United International University

Course Title: Human Computer Interaction

Course Code: CSE 4451

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Team's Specific Problem Statement

Our Problem Statement:

Agriculture plays a vital role in our country's economy. However, farmers in this sector often encounter numerous challenges. These challenges include a lack of knowledge about soil types, suitable crop choices for specific soil conditions, the necessary pesticides, and their proper application rates. If such a system exists, it would bring significant benefits to farmers. Farmers can use this system to contact for soil testing and can take expert guidance.

User Group:

As we are trying to figure out a system that will guide and provide information to our farmers, our user group will mainly be farmers.

Target:

Our main target is out of all the problems in a farmer's life, we are trying to provide a system to the farmers so that they can get enough knowledge to overcome their farming-related problems and benefit from our system.

Challenges They Face:

1. Lack of knowledge about types of soil:

Crops can not be cultivated in every type of soil. The specific type of soil conditions required for cultivating crops. Farmers face many problems when they try to cultivate crops in the wrong soil condition. Not only does this cause a waste of time but it can be a cause of frustration to the poor farmers whose lives depend on the supplies from their field. All these happen because of a lack of knowledge about the soil types.

2. Proper use of pesticides:

Farming crops always get infected by insects that eat these crops. That is why every year many crops get wasted. However, these insects can be controlled by using pesticides. Using pesticides at a huge amount does not help crops but damages the crops instead. So, proper application of pesticides is also needed.

3. Use of fertilizers :

As we know not every type of soil is suitable for farming but soil conditions can be changed by using fertilizers. Fertilizers add nutrition to the soil and help crops to grow. There are two types of fertilizers, natural and industrial. Natural fertilizers can be produced from cow dung and wasted food. On the other hand, industrial fertilizers need to be bought from the store. Although natural fertilizers do not harm the field, using industrial fertilizers in the wrong amounts imbalances the soil condition.Not only that these fertilizers get mixed with field soil and pond water which causes water and soil pollution. Thus it changes the pH level and minerals of soil and water. After that when a farmer tries to use the water into the crops or

plant seed into the soil, it does not provide the necessary nutrition to the crops. So, proper use of fertilizers is also needed.

4. Use of proper tools :

Most of the farmers still use old-fashioned agricultural tools for cultivating their farms. Such as cows, shovels, grape hoes, and rakes for digging the soil, sickles for cutting the crops, watering cans for waring the farm, etc. These tools are not only time-consuming but also take a lot of effort to use whereas there are many modern tools that can do all the things that can be done with the old-fashioned tools in a faster and efficient way. Most of the farmers have no idea about these tools. Using these old-fashioned tools is so frustrating that most of the farmers lose their motivation for farming.

5. Proper knowledge about seasonal crops :

Not every crop grows at every season. Different crops need to be cultivated in different seasons and different ways. So proper knowledge about which seed needs to be planted with respect to the season is needed. When a farmer tries to cultivate crops that are not suitable for that season, can not cultivate the crops and become demotivated about farming.

6. Natural calamities which are responsible for destroying crops:

Every year tons of crops are being destroyed by natural calamities. Farmers in our country do not have enough of an idea of what to do when a natural calamity hits and what to do to prevent them to minimize a lesser amount of harm.

Data Collection Process

What research methods do you use? Why?

We are using **Contextual Inquiries** for collecting data. To understand the problem of the life of a farmer, we have to think like a farmer and feel like a farmer. For observing a farmer's life deeply and getting an insight into their life, visiting their natural context is a great idea. By taking a non-participant observation we can understand what they are doing and how they are doing from a distance. This will provide us with some initial data to work with and moreover, it will open more doors for adding more questionnaires for the interview and will help to understand the answers of our targeted group more precisely. Then by questioning the targeted group we can verify their answers and generate a lot of data from them. After the end of this process, we will come to know what they are doing wrong and how to get rid of these problems in an easy way.

How do you reach out to your target user groups?

For making our tasks easy we chose our native village from where we belong. There are many farmers who are locals we already knew and our relatives help us to contact them. First of all, we told them about our motive and explained to them how our system is going to help them in the future. Most of the farmers who are experienced in this field and older were willing to share their stories and experiences with us and help us to continue our studies. From their perspective, they want to help the future generation overcome the problems that they faced while they had nothing to help them. But not every person was generous towards us. Most of the farmers who were young age did not care about what we were doing and our motivation. From their perspective with their strength, they can overcome anything and they do not need any modern tech. In this situation, with a little help of money, they were willing to share their information.

Briefly describe the demographics of your participants.

The main participants are mostly middle and old-aged farmers whose ages are between 30-40 years and 50-60 years old. There are also farmers who are younger and their age 15-27. Among them most of the farmers are male and there are female farmers also. Most of the farmers are uneducated and their highest level of study is between 5th-10th grade.

What types of data are generated from your data collection process?

We mainly generated text data from our data collection process. As we collected our data through the interview process, after analyzing the answers we generated text data.

How do you record collected data?

We record our collected data through handwritten notes. Most of the members were dedicated to noting down the data and some of them were interviewing the participants.

Specify any challenges faced during data collection. How did you overcome those hurdles?

During our data collection process, we faced many challenges and we were able to overcome many of them.

Challenges like:
1. We wanted to record our interview process through video and audio. But when we approached the farmers, they were so ashamed of talking in front of the camera that they were hassling to answer the question. So, we had to take notes only to record our data.

2. When we used some technical terms, most of them did not understand a bit. So, we had to teach them by using metaphors and YouTube videos also helped us to teach me what that means.

3. Many people did not take our study seriously and they provided very unclear answers. So, we were processing our data we ignored many irrelevant answers.

Data Analysis Process

We gained Five groups of data from the affinity diagram. Such as Fertilizers, Farming methods, pesticides, Seasonal Crops, and Water resources. And the connection between these groups. The unique data that we didn't already know is their water resource. How they manage water resources for their Land. We suspected their pesticide problem. How much do they need to use pesticides and which pesticide is needed in which crops?

Affinity Diagram Link: https://miro.com/app/board/uXjVNfpWi4s=/

User Persona

User Persona 1:

Farmer Amina

Amina, a 50-year-old female farmer in rural Bangladesh, relies on basic literacy and traditional farming methods. She aims to enhance crop yield for her family's sustenance, improve farming practices, and find affordable soil health solutions. Amina seeks an easy-to-use mobile system with offline access for soil testing and crop guidance.

Age	42
Gender	Female
Occupation	Small-scale farmer in a rural village
Education	5th grade

Goals

Ensure sufficient crop yield for family sustenance.
Improve farming practices for a better livelihood.
Seek cost-effective and easy-to-implement solutions for soil health.

Challenges

Limited access to modern agricultural information and technology.
Unfamiliarity with different soil types and their implications.
Dependence on traditional farming methods.

Needs and Expectations

An easy-to-use mobile-based system for soil testing and guidance.
Simplified information on suitable crops for local soil conditions.
Affordable and locally available solutions for pest control.
Offline access to resources due to limited internet connectivity.
Access to local workshops or training programs for skill development.
Integration with weather forecasts to plan farming activities effectively.

User Person 2:

Tech and Tools

- Grape hoes
- Shovels
- Rakes
- Sickles
- Watering cans
- Cows

Challenges

Using these old-fashioned tools is so frustrating. I wish I could have known more about new tech and usability at the beginning of my journey.

Demographic

- Name : Abdul Karim Mia
- Age : 35
- Gender : Male
- Nationality : Bangldeshi
- Education : SSC level

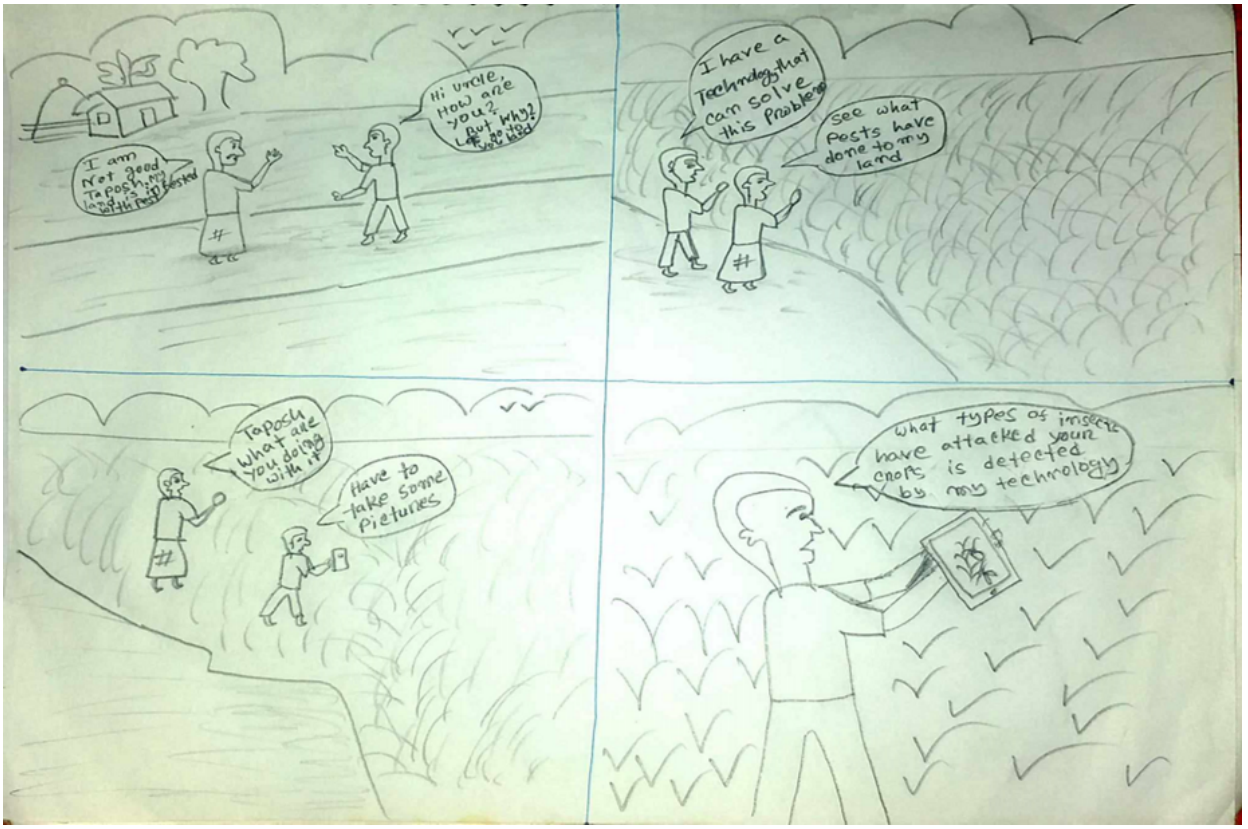
Need and Expectaion

A system that will provide him with useful knowledge about modern agricultural technology.But the system needs to be easily understandable.

Scenario

A boy named Tapas was studying engineering at United International University in Dhaka city. During his engineering studies, he created a project that could change the fortunes of farmers. He goes to the village house for university winter break. Then he saw one farmer standing on the road upset. When he was asked the reason for his upset, he said that his crops had been attacked by pests. Hearing this, Tapas went with him to observe the land damaged by insects. He used his technology to take some pictures of the crops and capture his land being infested with pests. His technology offered a solution to this problem. Tapas shows the answer to the farmer through his technology. The two of them went together to buy pesticides from the fertilizer and pesticide sales and monitoring center. They also show this technology to the staff of the fertilizer and pesticide sales and monitoring center and they support it. Farmers are very happy using this technology.

Story Board




Soon we will have to apply pesticide
Let's go to pestiside and fertilizer sales and consultancy center
This technology is developed by me
Yes, this is a smart technology
Give me a bag of insecticide
Uncle always pray for me
Thanks Tapash, I pray you will be a great engineer in life