

# Agrim

An Interactive Application For Farmer's Assistance to Avail Government schemes.

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## Feedback Sheet

## **Aknoledge**

This project would not have been possible without the support and help of many individuals. I would like to extend sincere gratitude and thank all of them.

I would like to thank my guides, Prof. Madhumita Mazumdar and Prof. Vishvajit Pandya. Their valuable comments, suggestions, direction, and knowledge have been key in shaping my project.

I would like to extend my gratitude to Mr. Laxman Bhai Jadeja from Sidhpur village to connect me with other farmers. Mr. Dilip Vasan panchayat computer operator explained to me the working of the panchayat. And all other farmers who have provided me valuable feedback during my research work.

I would like to thank my family. Without their constant help and support, this would not have been possible. Lastly, I would like to acknowledge my friends and batchmates who help me during my M.Des journey.

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## **Introduction:**

Agriculture is a vital industry for the Indian economy, it's not only a way of earning but so has been a way of living since ancient times. Saurashtra, Gujarat is one such region, dominated by Agriculture. Here, I am focusing on Sindhpur village, taluka Kutiyana, and District Porbandar as a Subject area of my Project. Farmers of this village still practice traditional seasonal farming; though they have adopted modern equipment like tractors, harvesters, hybrid seeds, pesticides, fertilizers, etc. Benefits from Government schemes have been a part of their support structure and economy.

But to apply for any government scheme it's a very difficult and time-consuming task. The farming community often struggles with this as it may need understanding regarding pre-requisites, Eligibility, documents, or digital competence to apply for it. Even some basic information can make a huge difference. It can save time, farmers can plan as well as be prepared ahead. The government has made an online web-based portal for farmers named I - Khedut portal, it is aimed to get information. And apply to the open schemes. But farmers rarely use it, Because it's complex, hard to navigate, requires multiple inputs, as well as the information given, is very legal and formal. It makes this whole experience discouraging for farmers. As a result, there is a void of information which creates a communication gap between the government and farmers.

To address this communication gap, we need to provide information in a manner that farmers can understand it. On a medium that is familiar, widely acceptable, and which can be repeatedly approached for future

use. Also, it should be able to host a large amount of information. The proposed solution is a smartphone-based application in the native language. Many different medium was explored and discussed before finalizing the application. As it is the best way possible in the current scenario.

## Synopsis

Agriculture is an important sector of the Indian economy, as it contributes about 15% to the total GDP. And provides employment to over 60% of the population. The Saurashtra region of Gujarat is historically and culturally been home to farming and cattle herding communities. Even in modern times, a large part of the population is still connected to farming or farming-related activities. Traditional Farming and cattle herding were interconnected occupations and farming was done using Ox to till and sow the land and the whole family had the responsibility to manage the land. But now due to the availability of specific mechanized farming equipments and out-state labor force, farming has evolved. Farmers have widely adopted machinery, hybrid seeds, fertilizers, pesticides non-traditional crops which has benefited farmers.

Government schemes and subsidies play a major role in the farming economy. The support structure has been a key element in pushing farmers to adopt these changes. Still to apply for any scheme is not an easy task for a farmer. They need to have an understanding of the system. Knowledge of legal documents, the procedure of application, etc. Farmers have to struggle to register they have to approach multiple persons to get the right information. There are many people who operate shops that provide services, like filling up forms and registering online they charge farmers to fill up forms. Information is also not easily available this makes farmers dependent, they have to rely on social media, panchayat, sellers, retailers, and government offices. The information scattered very formal, technical, and complex to interpret and follow.

The main problem farmers face is the accessibility to helpful information. Awareness is there, information is also available on a public platform. Government-run advertisements provide an introductory idea to farmers but, these ads are more focused and projected to highlight the government's achievements and miss out on necessary details.

The government has made I - Khedut portal, which seems to have neglected farmers' needs and capacity to operate a web-based platform. Farmers do not have access to pc or laptops and above all, It is not even optimized to work on a smartphone. So there is a need for a medium that can effectively present information on demand, in an understandable format.

## **Problem statement**

**Farmers have always faced many problems in order to apply for any government schemes. To apply for any scheme first they have to be eligible for it because every scheme has different criteria. Even the same schemes might have different provisions based on caste division. Next is to gather the needed documents required and at last apply for that scheme. But to complete this process in a given time period farmers need to know the process thoroughly and that is lacking.**

The above statement was the initial attempt to form a problem statement, based on my limited knowledge and my own primary understanding of what farmers face in general. The next phase in my project was to validate my information and interact with some farmers to understand the problem from their point of view.

So I conduct telephonic interviews with a few farmers. My main question to them was. Where do they find information regarding Government schemes? What is the level of awareness they have about it? What are the problems they face when they try to avail any scheme?

## **Insights from conversation**

Awareness is not an issue with farmers. They know there is a support structure for them by the government and there are many beneficiary schemes and subsidies that can benefit them.

Farmers mention there is an online government portal known as I - khedut portal where all the information is provided. But this is a web-based portal and they hardly use it because it's very difficult information provided is very formal.

Primarily they relied on social media, fellow farmers, and Panchayat these were their sources of any information. But many times information obtained from these is old non-reliable or incomplete.

Farmers have to ask someone it could be a panchayat official, private retailers, or fellow farmers to confirm and gain complete information. After this interaction with farmers, I redefined my problem statement.



### **Redefined Problem statement.**

I was able to derive important insights from these conversations. So the problem is not that farmers don't know or they are unwilling to make efforts to find open government schemes. The problem is of lack of effective communication between the government and farmers. The government has even made a web-based portal that hosts all the information specifically for farmers. But the main problem with it is it's web-based. This format is totally unknown, unreachable, and difficult to operate and adapt.

### **Final problem statement.**

**I want to address the communication gap between the government and farmers. Because the government builds plans for farmers' benefits, but that information is not efficiently conveyed to farmers. In the current framework, whether it's an online portal or government offices; the information is scattered and it's represented in a very formal language that is not familiar to farmers, so they find it very complex and hard to understand. Unavailability of information is discouraging for farmers to even think about applying for any government schemes as they have a preconceived notion that it would be a lengthy and difficult process. Even if they knew that a scheme exists they might not be able to apply for it on time or just simply ignore it Because Farmers themselves are either partially unaware or find it difficult to know the details like process, prerequisite, eligibility, or time limit of the schemes.**

## Need for design

There is a communication gap between the government and farmers. The need is to provide a platform that can bridge this gap. Farmers are conscious and eager to avail government schemes and subsidies. Well-known government schemes like crop insurance, crop loans, and tractor subsidies are famous and the majority of farmers apply for them the reason behind this is these schemes are repeated every year with the same requirements and same procedure. What goes unnoticed are limited but highly beneficial schemes for example storage units, cold storage, and small and medium specialized farming equipment. These schemes are overlooked because their requirements are different. They are not repeated every year, it needs special permission from different government bodies.

Farming and farming-related activities are hard. Farmers are in a continuous struggle with the weather, and market prices and they make quite a lot of investment in terms of time and money. Even some basic information can make a huge difference. Farmers can afford new equipment they can construct storage spaces, can adopt new farming techniques new crops, etc. on-demand information has the potential to change the daily operations of farmers.

In present times we are surrounded by information. And we have effective means to access it. And we use this information in many different useful ways. But farmers have lacked this “effective medium” so there is a necessity for a platform that is familiar, widely used, easy to access, and specifically, that has the ability to host a large amount of information. This platform will not only bridge the communication

gap but it can act as a universal medium to convey any kind of necessary information. Farmers can be encouraged to utilize the full potential of government schemes. The platform can help push toward new farming techniques and new crops.

## **Choice of medium**

I want to design the platform in such a way that it can provide complete, understandable step-by-step guidelines, like what needs to be done by farmers to avail of any schemes. The platform will be in the form of a smartphone-based application because most farmers have access to smartphones and internet service, it has become a part of their lives. Also, It will be easy to provide large-scale information to farmers via the app. And it's a familiar medium so it will be easy to understand and adapt.

The app needs to be designed in such a way that it can provide information with a minimum amount of input. The interface needs to be in the Gujarati language. If possible the information needs to be arranged with respect to seasons and farmers' general activities. Possibly it can also include features like a search option to specifically search information, and various filters so they can sort schemes that only they are eligible for.

## **Target audience**

My primary target audience is farmers up till the age of 40. The reason behind this is The middle-aged population's literacy level is much higher; they can read and write at least one language which is Gujarati. Literacy level in the younger generation is quite high, many of them are graduates and some of them own small businesses along with farming. Most of These farmers do use smartphones and multiple apps on daily basis.

## **Preliminary research**

My primary approach was, to gather insights about problem farmer face while trying to avail gov schemes. How do they navigate these problems? Where do they get information? Are they aware of I - khedut portal can they operate it?

### **First Direct interaction with farmers**

Farmers describe this problem as the inability to work out complex government procedures and helplessness to understand the given details about schemes. They complain it's a tedious task if they need to apply for government schemes. They have to do the physical and digital processes. The first step is to gather documents physically from government offices, then they must apply on the I - Khedut portal, After that they need to submit the application printout physically again in the respective offices. This was the general thoughts of farmers

### **Second interaction with farmers**

After discussing the Findings from Priliminary interaction in the classroom. I was told to reproach farmers with a set of questions to understand details in an elaborate manner. And approach the target audience with a structured interview. Especially my objective was to

find out details about I- khedut portal. Therefore i created a questionary and talked with farmers.

### **Questionnaire**

1. Are farmers aware of the I - Khedut portal?
2. Do they know how to use it ?
3. Is the portal easy to navigate?
4. Where do they find information?
5. Is it easy to find the necessary information?
6. Do they get alerts about government schemes?
7. If they are able to access the portal is it easy to understand?

### **Conversation with farmers**

The farmers did know that the portal existed and they also told that they don't use it. Because they find it simply hard to use and they are not familiar with it. And it's hard for them to understand any information that is present there, they have to depend on some other entity to get verified information.

Farmers pointed out that it needs a lot of input from their side. There are too many divisions in the portal. And there is no timetable available for any upcoming scheme. To find anything they have to simply check from time to time any kind of updates.

Upon asking the panchayat official, he said farmers are not using the portal because they can't understand it. Another reason is their digital know-how. They do not know how to operate the portal.

Some farmers, even knowing that this kind of portal exists, but they do not even make an attempt to get information from it because they think they would not be able to adapt to it. The whole image and opinion in farmer's minds are that it's hard to operate so they just don't even try it.

Even if they get any information from the portal, it is hard for them to understand and follow it. Because the nature of information is very formal and it's layered by terms, conditions, and prerequisites. That makes it more and more confusing for farmers.

So the next big question was what would they do if they needed any kind of information about government schemes and subsidies, where would they look for and how would they get it. Farmers state that they rely on social media, panchayat, sellers and retailers, and government offices. Generally, they get some partial knowledge, that some kind of scheme is available right now and they would start asking. First other fellow farmers and then directly contact the panchayat to get detailed information. But in every case, they are dependent on others to get verified information.

## Field Visit

### Introduction to Sindhpur village

As my project is related to farmers it was implied that i had to go to a village, interact and observe the life of a farmer so it helps me to generate a sense of empathy for my primary user. So as per the class discussion, I was suggested that I should focus on a village or location which I am most familiar with. Because it will help me to understand and interact with farmers in a better and more flexible way. Taking all these points in mind I choose my ancestral village Sindhpu, taluka Kutiyana, and district Porbandar.

Sindhpur has located approximately 60km from Porbandar city. It has a very distinct history as the name suggests the village used to belong to people of the Sindhi community. It was built by the government of India after the partition of India in 1947, especially for Sindhi refugees. But as time moved on Sindhi community moved out of the village selling lands to local communities like Maher, rabari, kori which are traditional farming and cattle herding communities of the Saurashtra region.

Because the village was built by the government for refugees. Each family was allotted a plot with a house and Agriculture land. All allotted plots were of a size and Originally houses were also the same because they were constructed by the government.

### The current state of the village

Currently, the major population of the village resides at their respective agricultural lands. This shift has happened in the past decade. Earlier farmers had to commute daily to their agricultural land for Farming activities. So when 24x7 electricity for domestic uses at frames, better affordable vehicles like tractors and motorcycles became easily available, Many people constructed houses on farms and started living there. So many of the original houses are deteriorating.



*Image1:Current state*



*Image 2: Street*



*Image 3: One of the deterioratinghouse*

## Facilities

The village has basic facilities like a gram panchayat, a school, drinking water storage and supply through community outlets. The new panchayat building is connected via the Internet. The villagers also have access to mobile networks and electricity. There are some retail

grocery shops and a dairy collection unit for milk collection. The center of the village which is called “Choro” or “Chowk” has a temple and it is also used for community celebrations like Navratri and Holika Dahan. A dam is also located in the outskirts of the village. To buy the majority of agricultural supplies like equipment, seeds, fertilizers, etc or any medical requirement villagers depend on the nearby taluka center Kutiyana which is around 15km away.



*Image 4: Choro or Chowk & Temple*



*Image 5: Panchayat office*



*Image 6: water storage tank*



*Image 7: Dam*

## **Interaction with villagers**

I started my conversation with the panchayat official Dilip Bhai. My primary goal was to understand his role in providing information to farmers. I asked him how farmers try to gain any kind of information. He told me that farmers contact him after they have some partial knowledge about any available scheme. They asked about the process of applying, are they eligible, and what documents are needed. But they only contact him after they know that a certain scheme is available. I also asked him about the i-khedut portal and he expressed that 80% of farmers do not use it because it's very confusing for them to Understand.

I went to one of the shops to interact with the group of villagers sitting there, many of whom were farmers. I asked them about primary sources of getting information regarding government schemes. Many of them depend on social media to find any active scheme. Then they might contact the panchayat to follow up or if it's equipment they would find some retailer who might know about it. Some of them are aware of i - khedut portal but they agree that rarely it give significant info that matches his Expectation.

Due to the rainy season, many of the trails going into the interior parts of the agricultural land of the village were inaccessible and I couldn't go and explore that area. I plan to do it in my next field visit.



*Image 8: Dilip Vasan ( Panchayat official )*

### **Literacy in Village**

The literacy level of elderly population is very low as In the olden days Access to education was limited up to eight standards. The middle-aged population's literacy level is much higher; they can read and write at least one language which is Gujarati. Literacy level in the younger generation is quite high, many of them are graduates and some of them own small businesses along with farming.

Currently, the village has a Government school with standards from 1 to 12, but most high school level children prefer to study in nearby private schools. This may change in the future because of ongoing construction of a government school that will have an upgraded education facility



*Image 8: New School building under construction*

### **Digital literacy**

Most of the current generation of farmers possess mobile phones. They are capable enough to efficiently operate smart mobile devices. Farmers also have access to the internet. Smartphones have become part of their lives and they even use popular apps like Facebook or youtube on a daily basis.

### **Environment and seasons**

The majority of farmers depend upon rain for crop cultivation. The village has no access to canals or any other irrigation facilities. Generally, crops are cultivated in the rainy season and winter season. In the summer season, the heat wave and severe weather conditions cause a drop in water levels in wells. During this time they have very little water available which is used as drinking water for cattle. Some wells



even completely dried up and these farmers depend on community water storage for the survival of cattle.

### **Major Crops**

The crop cycle starts in the rainy season with Groundnut or cotton. Because they are the most suited crops considering return on investment and availability of black cotton soil. Groundnuts are also chosen because after harvest the dried remains of Groundnut plants are very good cattle fodder. Then in winter farmers have a large variety of choices, but the most common crops are Jeera, Dhana, Wheat, Maize, and Jowar. In the summer season, most farmers do not have enough water for irrigation. But those who have water select low water requirement crops like mung or some other pulses

## Literature review

It was critical for me to Look at what is being done for this existing problem, and find out the problem that they have. From my interaction with the panchayat official, I knew that - the khedut portal is there but he himself expresses that only a handful of farmers use it because it's difficult and confusing. I explored different mediums and sources of information for farmers.

### E - Chopal and I - khedut portal

E - Chopal is an internet-based agricultural intervention backed by the ITC group. The program installs computers with Internet access in rural areas of India to offer farmers up-to-date marketing and agricultural information. E choupal is not available in Gujarat. Gujarat government has I- khedut portal which is used to present information for farmers it is available in both web and app format. Analyzing the I khedut portal one can clearly see it has a very difficult navigation structure. It relies heavily on the text to convey information. The app version is very poorly developed, it redirects the user from app to web and all the other interaction is the same. The portal has a lot of division and a very lengthy process to find any active schemes

## Farmer's method of operations

Before going forward in the design phase, I was told to understand the farmer's way of life. How does their ecosystem works how do they approach any problems and what are the decisive factors in the Agriculture cycle?

To thoroughly understand the agriculture cycle I needed to know the general way in which farmers operate. On what ground do they decide crops and effects of season market prices and most likely scenarios. So I made a questionnaire, the questions were about

1. what crops do they plant?
2. why do they opt for a particular crop?
3. what are the effects of the season?
4. what kind and how much fertilizer and pesticide they require?
5. what time period is watering is done?
6. The reason behind choosing the same crops every year.
7. Does the amount of rain affect their selection?
8. Do they think of any alternate crops or have backup plans?

## **Insights from the conversation about crop cycle.**

Rain is the decisive factor for farmers. Not just the amount of rain but the timing of rain is also crucial.

### **The First stage in the crop cycle starts with the rainy season.**

In Sindhpur village and surrounding area. The main crops are Groundnut and cotton. The reason behind it is the Soil which is black cotton soil that is very favorable for both groundnut and cotton and the weather condition is also very suitable for these crops. Another reason is market rates and demand. These are considered cash crops and have a high return on investment.

Many farmers divide their land and plant both groundnut and cotton; they would not bet everything on one crop. If the rain is late groundnut would be able to complete the period it needs to ripen. So they might go for an alternate crop which is cotton or castor plantation. Other general requirements for groundnut crop were water required in 10-12 days intervals, Fertilizer is needed before the time of sowing seed or with seeds, Pesticide required will depend on pests and diseases, and the time period needed for full cultivation is 4-4.5 months Similarly I collected data for every crop.

### **The second stage is the winter season.**

In the winter season, farmers have many options to choose from. But generally, they choose from Cumin seeds, Coriander, Maize, onion, bajra, jowar, Garlic, and wheat. The reason behind choosing Wheat, jowar, and maize are because they are safe crops to opt for as their market rates are stable as well as maize and jowar plant stocks can also be used as cattle fodder. And in the case of Cumine, coriander, and onion-garlic these are risk-bearing crops. They need more pesticides and fertilizer, as well as rates, are also

Fluctuating may require storage for some time after harvest. storage is also not easy or feasible. So basically it depends on the individual farmer what to choose.

### **The third stage is the summer season**

In the summer season, not all farmers have enough water to plant any crops. Some might have enough to plant small amounts of land using groundwater. They would opt for Mug and Tal because they require less water and very less fertilizer as well as pesticides. Or they may just pant cattle fodder of their choice.

With this much amount of information at hand, I was suggested to structure in a visual format similar to Panchang so that I can look at a larger perspective and use this critical information effectively.

Crop cycle in a visual format.

## Crop Cycle

Seasons	Months	Crops	Notes	
Rainy season	Ashadah	<b>Groundnut</b> water required in 10-12 days interval Fertilizer - before time of soing seed or with seeds Pestiside - depend on pest and diseses time period 4-4.5 months	<b>Cotton</b> water required in 8-10 days interval Fertilizer - before time of soing seed or with seeds again after 1 moths Urea, then again at the time of Riping DAP Pestiside - need pestiside on 10-15 days interval time period 8-9 months	Farmers start from either ground nut or Cotton because, they are most suited and have most return on investment.
	sravana			
	Bhadarvo			
Winter season	aso	<b>Cumin seeds</b> water required in 10-12 days interval Fertilizer - before time of soing seed. Pestiside - every week depend on pest and diseses time period 3 months	<b>Maize</b> water required in 8-10 days interval Fertilizer - before time of soing seed or with seeds Pestiside - if need, depend on pest and diseses time period 4 months	Farmers choose from varity of crops. the individual dision depends on risk factor, market rate, availability of water and Seeds.  Wheat, jowar, maize are some safe crops to opt for. their market rates are stable as well as maize and jowar pant stocks can also be used as cattle fodder.  Cumine, coriender, onion garlic are risk bearing crops. they need more pestisied and fertilizer as well as rates are also Flucuating may require to store for some time after harvest. storage is also not easy or feasalbel
	Karataka	<b>Coriander</b> water required in 12-15 days interval Fertilizer - before time of soing, then 2 time urea Pestiside - at least 2-3 round of pestiside needed time period 3 months	<b>Onion</b> water required in 6-8 days interval Fertilizer - before time of soing seeds then 2 times urea Pestiside - every weak after 1 moth of growing time period 4 months	
	magasara	<b>Bajar</b> water required in 8-10 days interval Fertilizer - before time of soing seed Pestiside -if needed, depend on pest and diseses time period 4 months	<b>jowar</b> water required in 8-10 days interval Fertilizer - before soing seeds Pestiside - if need be time period 4 months	
	posa	<b>Garlic</b> water required in 8-10 days interval Fertilizer - before time of soing then again 1-2 times urea Pestiside - depend on pest and diseses time period 4 months	<b>Wheat</b> water required in 6-8 days interval Fertilizer - before time of soing seed then 2 rounds of urea Pestiside - if need then only,depend on pest and diseses time period 4 months	
	maha			
Summer season	phagan	<b>Mug</b> water required in 8-10 days interval Fertilizer - before time of soing then again 1-2 times urea Pestiside - if needed then depend on pest and diseses time period 3.5 months	<b>Tal</b> water required in 15-16 days interval Fertilizer - generally doesnot require depends on farmer's choice Pestiside - if need then only,depend on pest and diseses time period 4 months	Farmers who have adequate waters in wells grow summer crops. most farmers do not have enough water on summer season.
	Caitara			
	Vaisakha			
	Jeth			

Image10: Crop Cycle

## **Analyzing farmers' capacity and understanding of apps and smartphones.**

### **Interaction with farmers**

To find out what kind of apps farmers use and what they think about it, I created a set of questions and approached farmers to have a conversation based on those questions. The objective of the conversation was:

- To familiarize myself with farmers' approach to mobile and mobile-based applications.
- Learn farmers' level of understanding of apps and its Content.
- Any specific problem farmers face while using these apps.
- What they enjoy and feel comfortable with.
- Discover apps that they regularly use.
- Usage of smartphones in activities related to agriculture

### **Major Questions:**

1. What kind of mobile phone do you use?
2. If feature phones then why feature phones why not smartphones?
3. If smartphones then, since when are you using smartphones?
4. How did you learn to use a smartphone, is it easy to use?
5. Other than calling, what do you use your mobile phone for?
6. Do you use the internet? If yes, what for?
7. What are the applications you use on a daily basis?

8. Which language are you comfortable using in an application?
9. Which is your favorite app and why do you like that app?
10. Which app do you feel is hard to use and why?
11. Do you use any app that helps in your agricultural activities or routine?
12. Any specific app which is related to farming?
13. What are the purposes of various apps that you use to aid your farming?
14. Are you aware of the I-Khedut mobile app, have you ever used it, and how was the experience?

### **Insights from conversations**

#### **Popular and most-used apps**

The most common app used by farmers is youtube. One of the reasons they find it easy to use is because of the voice search option, it is working quite well with Gujarati and they are curious to watch new things. They enjoy it also “because every time they open it they find something that is related to their interest”. This is because of the youtube algorithm which captures the user's interest from previous activities.

Other than youtube they also use popular platforms like Facebook and Whatsapp. On Facebook, they follow some agriculture-related pages where many people post their experiences with new crops or new methods of farming. Whatsapp is very common and everyone uses it for personal messaging, as well as video calling which has become

quite prevalent in the village. The Village panchayat also runs a Whatsapp group, Where panchayat officials share circulars and panchayat working timelines, like pan card listing or electricity bill payments, etc.

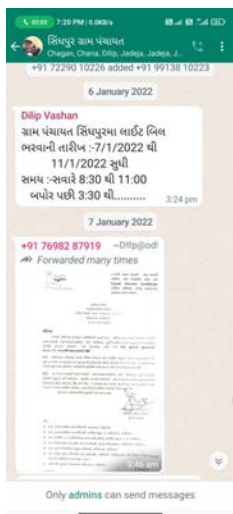


Image 11: Panchayat Whatsapp group



Image 12: Youtube



Image 13: Facebook

### Hard to use apps

The hard-to-use apps are payments apps and farmers are yet to adapt it. It is hard because they need to remember multiple passwords. The signing-up process is difficult and they feel insecure to seek help doing it. Normally they might take help if they find it difficult to set up social media accounts, and email accounts, but since payment apps involve money it is difficult to trust other people to set up an account.

### Farming Specific apps

Farmers also use different kinds of farming-specific apps. One of the most used apps is Piplana Pane. It is a simple app, where you can sell and buy crops, new or old equipment, animals, fertilizer, pesticides, etc. farmers or anyone can post photos and post information regarding what they need to sell, and interested people can find contact information and work out a deal between them. This app also provides advertisement services and many small local vendors who sell agriculture-related products advertise there.

One point that everyone mentions is language, an app with an English language interface is hard for them to use. Since it's hard for them to read and relate they have to remember the steps to navigate. But with time and multiple uses, they get used to it. This shows that they Depend on memory, not on the usability of the app. However, if an app is available in Gujarati they prefer it. It's easy to understand which makes navigation easy. They don't need to remember any steps so their cognitive load is less. The reason behind the success of small apps like piplana pane when bigger and better counterparts are available is because it's fully in Gujarati and connects regional people and provides local content.



Image14: piplana pane home screen



Image15: various selling posts



Image16: I - khedut home screen



Image17: schemes screen on I-khedut

The I-khedut portal, which is a government portal for farmers is also available in-app format but no one uses it; most of the farmers are not even aware that it is available in an app format. The main drawback of the i khedut portal is that it has not been optimized in the interface of the mobile app. The app displays the portal same as the website having all the same interactions and inheriting the same problem as the web.

**Conclusion**

Language is one of the important parts of any interaction for farmers. Gujarati language apps will be adapted easily. Another crucial aspect is to create a sense of familiarity, which will help farmers to adapt the app easily. Many farmers are yet to adapt the smartphone technology fully, for them the interface has to be sufficiently intuitive as well as Features like voice search, icons that project clear ideas, local content, and connectivity, easy account setup & authentication, relevant recommendations, Video and audio-based information delivery are appropriate.

## Possible Core Content for App

After analyzing the current System. And Interacting with farmers on what kind of apps they use on daily basis. I started brainstorming on what content in terms of features will go on the app. My focus was to make a user-friendly app including familiar interaction and options that are simple, and easy to understand.

### Information

The primary objective is to provide understandable information to the farmers of Sindhpur village. For this, the available information has to be redesigned and represented without changing its core meaning. Also, It needs to be broken down into small chunks of info so it becomes easy to retain. The division could be done based on the stages of requirements and process. Like prerequisites, eligibility, documents required, steps of the process, and touchpoints. Rearrangement of information needs to be done because it will help them to plan ahead. Sometimes reading a clustered information and Following a long process becomes overwhelming for Farmer. So dividing stages will reduce cognitive load. The language used to present the information will be Gujarati. Step-by-step guidelines. Information regarding the scheme will be displayed in a format of step-by-step guidelines. Because guidelines project an intuitive element to the farmer. It will be clear to farmers what are the requirements of the schemes when & how he needs to carry out a certain task. It will also project a time period so they can be aware and don't miss any

Deadlines. One of the purposes of the guideline is to standardize the scheme information and create a recurring template. So, once a user learns to interpret it, it will be easier for them to understand any scheme info. In the future. Guidelines must be made in a way that it is short, easy, and retainable for farmers.

Every step will be also available in an audio clip in Gujarati so that farmers can read as well as hear the steps and act on it.

By following the scheme guideline, a user will be able to understand a scheme, check eligibility, arrange prerequisites, and apply or register at the end.

### Categories

Categories will include schemes based on a domain or similarities. For example, The oilseed category will include schemes related to all the oilseeds. Equipment will include subsidies, benefits, or assistance from Gov. regarding equipment and so on.

Possible categories:

- Oilseeds
- Equipment
- Fertilizers
- Pesticides
- Irrigation
- Organic agriculture
- Vegetables
- Fruits
- Pulses
- Grains



The categories allow the farmers to specifically search and find any available scheme for their respective crops. Without doing any complex searches. Also, it will be less time-consuming and gives direct access to the schemes because the government provides a wide variety of schemes.

### **Registered**

Every registered scheme will be displayed on the registered section. Here farmers can keep track of previously registered schemes. And a timeline displaying the status of the registered scheme will keep farmers updated on the status of the scheme.

If there is any problem with the scheme, eg: document missing or criteria not fulfilled. It will be displayed there so farmers can know their mistake and correct it if possible.

### **Notification**

It will keep farmers notified regarding the opening and closing of eligible schemes, deadline alerts, application status alerts, etc. the main advantage will be to keep farmers updated therefore it will help them not to miss any crucial information. Notifying farmers will be a great help because missing the deadline to submit an application is a very common thing. Directly notifying of an eligible scheme is also beneficial as farmers will not need to specifically search for it.

### **Save**

Farmers can save schemes for later that they are interested in. Saved schemes will be shown in the saved section. Whenever there are any updates regarding the saved scheme farmers will be notified.

### **Agri News**

News related to agriculture will help farmers to keep up with changes in policy, circulars, and emerging novel techniques of farming, irrigation, and equipment. It could also display the upcoming schemes and plans of the government for farmers.

### **Market rates**

As market rates change every day, Farmers can choose locations of nearby markets so they can find out the current market rates of different crops. This can also help them not only while selling but while selecting crops for the upcoming season. Because in the selection of crops, market rates and demand is an important factor.

### **Weather updates**

The majority of farmers depend on the rain at the start of the crop cycle. Weather is also included in their social conversation and many farmers routinely check the weather on news. So whether updates will be a valuable addition to the application as well as it will help farmers to track weather and plan accordingly.

### **Podcast**

As farmers are already familiar with radio shows, Podcasts would be of great use to farmers. They can save it to listen to it later as well as listen to it while they are busy with some farming activity.

It will provide information regarding government schemes in audio format. Each scheme will have a dedicated podcast title. We can divide the podcast into the episodes or stages like an introduction to the scheme, benefits, what is required to apply for a particular scheme, and how and where you can apply. Similarly, podcasts not just for schemes but new methods in farming, innovative equipment, new high-yield crops, etc can also be there. This will provide farmers with a new perspective and they can be motivated to try taking small steps.

### **Chat or Assistance**

Farmers can directly send text messages or audio recordings via the app. And ask for help regarding any problem they are facing while applying for a scheme or any crop-related query. They can get guidelines that can help them to solve any problem they face. Or can be diverted to dedicated support personnel. The Chat can also be utilized to share a picture on it and get assistance on crop health and betterment from an expert.

### **Search**

A dedicated search bar will be available on all the screens. It will be conceptualized as a smart search that can suggest relevant schemes or info. Based on keywords. Will also have a voice search feature. This will be helpful to the users who are not frequent with typing on mobile.

### **Profile**

A profile created by a user on the app will be helpful in suggesting and recommending relevant schemes to a farmer based on their interest area as well as the previous schemes that they have explored. The profile will also save various documents of a farmer which are needed to apply for schemes, this way the eligibility for the schemes can easily be figured out.

## **Usage of smartphone and mobile applications of Farmers.**

## Objective

In the interaction of the previous field visit, I could get an overall idea of the smartphone and mobile technology usage of farmers through the observation. A follow-up visit was planned in order to get a more qualitative point of view in the same area through the observations of individuals and their interaction and behavior with mobile devices. The observations will be crucial for further design consideration in the project.

To understand farmers' digital aptitude, the following primary factors should be observed; Their way of interacting with applications, how they navigate, do they understand icons, are they able to understand the flow of information, Can they use options that require multiple interactions for a specific outcome, eg: posting an advertisement to sell Agricultural products, equipment, cattle on 'Pipla na Panne' app or posting a photo on 'Facebook'. As per previous interaction with farmers, I knew what kinds of apps they use in general. Now I need to observe them using those apps and see how they perform a given task. And take note of where they are facing problems, getting confused, where they require help, where they get frustrated, and what makes them frustrated, which may lead to completely abandoning the application or task. And also find out why they like any particular apps and what motivates them to come back again and again

### Interaction with farmers:

#### Laxman Bhai

### Interaction

Laxman Bhai is a farmer and also runs a pan shop in the village. He is very comfortable using a smartphone and various applications, he even uses all of his applications in the English language and he is quite comfortable with it. His most used app is youtube. I requested him to show how he used it. He Unlocked his phone, He initiated the youtube app from his home screen. And started scrolling and describing what he watched and why. Upon asking about different interactions on youtube he pointed out that he can like, dislike, subscribe, and comment on a video. Inquiring more about other options he said that he is aware of the other options which are download and share but it's no use for him. He was not aware of newer options like clipping videos or creating a short. Voice search is his most liked feature.



Image18:laxamm Bhai

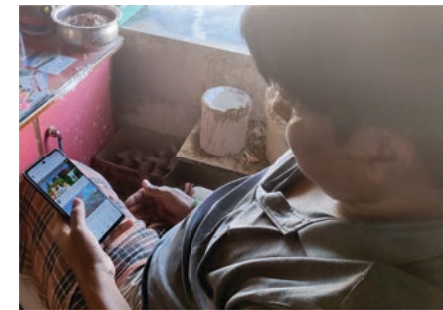


Image19: laxamm Bhai using youtube

### Observations

Even though laxman bhai is an active user, he was not aware of new interactions that youtube has introduced in recent updates. The reason behind this is that these interactions are not needed or not used in his social groups. As youtube has captured the interests of Laxman Bhai, it recommended the related videos to him, this feature entices Laxman Bhai to be interested and keep on using the app on daily basis.

### **Leela Bhai**

Interaction:

Leela Bhai, another farmer present at the pan shop, shares his experience of searching for used tractor tires on the Piplana pan app. I inquired how he searched. He walks me through his process. He launched the Piplana pan application and pointed out different categories. He described that tires could only be found in the tractor section, vehicle section, or by specifically typing and searching in the search bar. And he has been actively searching for tires for the past three days, but he was not able to find any good deals. Upon inquiring about other interactions on the app, like saving or sharing a post he said he only used to find and get the contact details of the seller of the items. As saving and sharing options are not needed, he has not bothered to explore them.



*Image20: Leela Bhai*



*Image 21 Leela Bhai using  
peepla na pan*

### **Observations:**

Interactions like saving and sharing are provided in the app to enhance the experience of the user. But, Leela Bhai's requirement was limited to searching and contacting the seller to buy the needed items so he only learned that many interactions. Because that fulfills his requirement. The motivating factor for Leela Bhai was that he could understand categories easily and the interface was in the Gujarati language. Local content provided by the app was most important.

## Naga Bhai

### Interaction:

Naga Bhai's most used app is Facebook. He likes to post photos, stories and watch videos and read different posts shared by his social circle. He describes it as 'it helps him stay up to date with what's happening around the village and surrounding areas or in his social circle.' I request him to show how he uses it. He opened Facebook and started scrolling. Describing various interactions pointing out stories, videos, and a notification tab. Further, I asked him to show me how he takes a photograph and posts that photo on Facebook. So he closed Facebook, opened the camera, and took a photo of the field. Then again open Facebook, tap the new post icon, select the photo from the gallery and say we can post from here pointing to the post button. Further inquiring about more detailed interactions, like menus, saving a post, hiding a post. He replied that he was not familiar with it and does not use it. Also, he does not feel that he needs those features. He also pointed out that typing in Gujarati is hard on Facebook. He often takes the help of his son to type captions if needed. He even pointed out to me that writing a description in a Piplana pan is easy as it has a text-to-speech option and Facebook does not have this.

### Observations:

Even though Naga bhai uses Facebook regularly, he didn't know about many features that Facebook provides, like accessing cameras directly

from Facebook, filters, reactions and emojis. He struggles to type on mobile devices and prefers voice to text option. His sole purpose of using Facebook is to consume entertaining and interesting content and stay connected with his social circle. This is the main motivation to come back to Facebook.



*Image22: Naga bhai*



*Image23: Naga bhai using facebook*

## Deepak Bhai

### Interaction :

Deepak is a graduating student who grew up in the village, helping his father in the farming and cattle business. He is well versed with smartphones and different apps. So I asked him about any app that helps him in farming or cattle business. He describes that buying and selling cattle is a very important part of the cattle business. which is mostly done by interacting with people in a village or calling and inquiring with some relatives in another village. This can now be done through this app simply posting photos, writing

descriptions about the cattle, and giving the phone no. And the interested person would directly call them.

### Observations:

The app has made the whole process of buying and selling cattle less time-consuming and easy. It has eliminated the stages of contacting and inquiring in other villages. He is an educated and young member of the village, so people who are not that well versed in smartphones often ask his help to interpret, save contact or even open a new account on social media or the Piplana pane app.



Image24: Depak bhai suing app

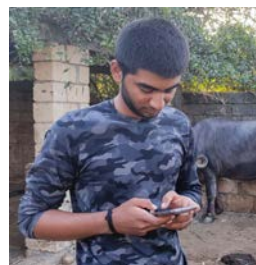


image25: Depak bhai

### Jenti bhai

#### Interaction:

Jentee is a young farmer who uses a smartphone very well. He shared his experience of using various apps. Stating that while youtube and Facebook provides entertainment it is also a source to find interesting new farming techniques. For example, on Facebook he could see what

other people are doing to get more yield. Because people share articles or informative videos that could help them in farming. He also pointed out that whenever there is an update and some changes are made in a new version of the app it takes little time to adjust and learn new features.

Upon asking about simple interaction and discussing other apps, he told me the Piplana pan has very simple interaction. Easy to understand icons, simple to post an advertisement even simpler than facebook. It even has a speech to text option. He opened the app and showed me how easy it was to post an ad on it.

#### Observation

He can learn on his own how to use an app. But he faces difficulty when the app is updated and changes are not introduced to him. More inclined towards speech to text options.

### Hardass bhai

Hardas bhai is a middle-aged farmer. He uses a feature phone he can write and read Gujarati but still, he does not use a smartphone. My objective of the conversation was to understand why he still doesn't use a smartphone and what difficulty he thinks he will have using it. He stated that he thinks it's hard for him to learn. "Smartphones are something that young people use". He also stated that English would be a hindrance in adopting it. So I changed my phone's interface to Gujarati and gave it to him. I guided him to some simple interactions like taking a photograph, typing in Gujarati, voice searching in google. After a few attempts, he understood the flow of a few interactions and tasks in the smartphone and stated that "if somebody can guide him to

use the smartphone for a few days he may be able to learn how to use it”.



*Image26: hardasbhai take photo*



*Image27: trying to type*



*image 28 voice search*

## Observations

Many farmers of middle age have a preconceived notion that smartphones are hard to use and People with education can only use them or they need a certain level of skills to operate it. But essentially what they need is guidance. Language plays a great part in order to create familiarity and adaptability. If the interface and guidance are

given in the native language, then a large number of people who are yet to adapt the smartphone can be served

## Conclusion

Farmers adopt an application, if that application has any value addition in their daily life or if that application is adopted by the surrounding social circle. They are able to learn and use the primary function of an app but many farmers do not use or remain unaware of many micro or less used interactions in an app. Because these features or interactions are not required by farmers therefore they do not explore it. They only focus on relevant features that help them to complete their needs. Gujarati language interface and speech to text options, and voice search options are more welcomed and easily adopted. As it makes it easy for them to understand and eliminates the need for typing which is difficult for many farmers. Changes are done while updating an app without giving a proper introduction increases the difficulty for farmers. Guidelines are needed, if prior guidelines and introduction to features are provided, app interaction would be easy. Local content and connectivity attract them, make them curious, and motivate them to come back to the app.

## **Content Customization**

After observing the farmers interacting with different apps I re-evaluated my content/ Features. Most of the previous thought content was kept as it fulfilled the requirements and some new things were added. Eg: application guide, Re-structuring the categories with respect to seasons, division of information.

### **Objective**

The primary objective is to provide information regarding government schemes. But during research, it was found out that we need supporting content. That makes the whole interaction with the app more dynamic, engaging, and fulfilling. Therefore we need farmer-centric content that can cater to their interest and entice their curiosity.

## **Content / Features**

### **Market rates**

As market rates change every day it is one of the information farmers require on a daily basis. Market rates are important not just for selling crops but it is a factor on which farmers choose the next crops to plant. So farmers will be provided with daily fresh market rates. They can choose the location of their nearest marketing yard.

### **Agri News**

Farmers are curious to know about new farming techniques, seeds, irrigation methods, and equipment so Agri news will cover these interests. It will also keep farmers informed about various policy changes. Also, It could display upcoming schemes, experiences of fellow farmers with new crops, and other ventures. It will present local news so they can get an overview of what's happening in their surroundings.

### **Weather updates**

Weather plays an important part in farming. Farmers are very vigilant about it and check weather forecasts daily. Therefore These updates will help them to prepare ahead. It can give a projected forecast for a week and even give advisory if caution is needed.

### **Podcast**

Podcasts will act as an effort-free medium of information. While reading can become less interesting. Listening to that information while doing any farming-related work or listing in groups will become a motivating factor. Information regarding government schemes can be presented in Podcast format, the information will be in a segmented, thoroughly broken down, and easily understandable way. It can also present any kind of farming-related knowledge. It shall have a comments section that can be used as a way to interact with creators to ask questions or feedback.



## **Chat assistance**

This feature will allow Farmers to seek assistance when they are facing problems while availing any scheme or they have any questions regarding crop health. They can type their queries or send audio recordings. Additionally, They can even attach photos of their crops to get assistance on crop health and betterment from experts.

## **Information regarding schemes**

All of the information will be divided and presented in an understandable way. Along with a Step by step guide to apply on the I - Khedut portal.

The primary divisions will be as follows:

- Eligibility
- Time period of application
- Prerequisites
- Document required
- Guidelines on how to apply on I - Khedut portal

This will help farmers to easily understand what they need, how to apply, and the time period in which they need to apply. For every scheme, guidelines will be in a standardized format. A recurring template so that once a user learns to interpret it, it will be easy to retain and understand it in the future. It should be short and in the Gujarati language. Also, it will be available in an audio clip, so that farmers can read as well as hear the steps and act on it. By following

guidelines farmers will be able to understand information and apply it on The I - khedut portal.

## **Categories**

This section will help farmers to search for any scheme in a specific category. The primary categories will be as per season.

- Monsoon season
- Winter season
- Summer season

## **Registered**

The registered section will display every registered scheme. It will help farmers to keep track of previously registered schemes. It will also have a timeline displaying the status of schemes to keep farmers updated. If there are any problems it will notify farmers of that.

## **Save**

Farmers save schemes, news articles, and podcasts for later access, all of these can be found in the saved section of the app. Notification It will keep farmers notified regarding the opening and closing of eligible schemes, deadline alerts, application status alerts, etc. the main advantage will be to keep farmers updated therefore it will help them not to miss any crucial information. Search A dedicated search option will be provided to specifically search for any information on the app

using keywords. It will also have a voice search option which is heavily used by farmers.

### **Onboarding**

It will start with a standard collection of information and app authorizations of locations and reading messages from farmers. Then They just need to provide their name and the mobile no voice to text option can also be provided here, then the tap register. So the app will automatically take location and read OTP to confirm registration.

### **Introduction to the app**

When the user logs in for the First time, a comprehensive introduction highlighting every feature one by one on the home screen with audio will play and inform farmers about necessary details.

### **Tooltip**

Farmers can tap & hold any icon to find out what it represents and what interaction can be done using it. It will help them to explore the app and if they forgot anything they can find out immediately.

## Information architecture.

During my research work and by interacting with farmers. I understood that my approach to design must be to create a similar experience that they are using daily. So to generate a familiar experience I must provide interactions and features similar to apps that they use on daily basis. While keeping in mind farmers' ability to navigate and use every feature. My flow of the app must not be too deep and micro-interactions should be limited and major interactions should be highlighted. They should always be able to get to the home screen from any screen. Home screens should have a glimpse of all the things they can do on the app. The app must suggest and guide the user to their specific requirements. After considering the above points the following information architecture was created.

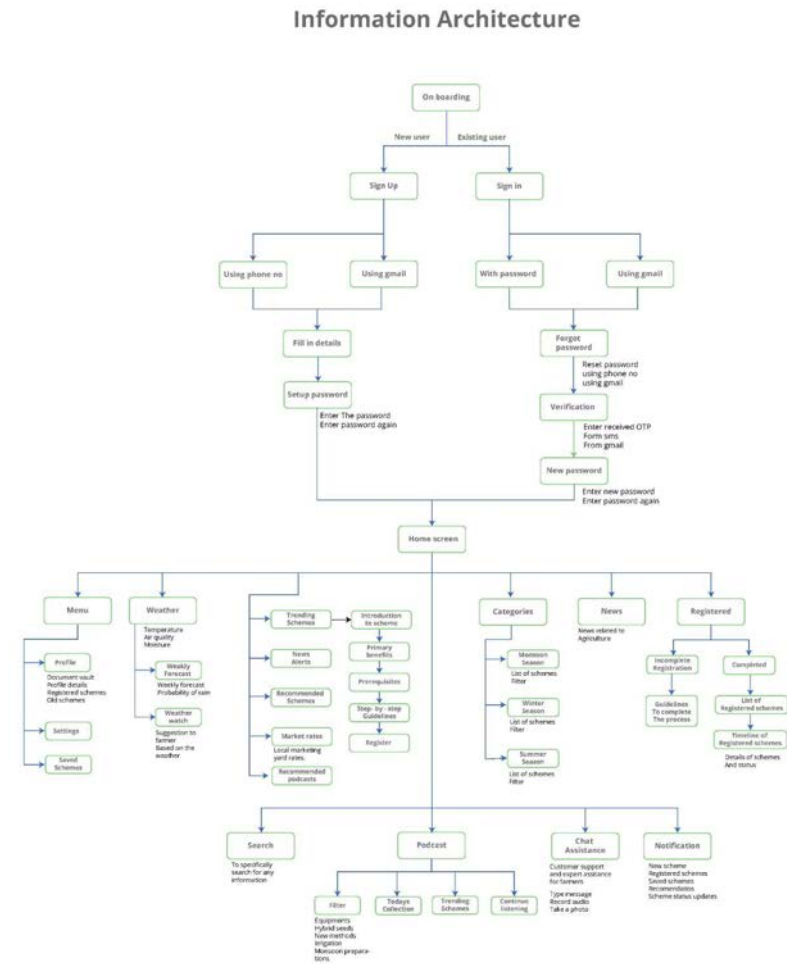


Image29: Information architecture

## Wireframing

Wirefarming was carried out to make a structured representation of the app without any visual or real text. It would present the main interactions and general idea of navigation.

### Approch to design

Farmers are a distinct target audience with peculiar requirements and abilities. There is a higher chance of adaptation of any new platform if the Farmers are familiar with the look and feel as well as the interaction. Therefore they should not be overwhelmed by anything which is strange and requires time to get used to.

The foremost focus from a UI design perspective is to create a familiar interface, which is similar to the apps that they are habitual of using on daily basis, like Facebook, Youtube, Whatsapp, Pipla na Pane, and Instagram, etc.

The main visual elements derived from the above apps are Thumbnails, Horizontal sliders, Tabs or Tiled layouts, Usage of banner images and Captions, etc. These elements are to be used to break down the information as well as present it in the form of a digital experience.

### Home Screen

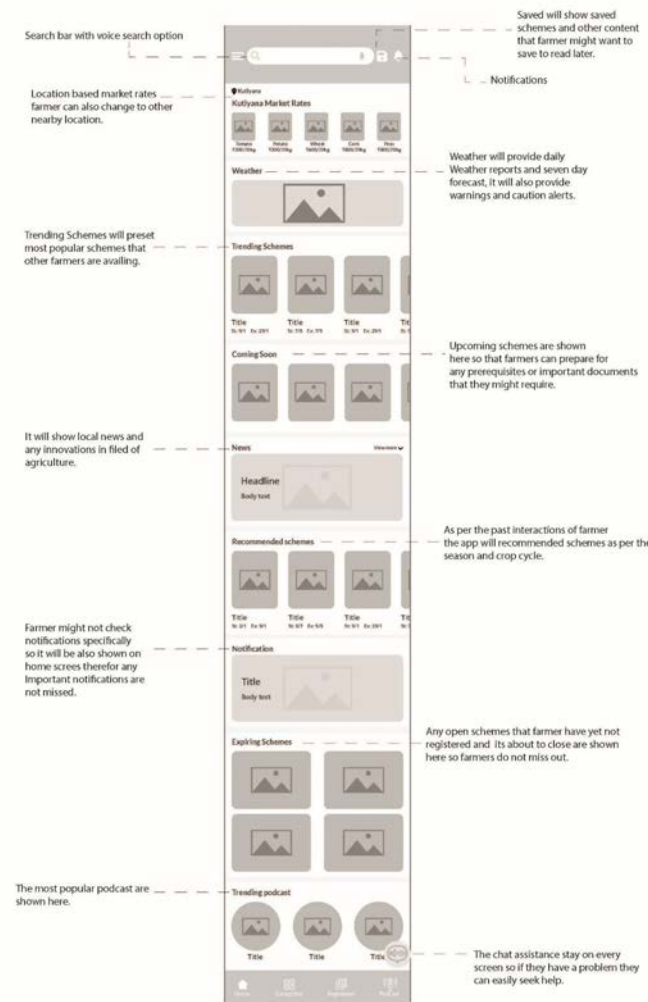


Image30: homescreen wireframe

# High Fidelity Screens And UI Design.

## Registration

Registration will be a simple process. Farmers only need to provide their name and phone number and they will have the option to take the introductory guide or skip it.

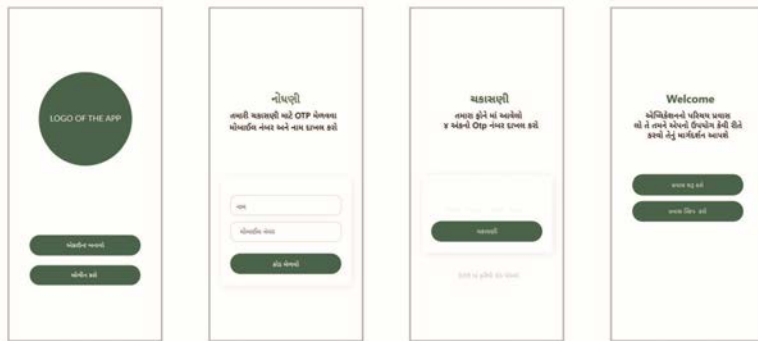


Image31 Registration

## Introduction Guide

Initial Guide will help a farmer to get a primary idea of what they can do on the home screen as well as take them through various options of what they can find and how to interact with different features & sections. They can either read the information or hear the audio version of it during the guide steps. If they miss anything they can tap again on the audio icon to replay it. If they forget anything they can retake the tour from the menu section.

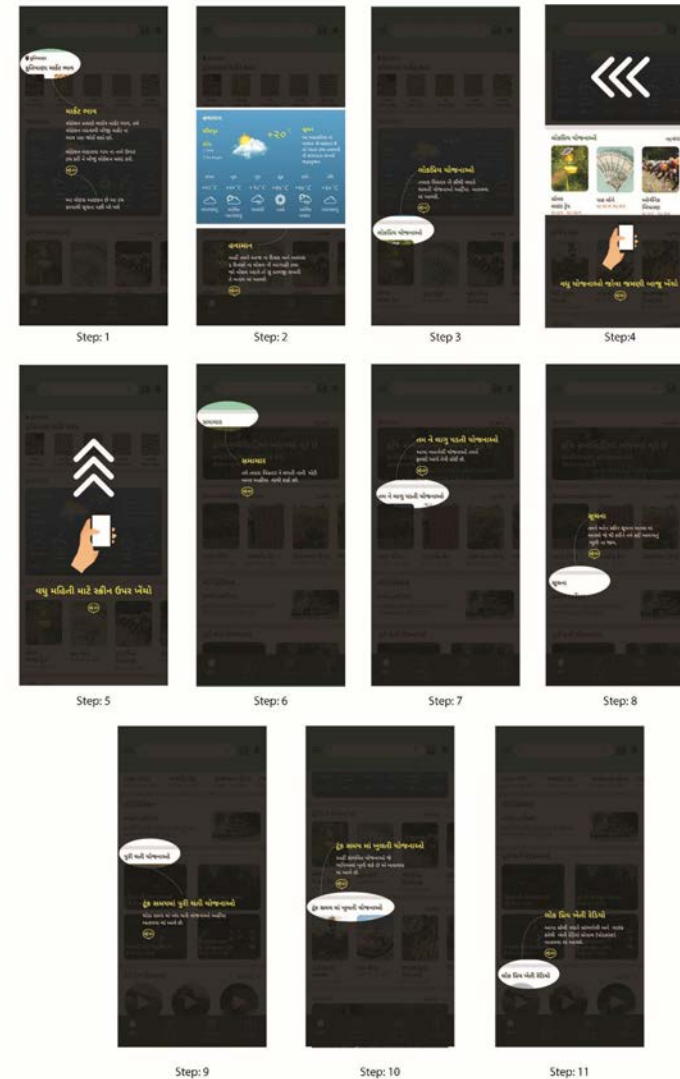


Image32 Guide

## Home Screen

### Design approach

The design approach to home screens was to keep familiar interaction, which is Derived from the apps they regularly used. Therefore using a tiled layout with images that represent text or invoke and support the context of the schemes. Presenting the basic information like start dates and end dates, with clear headings of sections so there is no confusion.

### Language used

While conceptualizing the home screen I used headings like trending schemes, coming soon, and recommendations. But while converting this into native language ( Gujarati ), for example, I used phrases like ‘ લોકપ્રિય ’ (trending schemes ) Which conveys the same meaning for farmers.



Image33 Hi Fidelity Home screen



## Classification of schemes

Farmers can find schemes classified as per seasons they can also specifically filter all of these schemes as per their liking.

## Weather screen

Detailed weather data will be shown here. A seven-day forecast and specific precautions and suggestions about weather will be shown here.

## Detail information

On schemes, Farmers can read or hear all the information present on the screen which is specifically divided into different sections like details, benefits, and documents required. So that it's easy to understand and retain it. If they are interested and they are eligible they can tap on easy apply and their application will be submitted.

## Notification screen

Notification screen will show different notification like new schemes newly registered schemes etc.

## Podcast screen

Here farmers can listen to a various podcast related to Farming. The screen is divided in different sections like new podcasts, trending podcast, small informative podcast. These sections will help farmers to find a podcast related to their interest.

## Calendar

This feature will help farmers to organize and avoid missing any schemes or other important activities. Farmers tend to forget the date and time to apply for schemes sometimes. Having a built-in calendar will help them to organize. They can add reminders such as submitting documents at panchayat or daily reminder to start the application process for any schemes. The calendar is integrated with Panchang. Farmers follow Panchang while performing important activities, such as sowing seeds, buying new equipments etc.

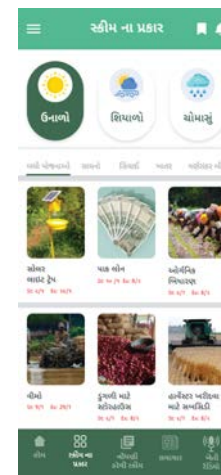


Image40: classification



Image42: Weather



image45: Calander



## Feed Screen

The Feed is named as Choro, (the Choro is the local word for Chowk, it is a place in the village where people gather and interact with each other). It is a social feature for the app, here farmers can post their own photos and videos and connect with other farmers. This will act as a supporting feature, so farmers are motivated to come back to the app. They can post stories, comment on another post,s and in between the app will suggest podcasts, news, and other information that may help them.

## Detailed news screen

Farmers can read any news article in detail, the screen will include the date & time when the article is published and the publisher. They will have the option to hear the whole article as well as share and save the article for future Reading. If the article has a video attached to it they can also watch that video.

## Market rates

Farmer can watch live market rates. They will have the option to Change location and categories of goods. The app will present farmers with categories like high in demand, and crops that may have high demand in the market because right now stocks are low and prices are increasing. This can help farmers to make an informed decision on which crop to plant next.



Image46: Feed



Image47: Market rates

## Feedback and user interaction.

### Objective

Collecting feedback from the target user is a valuable part of the design process. So after designing a significant amount of screens that can present a comprehensive idea to the farmers. I planned a visit and interacted with farmers with a prototype.

The main focus of interaction with farmers was to get feedback on the design and gather suggestions. And check if they can navigate properly. Icons, images, and titles make sense. See if they are comfortable with the overall interaction with the app. Do they need any other features?

Therefore the main points that I need to observe are as follows.

- Ease of use.
- Relatability and retainability of information.
- Intuitiveness to capture navigation.
- Is the experience familiar to apps that they use on a daily basis.
- The information presented is easy to understand.

### Interaction with farmers:

#### Bharat Bhai

Bharat Bhai is a farmer and also owns a furniture shop on the nearby highway. He is 32 years old and has studied till graduation. He is very comfortable with using mobile

phones and various apps. ReactionHe immediately recognized the login process and quickly went through it. He opted not to choose the app guide as he wanted to explore the app himself. Landing on the home screen he started reading and scrolling each section. The navigation was fluid for him, even exploring different screens from the bottom menu. He found the experience similar to the apps that he is already using. He specifically liked the market rates, which were presented with respect to units. He emphasized on the units part, giving me an example that some time rate of grains are in quintal. And that is confusing for farmers as farmers are habituated to sell crops in 20kg units. He also likes that they can check different market rates by changing locations.



Image39



image40

### Suggestion:

He told me that there should be categories in market rates like vegetables, grains, oilseeds, etc. So it's easy to segregate different rates and long scrolling is not required. Upon discussing the podcast part he told me to include videos also, as he found videos

more interesting and easier to understand.

### **Laxman Bhai**

Laxman Bhai is a farmer and also owns a pan shop in the village. He manages his farming land with his elder brother. He is 36 years old and studied till high school. He is familiar with smartphones and uses various applications on a daily basis.

### **Reaction:**

He took his time with the login and app guide carefully reading and understanding each section. He is interested in the text-to-voice option. He likes that it is possible to hear the written text. Upon reaching the home screen, he stated that due to the guide it's easy to navigate the home screen. He found the start and end date mentioned along with schemes very helpful. He also liked the categories of Trending schemes and Soon to be expiring schemes, as it would help a user to make a decision on the home screen itself.



*Image41*



*Image42*

### **Suggestions:**

He found the on-screen notification a little confusing and stated that it doesn't convey what exactly it is about. Upon explaining, he suggested to indicate it as 'Important Information' so it could not be missed by the user.

### **Kana Bhai**

He is a hereditary farmer and manages his farming with his family. He is 29 years old and has studied high school. He also uses a smartphone on a daily basis. It was my first time meeting him, so we discussed the basic idea and then I showed him the app and asked for feedback.



*Image43*



*Image44*

### **Reaction:**

The navigation of the app was good for him, but while going through the guide he was confused about how to move forward. So we'd discuss that and he suggested there should be something that indicates to move the guide forward. He also asked me what if they need help regarding usage and the features of the app. As the chatbot is still in

the design phase, I explained its functioning of it to him and he found the idea useful. He also commented that everything is in Gujarati so it's easy for him to operate.

### **Karu Bhai**

Karu bhai is a 37 years old traditional farmer and he is high school educated. He has two different tractors and various mechanical accessories which he has bought under subsidies. He also provides service to other farmers for tractor-related activities.

### **Reaction:**

He describes the guide as good and makes it easy to interact with applications. As he describes his experience, Typically he asks his son or someone else to explain the app beforehand he started using it as he is not well versed in using a smartphone.



*Image45*



*Image55*

### **Suggestion:**

He likes how the detailed information about schemes are displayed in different sections. He suggests whenever there is a clause of government-approved equipment sellers in a scheme, I should include a specific list showing those gov approved sellers.

### **Conclusion**

Observing farmers operating the app, it was clear that they can understand and navigate it easily. The guide was helpful and assisted them to get familiar with the app. Titles and images were relatable and they understood it. As per the suggestion I need to add an additional feature to categorize market rates, a next button in the steps of the guide, and a list of government-approved agencies wherever required in detailed information about the scheme.

## **Solution for Network Related Constraints.**

### **Objective**

Find out possible constraints regarding network and connectivity from an app development point of view. Farmers of Sindhpur village generally have easy access to smartphones and internet as its a village area, though situated near a highway and a few kilometers of Taluka centre. Therefore there is no problem in the development or availability of technology required by the user to use the app. But still, we have to take into consideration, that there might be network fluctuation as the location is a village. So to solve this occasional issue and limited-bandwidth scenarios. There are some methods and strategies that can be deployed to make app fully functional.

### **Cache**

A good caching strategy is a key to maintaining app performance. Make use of local storage by caching data on the device. When the device is back online, send a bulk download request back to the servers. This can be helpful when there is some connectivity problem. Even with a slow connection, The app will have data to present as well as speedy loading of images and text.

### **Optimize images with alternate formats and data-saving techniques**

High-resolution images greatly enhance the user experience, but when the connection is inconsistent loading speed often takes too much time. WebP format of images drastically reduces image file sizes without a noticeable visual difference to the naked eye from JPEG or PNG versions. We can still serve JPEG or PNG to users when they have high network speed, but for that, we must plan image request calls to retrieve WebP on low connectivity networks. WebP typically achieves an average of 30% more compression than JPEG, without losing image quality. Another method is to replace the image with a lower-resolution image stored partly in the app itself. A small thumbnail can be used as a placeholder until connection allows the app to retrieve the actual image. This allows the app to provide necessary details even when the connection is inconsistent. Another helpful technique is to use image slicing so that parts of the image keep loading one at a time instead of making the user to wait a long time before anything shows up. This method allows us to use images without sacrificing the functionality or efficiency of the app.

### **Bandwidth compression or optimization**

Bandwidth compression reduces the bandwidth of a signal carrying information without affecting the information contained in the signal. It can be achieved using lossless data compression techniques.

## Server-side strategies

Servers can be optimized specifically to push data when high network speed is available to achieve this, one method is to provide server-side caching mechanisms. There are many more server optimizing methods which can be employed when the need arises.

## Light version of an app

When an app or a platform has been established and has a large user base. Generally, a new version of an app is made that only has core features that provide limited but workable access to the user. This “light” version of an app is specifically developed.

## Logo and name

Initially, I was thinking of choosing a name related to farming or agriculture. Then while exploring possible names I found out the Word Agrim( अग्रिम). That means Advance or पहला this I thought represent what this app can enable farmers that is to be first to be ahead and keep advancing further.

The logo that I created is a result of many different combinations and attempts to the name Agrim.



Image56: splash screen

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## Conclusion

Farming which is one of the oldest occupation and way of life is filled with struggles. People are moving away from it the young generation of farmers are trying to diverge themselves from farming. What farmers need is hope for a better future. Food is a basic necessity, as time goes we are moving towards a food crisis. The need is not just to ramp up production but to encourage farming as an occupation. To do this we must use the technology in our hands in this direction. Even small efforts can make large changes possible. On-demand information and a platform that can reduce the dependency of farmers can make farmers' life a little easy.

Through this project, I was able to understand the importance of user-centered design. The problem occurs because existing systems are not made user-centered, primarily not considering farmers' ability to operate I - khedut portal and the overall complex design that demotivates them. One thing that I will always cherish about this project is that I was also able to connect with my past and heritage. I was able to understand the importance of communication and how people communicate in their own way.

With my product, I intend to bridge the communication gap between farmers and the government. A little effort in this direction can lead to huge benefits for a large section of our population.