper for effective seed distribution. 5. Rotation of the ground wheel drives the main shaft through the power transmission system. 6. Tiller ensures good contact with the ground and is adjustable via a DC motor for optimal angles. 7. Conclusion highlights advantages: - Reducing seed plantation time. - Increasing seed efficiency time. - Enhancing overall plant efficiency and reducing manual	Automatic Seed Feeder is invention in the,which is having several Drawbacks The drawbacks of the automatic seed feeder is that it has several drawbacks 1)It needs a lot of water intensive resources. 2)It needs lot of space intensive to do the work 3)It needs lot of money to do the work

				Importance of Belt with Holes: To enhance efficiency, a belt with small holes and defined thickness is suggested. This belt plays a crucial role in the automatic seed feeder for small seeds, particularly when used in conjunction with a conveyor belt and motor. Utilization of Conveyor Belt: The incorporation of a conveyor belt with a motor proves to be beneficial, especially for handling small seeds. This mechanism ensures a consistent and controlled seed feeding process for improved precision in sowing operations.	efforts. - Faster seed feeding compared to manual methods. - Cost-effective and minimal space requirement. - Operated by a sewing motor for easy seed planting. - Water-saving, creating an optimal environment for seed nourishment.	

6	Analysis of IOT-based smart agriculture monitoring and control systems	Dipti D. Desai, Priyanka B. Patil, Prof. S. M. Nadaf	2023 oo	1. Productivity Decline: The agricultural sector in India is experiencing a daily decline in productivity, posing a significant threat to overall environmental productivity. 2. Revival Imperative: There is a pressing need for a strategic is baar Agricultural System: The scale of agriculture in India demands extensive upkeep, knowledge, and management, presenting inherent challenges in maintaining efficiency. 4. IoT Integration: The introduction of the Internet of Things (IoT) offers a potential solution. IoT involves a network of interconnected devices that can send and receive data over the Internet, facilitating automated activities without constant human intervention [17]. 5. Data Exchange: IoT enables seamless exchange of data among agricultural devices, creating a connected ecosystem capable of making informed decisions. 6. Reduced Human Dependency: The use of IoT in agriculture minimizes the reliance on manual labor, providing through IoT can lead to improved decision-making, resource management, and overall productivity	1. Objective: Develop a smart agricultural system using cutting-edge technologies—wireless sensor networks, IoT, and Arduino—leveraging automation for enhanced efficiency. 2. Environmental Monitoring: Focus on monitoring key environmental variables like temperature, humidity, wetness, and animal movement in agricultural areas to optimize crop operations in real-time. 3. Device Heterogeneity: Embrace device heterogeneity and interoperability for adaptive, scalable, and durable techniques in IoT-based agriculture. 4. Technological Contribution: Contribute to the advancement of IoT technologies in agriculture, aligning with the evolution of hardware and software systems. 5. Global Initiatives: Discuss projects and initiatives worldwide, both public and private, aimed at providing	IOT devices is invention in the,which is having several Drawbacks The drawbacks of the is that it has several drawbacks 1)It needs to be constantly updated according to market requirements 2)It needs to be constantly monitored 3)It needs high intensive money

				in the agricultural sector [17]. 8. Need for Comprehensive Strategy: Addressing the challenges in Indian agriculture requires a comprehensive strategy that integrates technological solutions, with IoT playing a pivotal role in transforming the sector.	smart and sustainable precision agriculture solutions. 6. Security and Privacy: Address security and privacy concerns in IoT-based green agriculture, categorizing threat models into five aspects: authentication, confidentiality, availability, and integrity. 7. Taxonomy and Comparison: Provide a taxonomy and side-by-side comparison of advanced methods for securing and preserving privacy in IoT technologies for agriculture.	

In the vast fields of agriculture, "**Kheti Sahayak**" stands as a digital companion, ready to embark on a journey that blends tradition with innovation. As we sow the seeds of technology in the fertile soil of farming practices, our mission is to nurture a resilient ally for the hardworking farmers across India. In the heart of this endeavor lies the wisdom gleaned from six research papers, each a lantern guiding "**Kheti Sahayak**" through the labyrinth of possibilities. These papers, like seasoned storytellers, share tales of technological marvels, farmer-centric experiences, and the promise of a sustainable tomorrow. Join us as we unfold the pages of insight drawn from these studies, shaping "**Kheti Sahayak**" into a beacon of empowerment for the heroes of the fields.

i. **Technology Advancements:** The amalgamation of cutting-edge technologies such as wireless sensor networks, IoT, computational tools, and innovative farm machinery emerges as a common theme. These advancements underscore the need for "Kheti Sahayak" to stay technologically relevant.
ii. **Impact on Farmers:** Understanding how technology affects farmers directly informs the app's design. Mechanized implements, computational tools, and IoT-based monitoring systems impact daily operations, workload, and decision-making. Integrating such insights can make "Kheti Sahayak" more farmer-centric.
iii. **Societal and Economic Considerations:** Each paper addresses the broader implications on society and the economy. Changes in labor dynamics, economic viability, and sustainability are crucial dimensions. "Kheti Sahayak" should align with these considerations to contribute positively to both the farming community and the economy.
iv. **Challenges:** Identifying challenges in tool usage, computational implementations, ICT integration, and manual operations provides a roadmap for anticipating hurdles. "Kheti Sahayak" must be equipped to address these challenges effectively, ensuring smooth user experiences.
v. **Future Directions:** Common among all papers is the emphasis on future advancements and directions. From introducing more advanced tools to exploring automation and advancing smart agricultural systems, the collective vision underscores the importance of continuous improvement. "Kheti Sahayak" should embrace an adaptive approach to remain at the forefront of agricultural technology.

2.1.1. Synthesis and Application for “Kheti Sahayak”:

i. Applying these lessons to *“**Kheti Sahayak**”* is like giving it a superpower upgrade. We need to make sure the app stays cool and useful for farmers by using the latest tech tricks. It's like designing a superhero suit – it should fit farmers perfectly and help them in their daily tasks.

ii. We also want the app to be a good citizen, making a positive impact on both farmers and the economy. Solving any problems that might come up is like fixing little bumps on the superhero's road – we want a smooth ride for farmers using our app

iii. Most importantly, we're not just creating the app; we're creating a superhero that evolves with time. We want “Kheti Sahayak” to be ready for future changes and to keep getting better, just like how superheroes keep upgrading their gear to face new challenges!

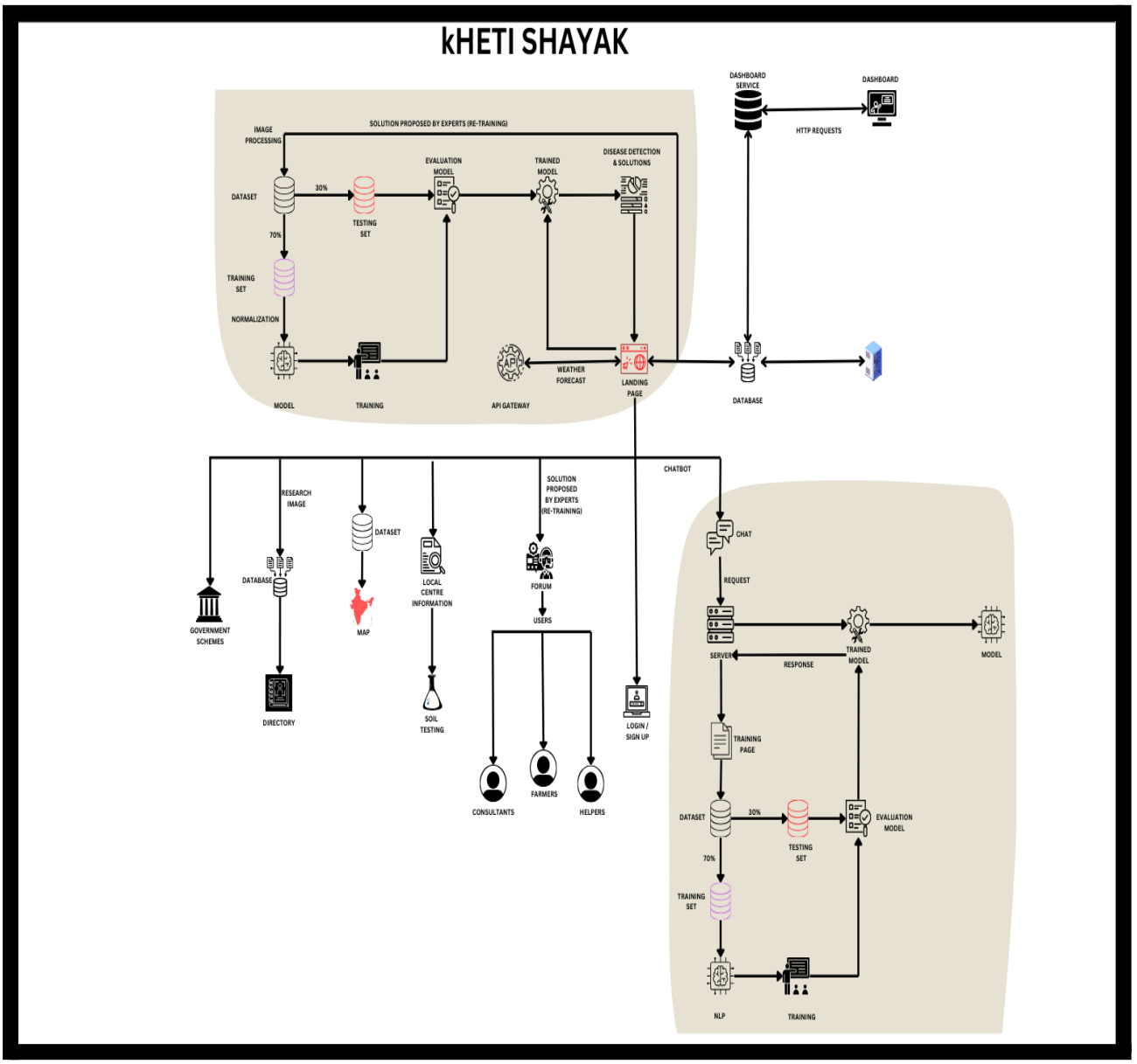
3. Kheti Sahayak

“Kheti Sahayak”: *Ek Desh, Anek Kisan, Ek Saath*”

In the intricate mosaic of Indian agriculture, “Kheti Sahayak" stands as a catalyst for unity and collaboration. This initiative is dedicated to connecting farmers across the nation, empowering each individual and promoting collective well-being. Through streamlined tool access, financial inclusion, and a commitment to sustainability, '“Kheti Sahayak” ' seeks to weave a narrative where farmers join hands for shared prosperity and resilient farming practices.

3.1.1 System Design / Architecture

Fig 3.1 Architecture Design



i. **Local Centre Information**: This seems to be the source of data for the system. It likely stores information relevant to agriculture in a specific location.

ii. **Research:** This component likely refers to agricultural research conducted relevant to the local area.

iii. **Governorate Schemes:** This component likely refers to government programs or initiatives related to agriculture.

iv. **Chat:** This component allows farmers to chat with each other or with agricultural experts/consultants.

v. **Forum:** This component seems to be an online discussion board where users can ask questions and share information about agriculture.

vi. **API Gateway:** This component acts as an intermedia Opp ii íiry between the various parts of the system. It receives requests from users and forwards them to the appropriate backend services.

vii. **Database:** This component stores all of the system's data, including information from the Local Centre Information, research data, and user data.

viii. **Dataset:** This component retrieves data from various sources, possibly including the Local Centre Information database, research databases, and government databases.

ix. **Normalization:** This component cleans and preprocesses the data before it is used by other parts of the system.

x. **Training Set:** This component is a subset of the data that is used to train the machine learning model.

xi. **Testing Set**: This component is another subset of the data that is used to evaluate the performance of the machine learning model.

xii. **Trained Disease Detection Model:** This component is a machine learning model that has been trained to identify diseases in crops.

xiii. **Evaluation:** This component evaluates the performance of the disease detection model.

xiv. **Solutions Proposed by Experts (Re-training):** This component refers to a process where human experts review the results of the disease detection model and retrain it if necessary.

xv. **Weather Forecast**: This component provides weather data to the system. This data may be used by the disease detection model or by other parts of the system.

xvi. **HTTP Requests:** This refers to a standard way to send requests between different parts of a system.

xvii. **Dashboard:** This component provides a visual overview of the system's performance and key metrics.

xviii. **Chatbot:** This component interacts with users through a chat interface and likely provides them with information or services related to agriculture.

xix. **Solutions Proposed by Experts:** This component refers to information or advice provided by human experts to address agricultural problems.

"**Kheti Sahayak**" employs a user-friendly Flutter mobile app backed by a Node.js server and Firebase Realtime Database. The system design facilitates secure user registration, algorithmic tool matching, real-time notifications, and secure transactions. The app's architecture ensures scalability, with Firebase handling tool listings and transaction data. The design integrates encryption for security and external services for notifications. Rigorous testing, deployment strategies, and scalability considerations are in place. This holistic approach ensures a seamless, secure, and scalable tool-sharing platform for farmers, fostering community collaboration and agricultural efficiency.

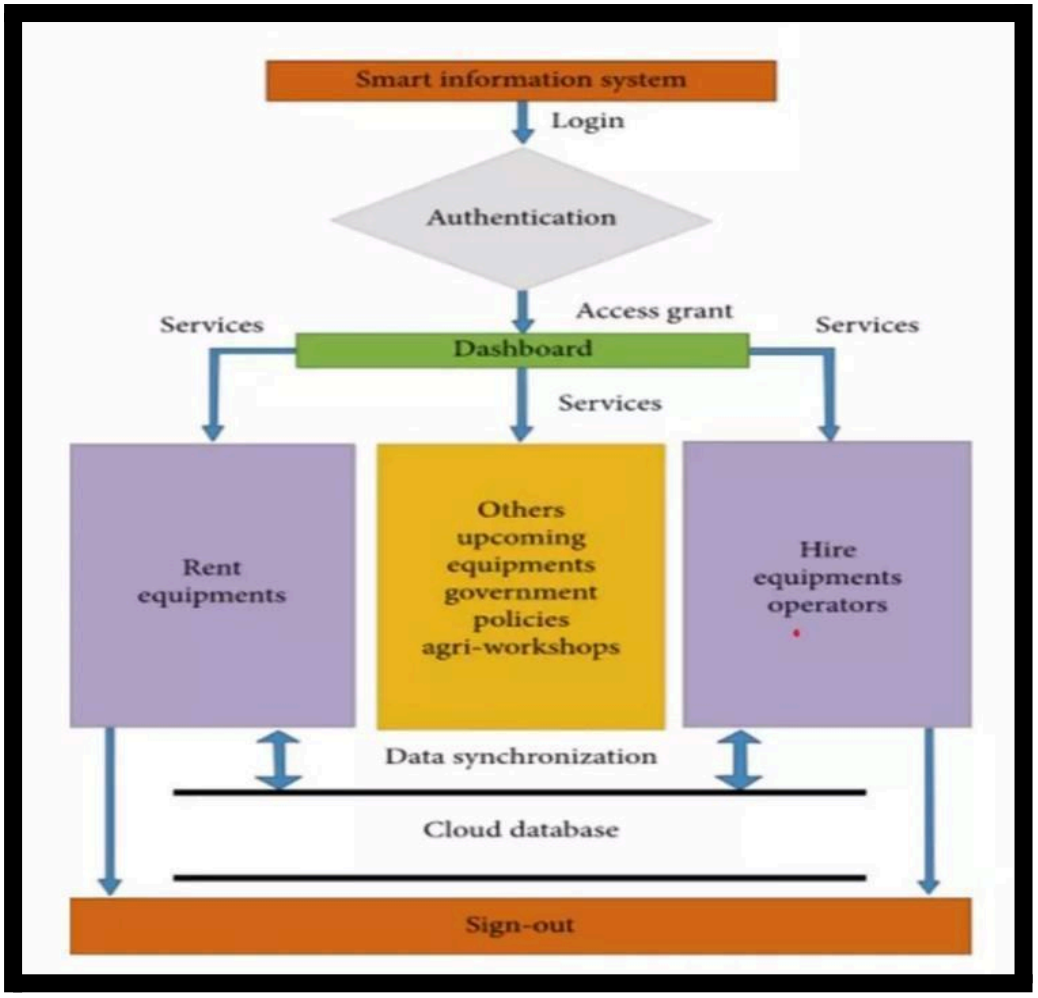


Fig 3.2 Login System

The diagram you sent appears to show a login system for an agricultural equipment rental service. Let's break down the functionalities:

i. **Login:** Here, a user can enter their credentials to access the system.

ii. **Authentication**: The system verifies if the entered credentials are valid.

iii. **Services:** Once logged in, users will have access to various services. The diagram shows some examples including:

a) **Dashboard:** This could be a personalized homepage that shows relevant information to the user.

b) **Access Grant:** This service might allow users to manage their account permissions.

c) **Rent equipment:** This service likely allows users to rent agricultural equipment.

d) **Hire equipment operators:** This service may connect users with people who can operate agricultural equipment.

e) **Others**: This category seems to group various unspecified services relevant to agriculture. Examples could be information on upcoming workshops, government policies, or agricultural works.

f) **Data Synchronization:** This indicates that the system keeps its data up-to-date across different devices.

g) **Cloud Database:** This suggests the system stores its data on a remote server.

h) **Sign-out:** This allows users to end their session.

Smart Info System offers a streamlined user experience, beginning with secure login and authentication processes. Once authenticated, users access a comprehensive dashboard featuring three key functionalities: renting equipment, exploring upcoming government policies, and hiring equipment operators. The system ensures seamless data synchronization with a cloud database, providing a reliable and centralized storage solution. Users can efficiently rent equipment, stay informed about government policies, and hire equipment operators, enhancing their overall experience. The architecture prioritizes data security and accessibility, promoting user satisfaction. A straightforward sign-out option completes the user journey, offering a well-rounded and user-friendly information and services platform.

3.1.2 Working Principle

"**Kheti Sahayak**", a platform where farmers choreograph the sharing of tools seamlessly. This digital ballet encompasses user registration, algorithmic matchmaking, secure transactions, and a community-driven feedback loop, uniting farmers in a collaborative dance for enhanced agricultural efficiency**.**

i. User Registration and Tool Listing:

a. Farmers register on the "Kheti Sahayak" platform, providing essential details.
b. Users list their available tools, specifying types, conditions, and seasonal availability.

ii. User Interaction and Tool Request:

a. Farmers explore the platform, searching for tools they require in a complementary season.
b. Users interact through a secure messaging system, discussing details and confirming the tool request.

iii. Algorithmic Matching:

a. The platform employs advanced algorithms to analyze tool availability, geographical proximity, and seasonal compatibility.
b. Algorithms match tool requests with available tools, suggesting potential matches to users.

iv. Secure Transactions and Tool Exchange:

a. The platform facilitates secure financial transactions, ensuring transparency and trust.
b. Farmers exchange tools through a well-coordinated process, facilitated by the platform.

v. Feedback and Rating System:

a. After the tool exchange, users provide feedback on the overall

3.2 Expected Results

The "**Kheti Sahayak**" system aims to yield positive outcomes for farmers and the agricultural sector through various anticipated results. These include

i. ***Increased Tool Accessibility****:* "**Kheti Sahayak**" paves the way for farmers to broaden their tool repertoire, ensuring they have the right equipment precisely when needed. This not only streamlines their farming processes but also empowers them with a diverse set of tools tailored to various agricultural needs.

ii. ***Improved Efficiency:*** The app's design emphasizes community building among farmers. By facilitating interactions and shared tool usage, "**Kheti Sahayak**" creates a network where farmers can learn from one another, fostering a collaborative spirit in the agricultural community.

iii. ***Nurtured Collaboration:*** By creating a digital hub for farmers, the app cultivates a sense of community and collaboration. Farmers can share insights, techniques, and, most importantly, tools, fostering a supportive network that transcends geographical boundaries.

iv. ***Geographical Reach:*** "**Kheti Sahayak**" breaks down geographical barriers, connecting farmers from various regions across India. This expansive reach allows farmers to access a diverse pool of tools and expertise, enriching their farming practices with a broader spectrum of resources. Whether in the northern fields of Punjab or the rice paddies of West Bengal, the app's reach extends far and wide, promoting a nationwide network of collaboration and shared agricultural wisdom.

v. ***Transparent Transactions:*** "**Kheti Sahayak**" ensures a transparent ecosystem for tool transactions. The app's secure transaction process guarantees clarity in financial dealings, instilling trust among farmers. The transparency in transactions not only simplifies the exchange of tools but also contributes to the overall reliability of the platform. This commitment to openness empowers farmers, allowing them to engage in tool-sharing with confidence, knowing that each transaction is conducted securely and transparently.

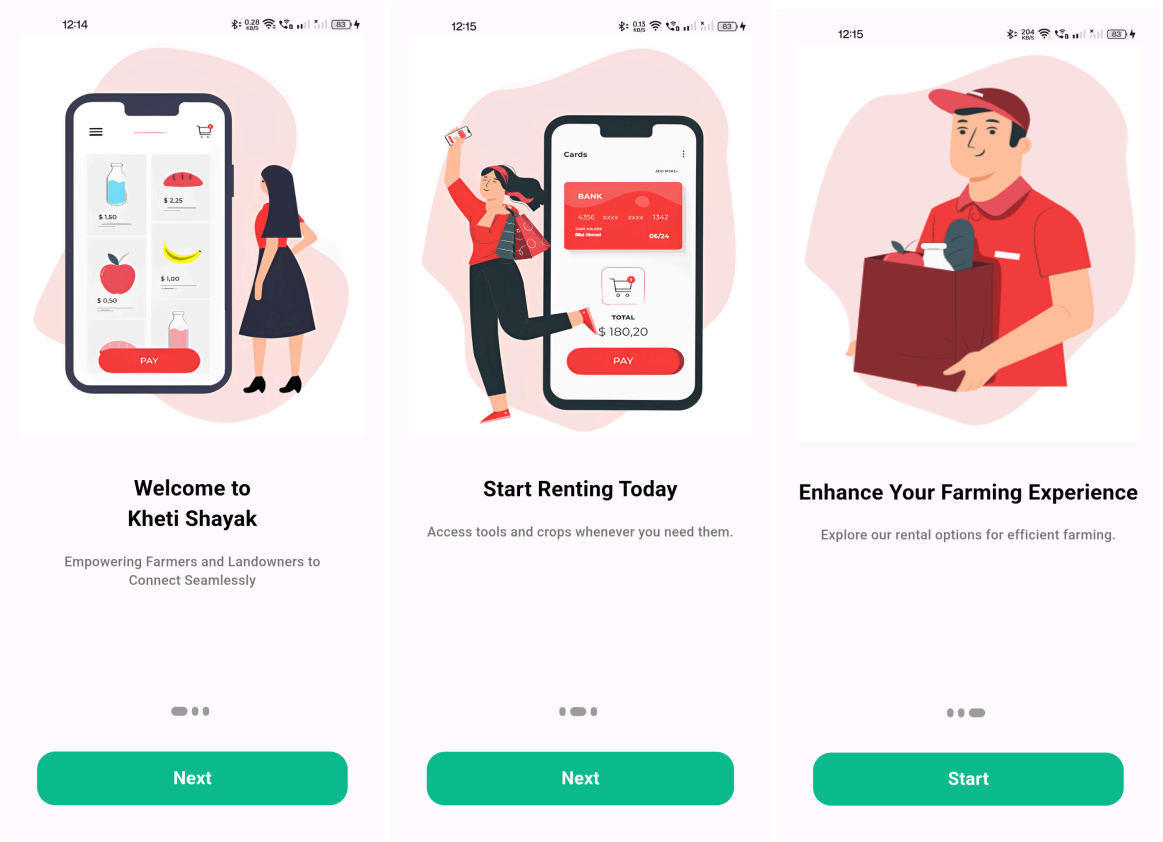
vi. ***Facilitating Financial Inclusion:*** "**Kheti Sahayak**" is a champion for financial inclusion. Small and marginal farmers gain access to high-quality tools without shouldering the financial burden of ownership, contributing to a more inclusive and economically sustainable agricultural landscape.

vii. ***Weather-Responsive Farming:*** The app equips farmers with the agility to adapt to changing weather conditions. By providing access to tools suitable for different seasons, "**Kheti Sahayak**" empowers farmers to make informed decisions based on real-time weather insights.

viii. ***Community-Driven Reputation:*** The feedback and rating system is more than just a feature; it's a testament to the community-driven ethos of the app. Users actively contribute to building a reputation based on trust, accountability and positive interactions, further strengthening the collaborative spirit.

4. OUTPUT

Interactive User Interface

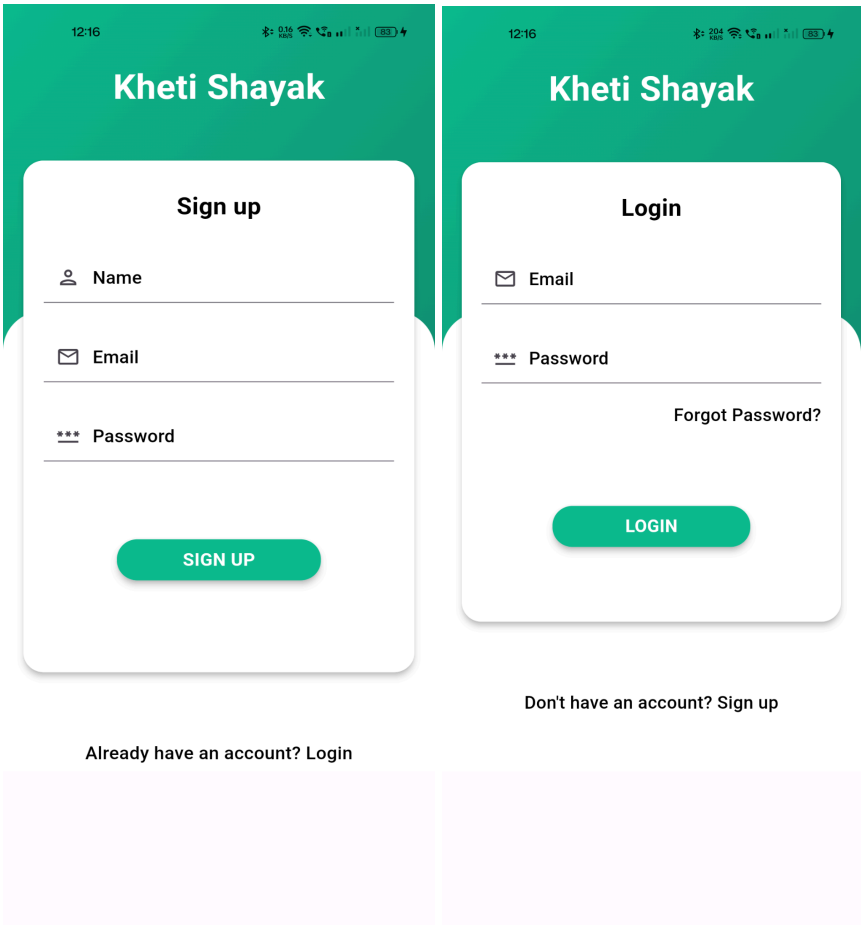


A *B* *C*

Fig 4.1(A,B,C) Onboarding Screen

Fig 4.1(A,B,C) represents the user interface. It helps user engagement and ease of navigation, ensuring a seamless experience for farmers. With visually appealing layouts and intuitive controls, users can effortlessly access all features and functionalities with just a few taps. The user interface is optimized for both novice and experienced users, promoting efficient usage and maximizing productivity on the platform. From browsing available tools to managing transactions, every aspect of the user interface is meticulously crafted to enhance user satisfaction and usability.

Secure authentication login/signup /delete/edit account



A **B**

Fig 4.2(A,B) Login - SignUp Authentication

In Fig 4.2(A,B), our platform prioritizes user security with a robust authentication system, safeguarding user data and privacy at every step. Users can securely log in or sign up for an account, with stringent measures in place to prevent unauthorized access. Additionally, users have the flexibility to delete or edit their accounts, providing full control over their personal information and account settings. Whether logging in for the first time or accessing their account from different devices, users can trust in our authentication system to keep their data safe and secure.

Password recovery

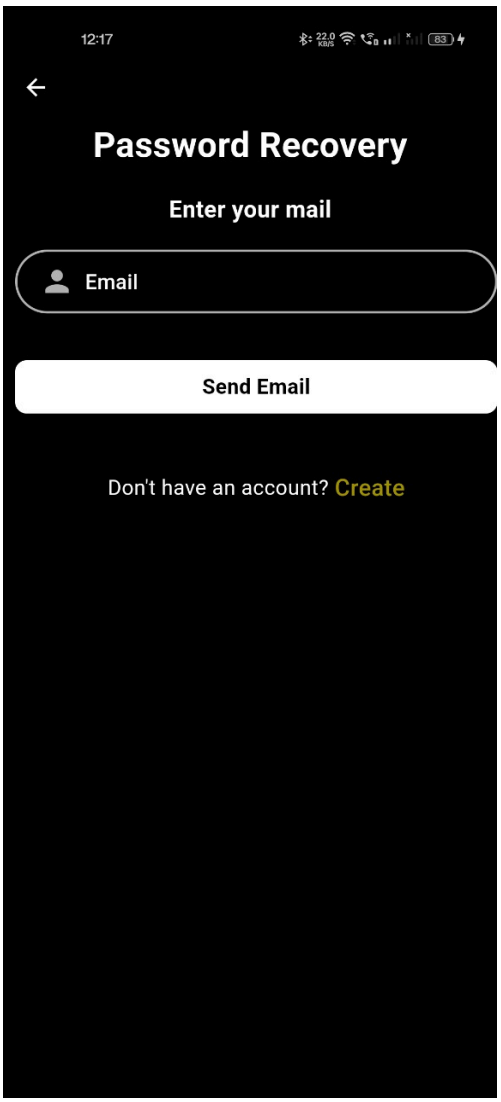
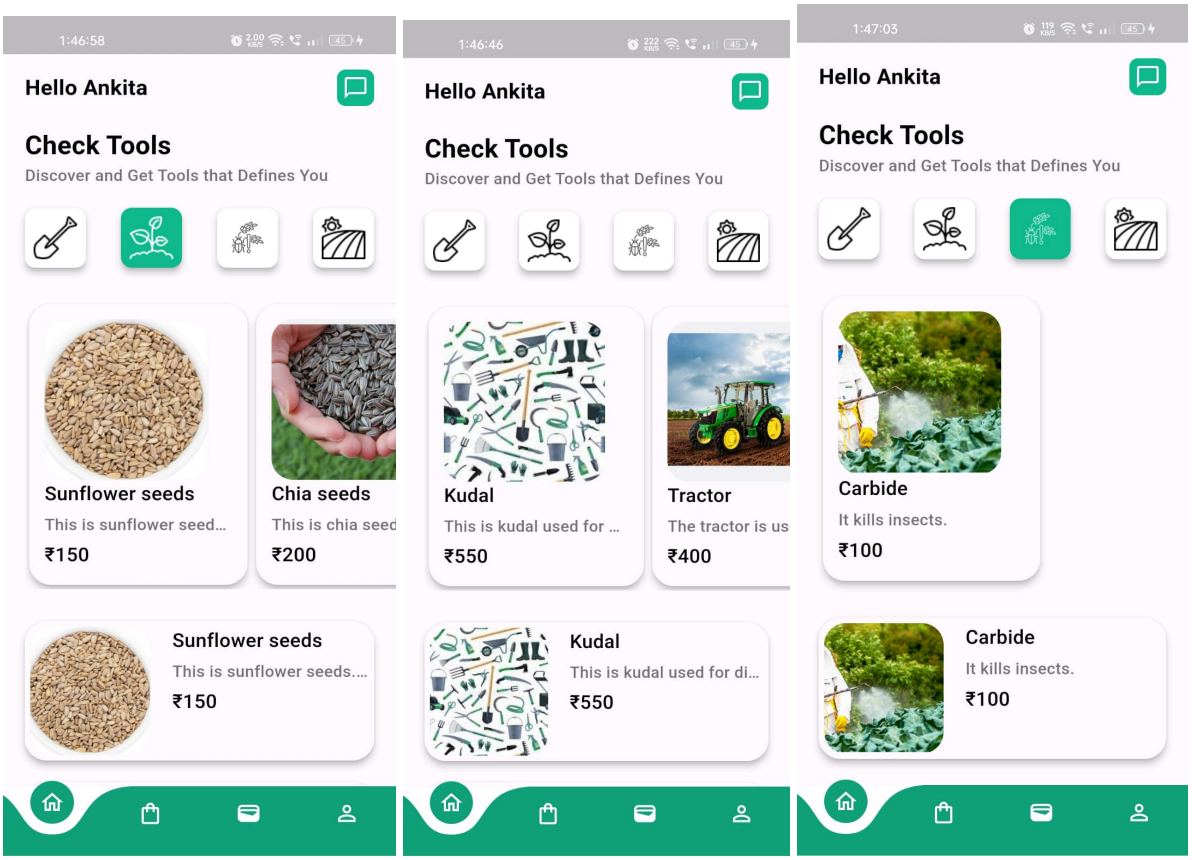


Fig 4.3 Password Recovery

In Fig 4.3 we have made the password recovery feature as we understand the importance of accessibility, which is why we've implemented a seamless password recovery process for users who may forget their login credentials. With just a few simple steps, users can easily recover their passwords, ensuring uninterrupted access to their accounts. Our password recovery feature utilizes industry-standard security protocols to protect sensitive information and prevent unauthorized access. Whether through email verification or security questions, users can regain access to their accounts swiftly and securely, minimizing downtime and frustration.

Category wise sorting of items/tools



A ***B*** ***C***

Fig 4.4 Category Wise Items

In Fig 4.4 to streamline the browsing experience, our platform offers category-wise sorting of items and tools, allowing users to quickly find what they need. With intuitive category organization, users can easily navigate through a wide range of tools and items, saving time and effort. From agricultural equipment to seeds and fertilizers, users can explore categories tailored to their specific farming needs, enhancing efficiency in procurement. By categorizing items based on their attributes and functionalities, we empower users to make informed decisions and optimize their farming practices with ease.

Kheti sahayak wallet

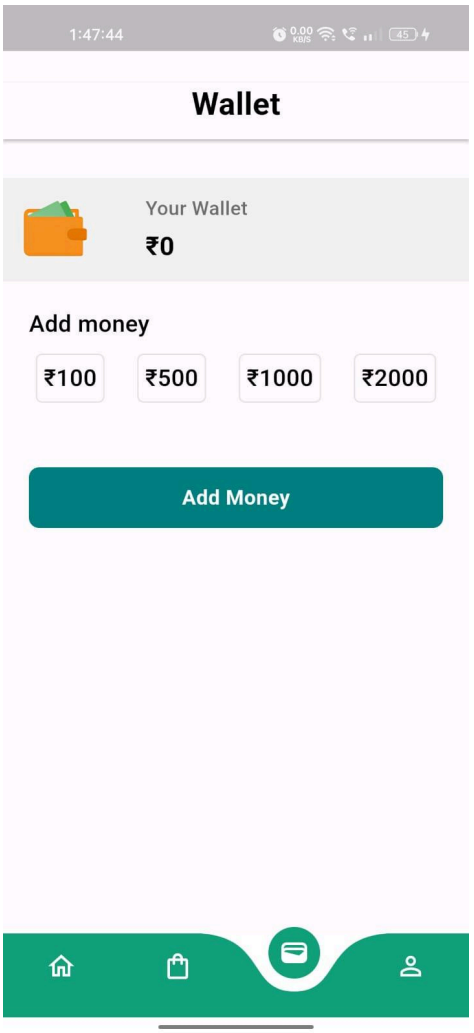


Fig 4.5 Wallet

In Fig 4.5 ,our platform integrates the "Kheti Sahayak Wallet," a feature designed to facilitate transactions and financial management within the app. This wallet system provides users with a convenient and secure way to conduct transactions, ensuring smooth and hassle-free interactions while enhancing the overall user experience.

Cart added

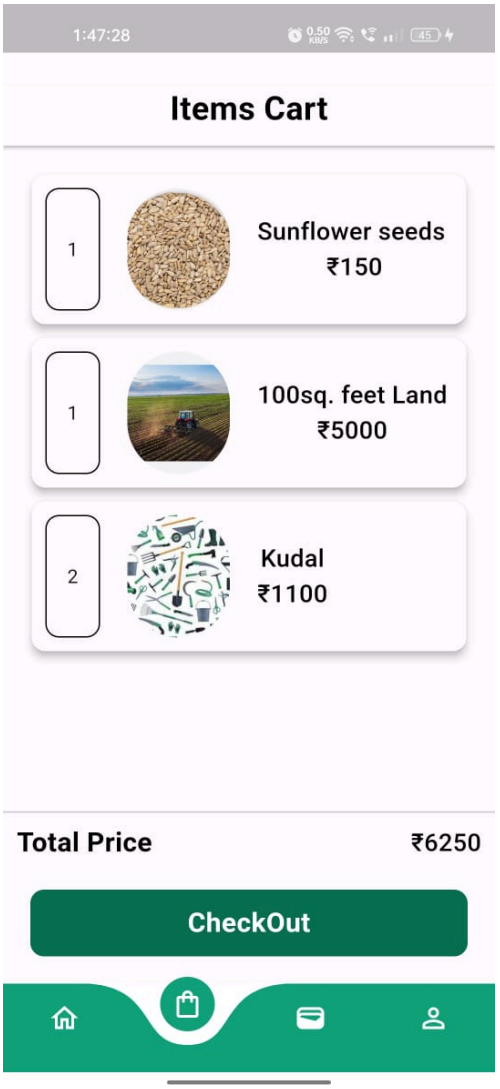
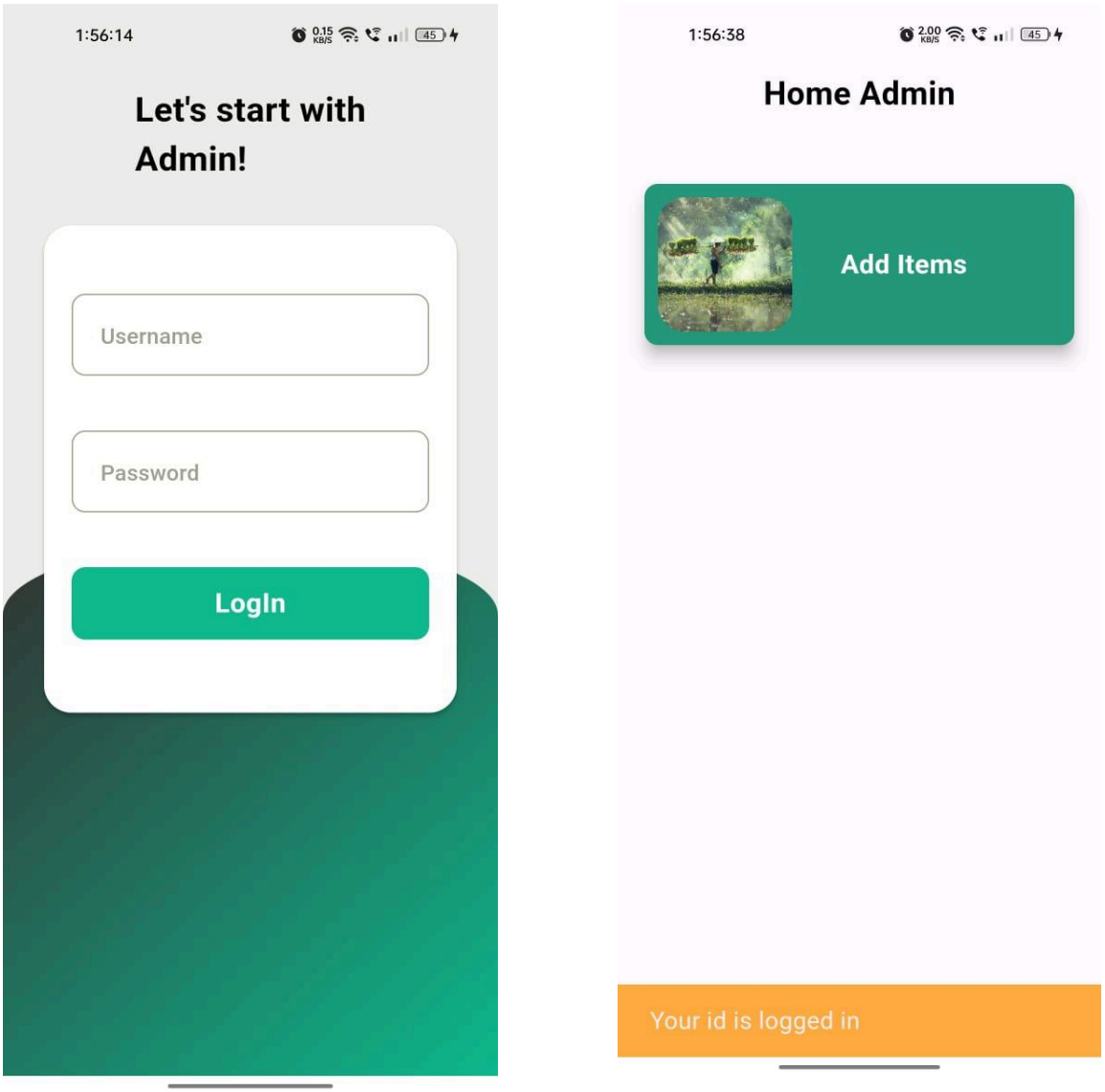


Fig 4.6 Item Card

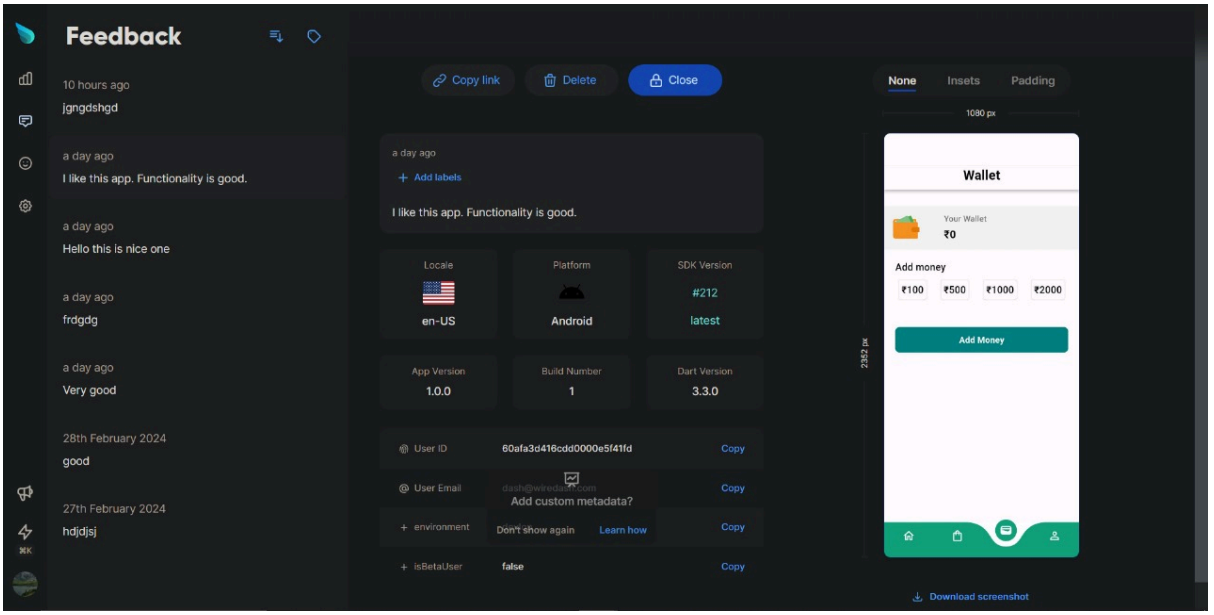
In this Fig 4.6, we've introduced a handy "Add to Cart" feature, letting users effortlessly collect items/tools from different categories. This nifty addition makes browsing a breeze, allowing users to easily select what they need and proceed to checkout hassle-free. It's all about enhancing user experience, making sure our platform is intuitive and user-friendly. So, whether they're exploring tools or finalizing their choices, this feature ensures a smooth journey for our users every step of the way.

Admin panel



(A) (B)

Fig 4.7 A,B Admin pannel



(C)

Fig 4.8 Admin Panel

In Fig 4.8, we've introduced an easy-to-use admin panel allowing sellers, owners, and management to effortlessly access key functionalities. Through this interface, they can log in to manage tasks like adding, deleting, and updating items, while also monitoring user activity. This centralized hub simplifies administrative duties, empowering administrators to efficiently oversee inventory and platform operations. By offering comprehensive control and monitoring features, the admin panel enhances organizational efficiency and facilitates informed decision-making.

Add delete category items

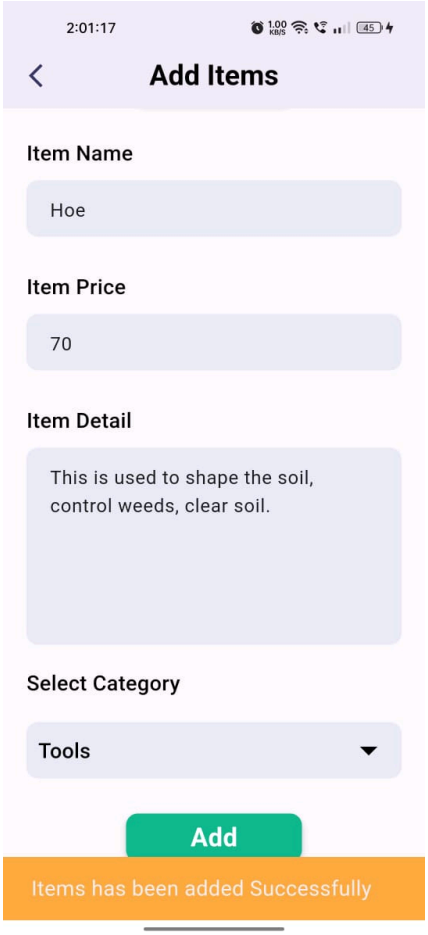


Fig 4.9 Add Items

In this Fig 4.9, we have implemented a proactive approach to maintaining the security and integrity of our app by enabling the deletion of all items associated with sellers flagged for fraudulent activity. This ensures swift action against unrealistic or scam-type items reported by users, bolstering trust within our community. Additionally, administrators have the capability to add and update items as needed, further enhancing the reliability and authenticity of our platform. By prioritizing user safety and responsiveness, we uphold our commitment to providing a secure and trustworthy environment for all users.

Admin Panel

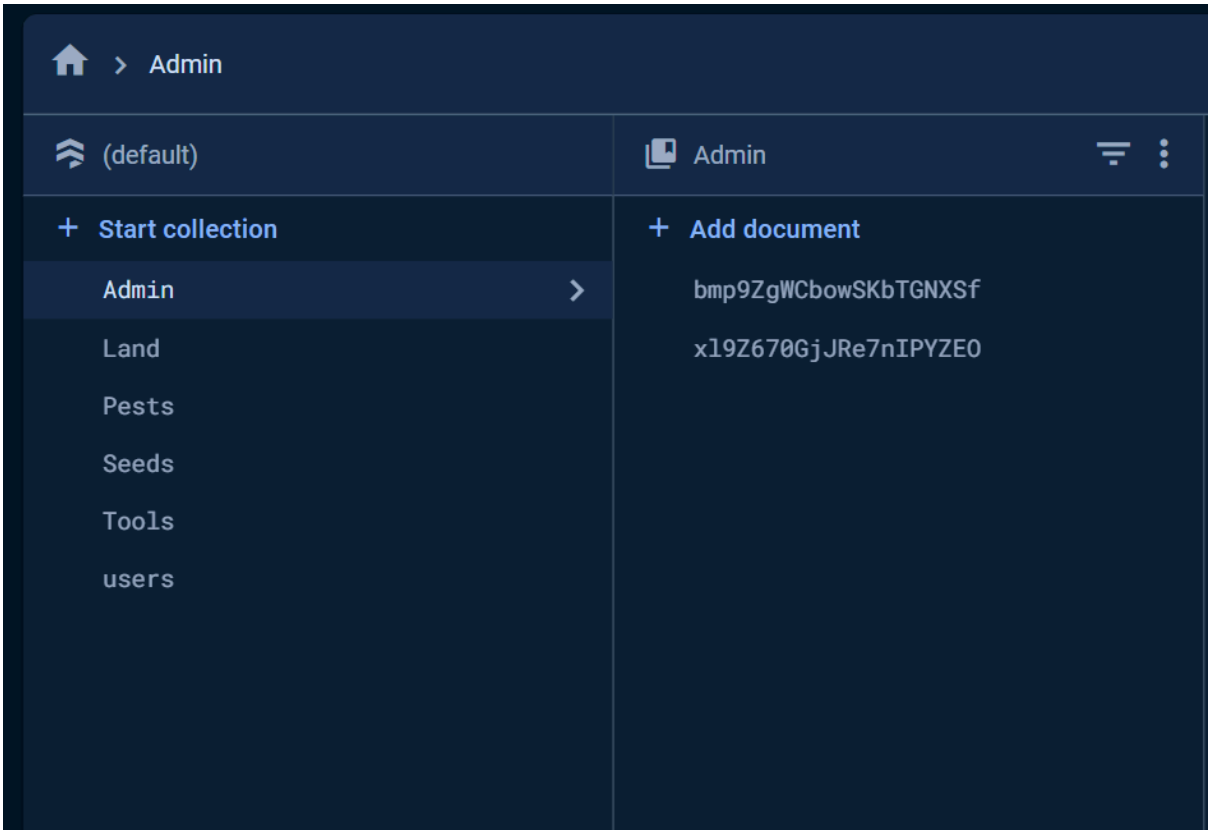
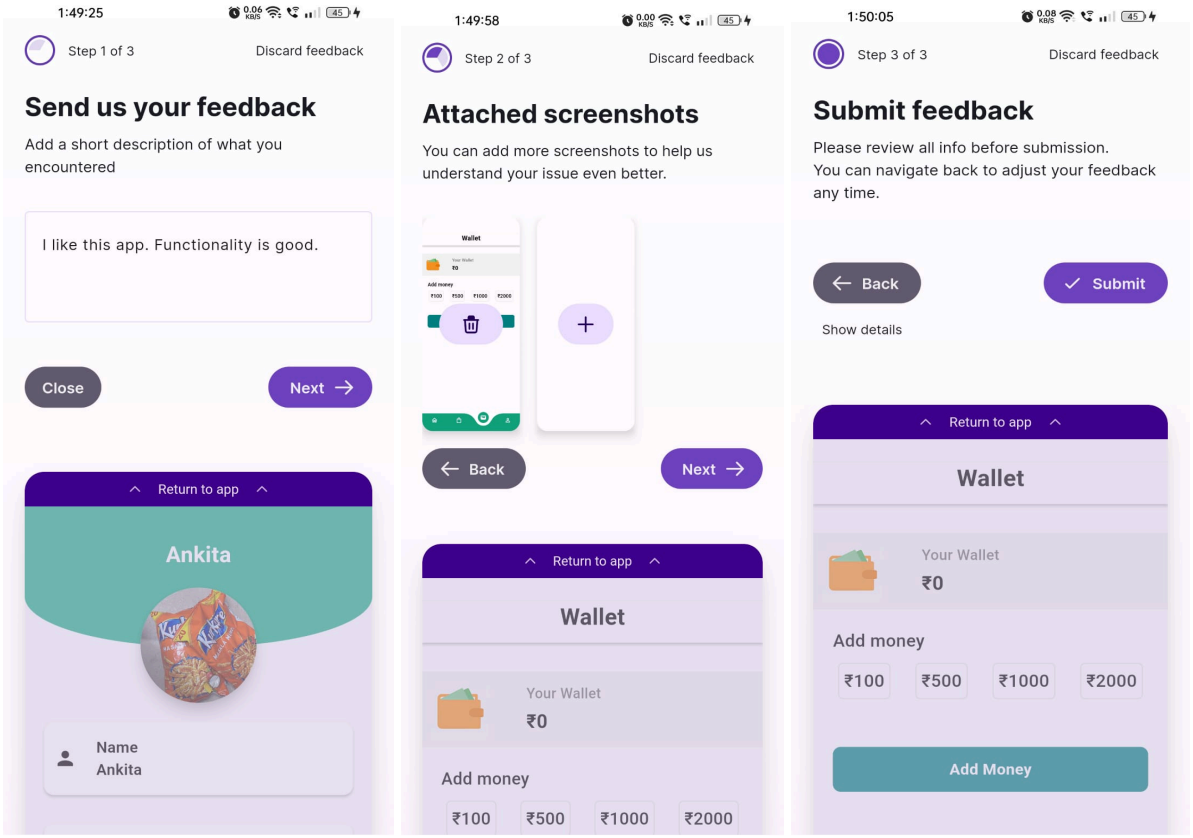


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Feedback



(A) (B) (C)

Fig 4.10(A,B,C) Feedback

In this Fig 4.10(A,B,C), we have implemented a robust feedback system that empowers users to report any fraudulent or suspicious activity directly to the admin. Upon receiving such feedback, administrators have the authority to take decisive action, including the deletion of all items associated with reported sellers. This proactive approach safeguards the integrity of our platform and fosters a sense of trust among our user community. Additionally, administrators can utilize feedback to continuously improve the platform and ensure a safe and reliable user experience. Through these measures, we remain committed to upholding the highest standards of security and integrity in our app.

Chatbot



Fig 4.11

In Fig 4.11, a chatbot implementation can significantly enhance user engagement and support. By integrating a chatbot, farmers can quickly access information on farming practices, crop management techniques, and weather forecasts. Additionally, the chatbot can assist users in navigating the platform, providing personalized recommendations for tools, seeds, and land rentals based on their specific needs and preferences. This AI-driven feature not only improves user experience but also facilitates efficient communication and problem-solving, ultimately empowering farmers to make informed decisions and optimize their agricultural practices.

5. Contribution

A. ANKITA SONI (21BCE11499)

In the project, I played a pivotal role in various aspects. I developed a visually engaging presentation that effectively communicated key project details, objectives, and outcomes through informative slides enriched with relevant graphics and visuals. Additionally, I curated a diverse range of resources including research papers, articles, and data sets to support the project's goals, conducting thorough research to provide valuable insights. My in-depth research on agriculture consultancy, new technologies for crop yield enhancement, and environmental factors like soil degradation and climate change informed decision-making processes within the project. Furthermore, I led the development of the frontend of the project website, focusing on creating an intuitive user interface design and optimizing user experience across different devices by implementing responsive design principles and integrating interactive features for enhanced usability and engagement. These contributions underscore my dedication to enhancing project outcomes and aligning with its objectives effectively.

B. SHASHWAT SHANDILYA (21BCE11173)

Hello there, myself Shashwat Shandilya, Flutter Developer for the innovative farmers' tool and land rental app project - Kheti Sahayak. contributions span various crucial aspects of the app's development, demonstrating a comprehensive skill set and dedication to the project. From designing and implementing all screens to crafting the backend logic, your technical proficiency shines through. Moreover, the integration of features like a chatbot adds a layer of interactivity and user engagement, enhancing the overall user experience. Beyond the technical realm, your commitment is evident in the research papers you've authored on pertinent topics, showcasing a deep understanding of the subject matter and a willingness to contribute knowledge to the field. In summary, your multifaceted contributions have been instrumental in bringing Kheti Shayak to fruition, embodying your passion for innovation and excellence in app development.

C. JASIKA GUPTA (21BCE10859)

I'm Jasika Gupta, a Front-end Flutter Developer and Content Writer contributing to the groundbreaking farmers' tool and land rental app project - Kheti Sahayak. My role extends beyond coding and content creation; I'm committed to researching and brainstorming ideas, continuously improving the user experience by incorporating valuable feedback. Specializing in translating design concepts into interactive interfaces, I bring a unique blend of technical expertise and creative flair to the project. My commitment also involves effective communication through engaging content creation and dynamic PowerPoint presentations, ensuring our project resonates successfully with our audience. In this multifaceted role, I strive to bridge the gap between technology and user satisfaction, contributing to the overall success and impact of Kheti Sahayak.

D. SAYANTAN PAL (21BCY10169)

In our collaborative effort to develop a comprehensive web app catering to farmers' needs, my key contributions have been integral to the project's success. I played a pivotal role in crafting and continually refining the visual identity by creating and updating the logo base, ensuring a professional and appealing representation of our services. Additionally, I leverage my skills in data integration by developing a weather forecast model using API, providing farmers with crucial insights for informed decision-making. Furthermore, I actively shaped the user experience by formulating the website's flow architecture, ensuring seamless navigation and accessibility. It has been a fulfilling experience to contribute to a project that combines online tele-consultation services with offline alternatives, ultimately empowering farmers with valuable resources and support.

E. BHUVAN GOUR (21BCE11172)

Hello, I'm Bhuvan Gour, Front-end Flutter Developer and Content Writer for the innovative farmers' tool and land rental app project - Kheti Sahayak.In our collaborative effort to develop an innovative tool rental app catering to the needs of farmers, my contributions have been pivotal in shaping the project's success. I took charge of designing the website flow architecture, ensuring a seamless and intuitive user experience for our clients. Additionally, I crafted the engaging home screen of the app, creating a visually appealing and user-friendly interface. To provide comprehensive insights into our progress, I meticulously compiled a detailed project report, highlighting key milestones and outlining the trajectory of our development efforts. Through my dedicated work on the website architecture, app interface, and project documentation, I am proud to have played a significant role in bringing our tool rental service to fruition.

F. SUBHAMAY BERA (21BCG10082)

In the project, my significant contributions encompassed directory design, map data design, and integration, as well as extensive research work. The directory design involved structuring and organizing information in a coherent and accessible manner, ensuring efficient retrieval and navigation within the system. Concurrently, the map data design focused on creating a visually appealing and functional mapping interface that seamlessly integrated with the project's objectives. Integration efforts were pivotal in harmonizing various components to work cohesively, enhancing overall system performance and user experience. Additionally, my research work delved into exploring innovative solutions, analyzing industry best practices, and staying abreast of emerging trends to inform decision-making processes and drive project success. These combined efforts underscored my commitment to delivering comprehensive and impactful contributions to the project's development and implementation.

G. TEJAS KOTHAWADE (21BCE11065)

In contributing to the agriculture tool rental app project, I undertook comprehensive research to understand the dynamics of the agricultural tool rental business model and its operational intricacies. My efforts involved investigating how similar businesses function, including examining their revenue streams, customer acquisition strategies, and operational logistics. Furthermore, I delved into the availability of agricultural tools in the target market, analyzing factors such as demand trends, seasonal variations, and potential suppliers. Through this research, I aimed to provide valuable insights that would inform strategic decisions regarding the app's development, such as identifying the most sought-after tools, optimizing pricing structures, and establishing partnerships with reliable suppliers. Overall, my contributions laid a solid foundation for the project by offering crucial data-driven insights into the market landscape and operational requirements of the agriculture tool rental industry.

H. RUDRAM SARAF (21BCY10216)

Hey, I'm Rudram. I have been part of the team working on the Kheti Sahayak app. My role mainly focused on fine-tuning the user interface to make it more user-friendly and intuitive. I spent a lot of time testing different features and functionalities to ensure they worked smoothly across different devices and screen sizes. Additionally, I collaborated with the front-end developers to implement design improvements based on user feedback. Though I'm not an expert, I tried my best to contribute to the project's success by ensuring a seamless user experience through UI enhancements and rigorous testing Furthermore, I assisted in conducting user testing sessions to gather feedback on the app's usability and identify areas for improvement. By closely observing how users interacted with the interface, I gained valuable insights into their preferences and pain points, which guided further refinements to enhance overall user satisfaction. My dedication to refining the UI and conducting thorough testing reflects my commitment to ensuring a high-quality experience for the app's users.

I. AYAM DASH (21BSA10153)

My role mainly focused on fine-tuning the user interface to make it more user-friendly and intuitive. I spent a lot of time testing different features and functionalities to ensure they worked smoothly across different devices and screen sizes. Additionally, I collaborated with the front-end developers to implement design improvements based on user feedback.Through this research, I aimed to provide valuable insights that would inform strategic decisions regarding the app's development, such as identifying the most sought-after tools, optimizing pricing structures, and establishing partnerships with reliable suppliers. Overall, my contributions laid a solid foundation for the project by offering crucial data-driven insights into the market landscape and operational requirements of the agriculture tool rental industry.

6. CONCLUSION

In the rich expanse of Indian agriculture, "**Kheti Sahayak**" transcends its digital form, emerging as a testament to the power of collaboration and innovation in addressing the myriad challenges faced by farmers. As the digital revolution sweeps through the farming landscape, this platform serves as a beacon of hope, fostering connections among farmers, seasons, and progress in a harmonious dance towards sustainable agricultural practices.

The journey of "**Kheti Sahayak**" extends beyond the provision of mere tools; it cultivates a resilient community where transparency, trust, and sustainable practices flourish. Through its innovative features and collaborative spirit, "**Kheti Sahayak**" empowers farmers to navigate the complexities of agriculture with confidence and resilience. By providing access to expert guidance, essential resources, and a supportive community, the platform bridges the gap between traditional farming practices and modern technological solutions.

At its core, "**Kheti Sahayak**" embodies the values of unity, accessibility, and shared prosperity. It envisions a future where Indian agriculture thrives through collective effort and mutual support, rather than individual struggle. By facilitating knowledge sharing, resource pooling, and collaborative decision-making, "**Kheti Sahayak**" paves the way for a more connected and resilient farming community.

As we reflect on the transformative impact of "**Kheti Sahayak**," we envision a landscape where farmers seamlessly exchange insights, resources, and tools, guided by a spirit of cooperation and mutual benefit. The platform serves as a catalyst for positive change, empowering farmers to embrace sustainable farming practices, adapt to changing environmental conditions, and secure their livelihoods for generations to come.

In the fields of tomorrow, let "**Kheti Sahayak**" be the guiding star, illuminating the path towards a more inclusive, equitable, and resilient agricultural sector. With its unwavering commitment to farmer empowerment and sustainable development, "**Kheti Sahayak**" inspires us to reimagine the future of Indian agriculture as a collective endeavor, driven by shared goals and mutual respect.

7. BIO-DATA

1. ANKITA SONI



As a dedicated Flutter Developer with a passion for crafting captivating mobile applications, I possess a creative flair and an unwavering attention to detail that distinguishes me within the field. Graduating from VIT-Bhopal with a degree in B-Tech CSE Core, I boast a robust academic foundation in computer science and engineering.

My expertise spans across various technical domains including Java, Android, Flutter, Dart, MySQL, and AWS, underscoring a versatile skill set that equips me to address diverse facets of mobile app development. Bolstering my proficiency is practical experience garnered from working with Android Studio, further solidifying my capabilities in mobile application development.

I am eagerly poised to collaborate with dynamic teams and contribute to innovative projects, exemplifying my team-oriented approach and keenness to partake in cutting-edge initiatives. My aspiration to harness my knowledge and talents for the advancement of technology underscores my unwavering commitment to continual growth and innovation within the mobile app development landscape.

2. SHASHWAT SHANDILYA



Hey, I'm Shashwat Shandilya, a third-year student at VIT Bhopal, studying Computer Science. I'm all about making cool phone apps! I've learned Java, Kotlin, Flutter, and Dart to create them. Plus, I'm pretty good at handling the backend stuff using Firebase.

Python is another language I know well. It's super handy for solving different problems. When it comes to managing data, SQL is my go-to tool. And I'm no stranger to keeping track of my work – I use Git and GitHub like a champ.

I'm always eager to learn new things and take on exciting projects. Whether it's coding up a storm or problem-solving, I'm ready to bring my skills to the table and make things happen!

3. JASIKA GUPTA



In the Kheti Sahayak project, my significant contribution lies in the development of the login/signup and password recovery pages, encompassing both the frontend UI/UX design and backend implementation. Leveraging my expertise as a dynamic front-end web developer proficient in CSS, Bootstrap, HTML, and PHP, I meticulously crafted user-friendly interfaces that ensure seamless navigation and interaction. Additionally, my robust command of SQL facilitated efficient backend database management, ensuring the security and integrity of user credentials.

Beyond coding, my skills extend to content writing and design, enhancing the overall user experience with engaging and informative interface elements. Moreover, my proficiency in Flutter for mobile development enables me to contribute to the project's mobile interface, extending its reach and accessibility to a wider audience.

As a dedicated learner, I actively engage in tackling data structure and algorithm challenges, constantly seeking to enhance my skills and stay abreast of industry trends. Furthermore, my diverse interests, including reading novels and poetry, writing, and painting, imbue my work with creativity and depth, enriching the project with unique perspectives and insights.

With a passion for solving real-life problems and a penchant for innovation, I am committed to contributing my expertise and creativity to the Kheti Sahayak project, eager to grow and thrive in diverse environments.

4. SAYANTAN PAL



Hey, I'm Sayantan Pal, a Full Stack Web Developer and UI/UX Designer hailing from Haldia ,West Bengal. My skill set spans HTML, CSS, JavaScript, ReactJS, Angular, and Vue.js, allowing me to create dynamic and user-friendly web applications. Design is my passion, and I bring creativity to life using Figma and Canva.

Collaboration is key for me, and I leverage Git and GitHub to work seamlessly with teams, turning innovative ideas into tangible web solutions. On the backend, I'm proficient in Node.js and Express.js, and I navigate cloud platforms like Firebase, AWS, Docker, and Kubernetes for comprehensive solutions Driven by a relentless pursuit of knowledge, I'm enthusiastic about contributing to impactful web projects. With a commitment to excellence, let's connect and bring something remarkable to the digital landscape**.**

5. BHUVAN GOUR



Hey, I'm Bhuvan Gaur, a third-year student at VIT Bhopal, studying Computer Science. I'm all about making cool phone apps! I've learned Java, Kotlin, Flutter, and Dart to create them. Plus, I'm pretty good at handling the backend stuff using Firebase.

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I'm always eager to learn new things and take on exciting projects. Whether it's coding up a storm or problem-solving, I'm ready to bring my skills to the table and make things happen!

6. SUBHAMAY BERA



As a strong, passionate, and creative 3D Modeler, I am excited to share my bio-data with you. I am a recent graduate from VIT Bhopal, where I earned my B.Tech degree in Computer Science with a specialization in Gaming Technology. My passion for 3D modeling and gaming technology started early on, and I have since honed my skills to become an expert in the field. My expertise extends to various 3D modeling software, including Maya, Blender, and ZBrush, which I have used to create stunning and realistic 3D models. In addition to my technical skills, I am also a creative thinker who loves to explore new ideas and concepts. I am eager to work with teams where I can gain new experiences and contribute my enormous talent and innovative ideas. I am a team player who values collaboration and communication, and I am always open to learning from others and sharing my knowledge with them. In summary, I am a highly skilled and dedicated 3D Modeler with a strong academic background and a passion for creating exceptional gaming experiences. I am always looking for ways to improve and grow, and I am excited about the opportunity to contribute my skills and creativity to innovative projects.

7. TEJAS KOTHAWADE



I am a passionate web developer with a strong background in computer science and engineering. I have a Bachelor's degree in B-Tech CSE Core from VIT Bhopal University,which has provided me with a solid foundation in the field of computer science and engineering. My technical skills include proficiency in HTML, CSS, and JavaScript, and I have hands-on experience with React/Java, C, and Python. I am dedicated to crafting seamless user experiences and exploring new technologies is evident in your work. I have a keen eye for detail and a creative flair that allows me to develop innovative solutions to complex problems. I am always looking for ways to improve your skills and stay up-to-date with the latest technologies and trends in the industry. I am also eager to contribute my skills and creativity to innovative projects, and I am dedicated to working hard to achieve my goals. I am a team player who values collaboration and communication, and I am always open to learning from others and sharing my knowledge with them.

8. RUDRAM SARAF



An aspiring Cyber Security professional, I know languages Java and Python, and I possess proficiency in cybersecurity tools like BurpSuite and Postman. Currently enrolled in the VIT Bhopal, I am fervently pursuing my studies in this Computer Science with specialization in Cybersecurity and Digital Forensics. With a strong foundation in cybersecurity principles and a knack for problem-solving, I am committed to staying at the forefront of technological advancements to effectively protect digital assets. My academic journey is fueled by a relentless passion for cybersecurity, and I eagerly anticipate the opportunity to contribute meaningfully to the industry’s growth and resilience.

9. AYAM DASH



I am Ayam Dash, a student of Vitbhopal who is currently studying Cloud computing in the 4 th year. I have a deep interest in the Agriculture domain.I am eager to contribute to team success through hard work, attention to detail. I am passionate about the use of technologies like Ai/Machine learning in the domain of agriculture. I would like to grow and excel in the industry and cope up with the current demands. I would like to aim myself in the areas of research and development where I can gain new insights and knowledge. My experience in exploring various topics and challenges in the field of Computer Science has helped me develop and fine-tune my preliminary skills through my degree in IIT Madras Bsc data science.I have also represented my state in the National level Cbse Science Exhibition in the domain of agricultural science in which we got second prize in the state level.

8. REFERENCE

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