

ABSTRACT

AgroTech is an application that mainly focuses on guiding farmers with their activities. This application is created using the python platform. It is created keeping in mind, the increasing difficulties or hurdles faced by our farmers and aims to resolve their issues. Our country which mainly depends on agriculture, still requires a lot of assistance and improvements which was the main inspiration for developing this application.

Though the economy is mainly concentrated around agriculture, the plight of the farmers or the infrastructure revolving around farming has not been improved. Our application is going to assist this sector, so that it may improve. Our application helps farmers in many ways, not only by suggesting the efficient way of farming but also by keeping eye on their expenses spent on cultivating crops.

Moreover, farming apps are the most convenient and useful medium to guide farmers in farming. It gives you the guideline for doing the proper scientific way of farming, crop cultivation, sowing or harvesting of any crop or vegetables. Farmers can easily solve their farming problems related to pest or insect attack or any problems which put them in a difficult situation. A farming app can be the best friend of farmers in farming which can enhance their productivity without spending a single amount of money.

Table of contents.

Chapter		page no
1) Introduction		
	1.1 Introduction.....	1
	1.2 Objective.....	1
	1.3 Literature survey.....	1
	1.4 Existing System.....	2
	1.5 Proposed system.....	3
2) System Requirement		
	2.1 Hardware requirement.....	4
	2.2 Software requirement.....	4
3) System design		
	3.1 System architecture.....	5
	3.2 Flowchart/Algorithm.....	5
4)Implementation and Design		
	4.1 Pseudocode.....	7
	4.2 Results.....	11
5) Conclusion And future Enhancement		

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CHAPTER-1

INTRODUCTION

1.1 Introduction

As we all know India is agriculture-based country and still as far as 50% of the Indian work force is agriculture employed and contributed 17-18% to country's GDP.

Rural India is drastically moving towards digitalization and technology these days. As per report of 'The Rising Connected Consumer in Rural India', a study by the Boston Consulting Group, this share of rural India will jump to 48% by 2020.

Digital India, launched in 2015 by Indian Prime Minister Narendra Modi which aims towards the promotion of digital literacy and creation of digital infrastructure, is apparently helping Rural India to gain this success of the farming community. Moreover, while 58% of Indian households still depend on Agriculture as their most eminent source of livelihood, it's time to give more focus on Digital Agriculture for a growing and prosperous India.

1.2 Objectives

- Our application's main objective is to guide novice as well as experienced farmers in their activities which revolve around their occupation.
- Our application aims to take in tests of soil samples and with the help of the data collected, our application will provide suggestions based on the test results and assist the user to increase their productivity and improve their efficiency.
- Our application can bring small change in the farmers life by giving them right suggestions thus making difficult choices easy.
- Our application also works as an expense tracker, keeping track on the expenditure of the yield and the profits after successful cultivation. It also suggests the user with the appropriate ways to manage the expenses of the whole process.

1.3 Literature survey

1.3.1 Smart Farm:

Kunal Prasad and Chittaranjan Jena designed first of CropIn's agriculture solutions, 'SmartFarm'. SmartFarm is a robust and flexible farm management solution that incorporates end-to-end solutions for data-driven decision making for multiple stakeholders in the Agri-ecosystem. Its real-time satellite- and weather-based advisory enables accurate output predictability for agribusinesses and other agricultural organizations, while making businesses and farm operations exceedingly efficient. Keeping track of processes involved pre- and post-harvest has never been easier, with SmartFarm's traceability capabilities powered by smart crop reports & insights for easy reporting on-the-go. By recommending a customized package of practices for each crop, SmartFarm also ensures sustainable farming for a produce that is

both quality and quantity, by using only the right inputs at the right time. More importantly, SmartFarm's geo-tagging feature enables accurate measurement of farm acreage, and also helps to log alerts for pest infestation and diseases from the precise location. This not only helps to focus on only the area, but also saves a considerable amount of time otherwise spent on identifying the location and spread of the disease or infestation. CropIn's SmartFarm also ensures adherence to global standards of Compliance & Certification for hasslefree export of fresh produce to international markets.

1.3.2 SmartRiskTM

With the increasing difficulty in forecasting the future and preparing in advance for events such as these, farmers and agribusinesses are at a loss. To monitor and mitigate such risks, CropIn launched its AI- and ML-powered platform 'SmartRiskTM' in 2018. It is a predictive and prescriptive solution with capabilities to detect cropping patterns and predict the future of a crop.

This forecasting intelligence highlights the associated risk and opportunities for various Agristakeholders, such as banks and NBFCs, insurance companies, commodity traders, sourcing managers and Government bodies too.

1.4 Existing System

Present-day growers have over 50 software products at their disposal. The choice is more than rich; the information they provide may be overwhelming at times. The best option not to get confused is to choose the farm app best responding to the specific needs of your enterprise.

Applications for the agricultural industry differ in the span of services they render and the data they rely on.

1.4.1 FarmLogs

This farm app dates back to 2011. The application provides services to around 50,000 agricultural enterprises. The platform CEO Jesse Vollmar started it as a user-friendly product for easier farming. This software offers several tariff plans that you can customize with add-ons. It has desktop as well as Android and iOS versions.

1.4.2. Granular

The company has headquarters in San Francisco. It produces software for farmers from the USA, Canada, and Australia. The US farmers are also granted access to AcreValue. The tool gives satellitebased field insights. It analyzes crop health, inventory utilization, soil fertility and composition.

The program enables task assignments to farmworkers. It provides technical and agronomical support for strong farm-running decisions. Granular also suggests predictive models to

increase profitability. The multi-location feature allows viewing diverse terrains in one window.

Granular opens either from office or on the road from Android and iOS mobile devices. Its demo version helps to estimate the product's efficiency.

1.5 Proposed System

By the end of this project we will be able to suggest the farmers how they need to make their decisions while selecting the crops according to the seasonal needs and manures required and soil conditions and training them how to use the modern techniques to boost their yield, and also giving the best output for their investment with profit through 'expense tracking system. We are using the high level language python for this project (conditional statements, loops , functions,GUI).

Chapter 2

SYSTEM REQUIREMENT

2.1 Hardware requirement

- RAM: 8GB
- CPU: Intel I5 10th Gen.
- GPU: Nvidia 1650
- Memory: 512 SSD.
- OS: Windows 11.

2.2 Software requirements

- Latest version of PYTHON (3.10) and its packages like
 - Tkinter (to create gui)
 - sqlite3 (to create database)
 - matplotlib (to generate graphs)
-

Chapter 3

System Design

3.1 System architecture

The architecture design part of analysing soil reports and tracking expenses of farmers and creating and storing reports in dataset for the application using tkinter , sqlite3, matplotlib and then giving the result accurately. The various tools and application used to design this application are depicted.

The tools used here are standard libraries offered by Python language, ie, tkinter, sqlite3, matplotlib. Tkinter is used here to create the UI for the application, this GUI helped our application in being officially presentable. Sqlite3 is used here to create the database, where all the information of previous years is stored, users give inputs in the application and all this data is stored in this database, so that it can be access whenever a user want to. And lastly

In expenditure analyser which is subset of this application user can give inputs of their expenses in the crops, and matplotlib is used to create the graphs to keep track of expenses of the farmers crops.

3.2 Flowchart/Algorithm

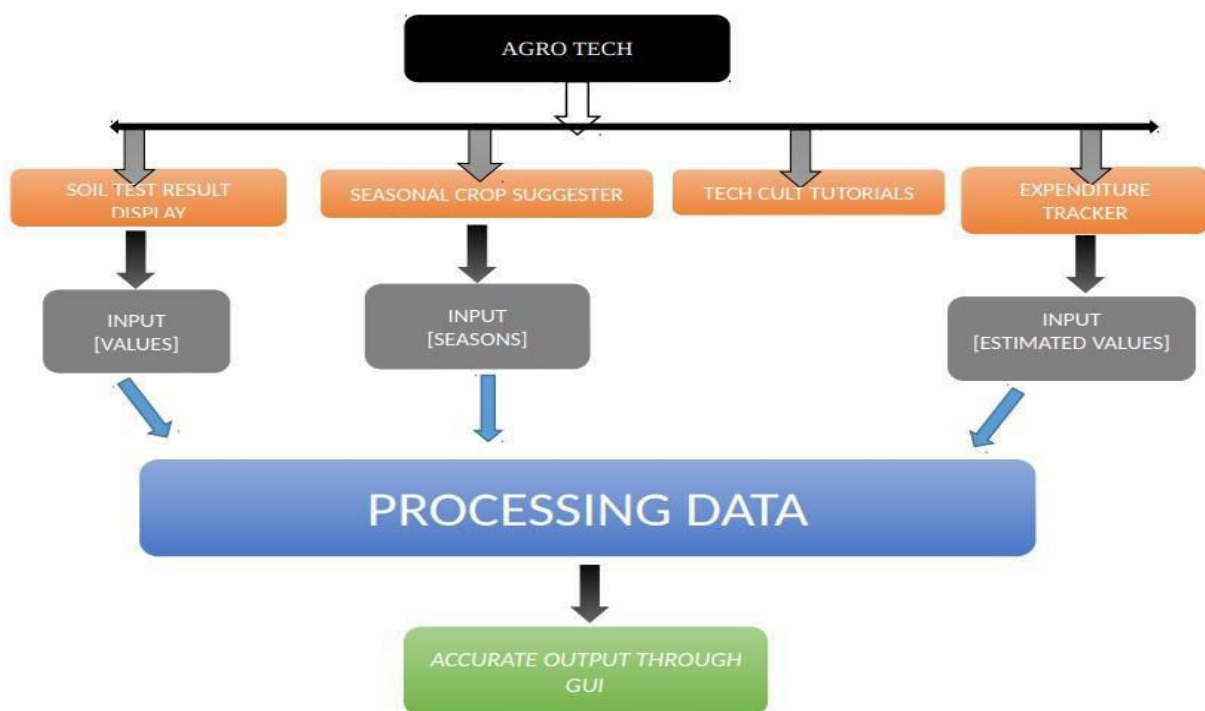


Figure 3.2.1 Flowchart showing process of the application

As shown above in the flowchart, the working of the application is simple. The application “Agro Tech” takes in input from the user i.e., inputs from the result of soil test. According to the inputs given from the user, the application processes the input and stores the input into the dataset.

And from the input of the user, the application suggests the user to maintain the soil to a perfect level of minerals. If the given data is already the required amount of the minerals, there will be no suggestions. The application has a subset i.e., Expenditure analyser, this takes inputs from user and estimates the values and gives result in graphs so it will be easy for the user to track his expenditure.

Chapter 4

IMPLEMENTATION AND RESULTS

4.1 Pseudocode

Step1: create main window of the project using tkinter

Step2: creating two main functions

Step3: taking inputs for the 1st function from user and process data

Step4: giving best output with pie charts

Step5: taking inputs for second function and storing it using database

Step6: analysing ups and downs using graphs with respect to the previous data

Step7: processing data and giving the present status.



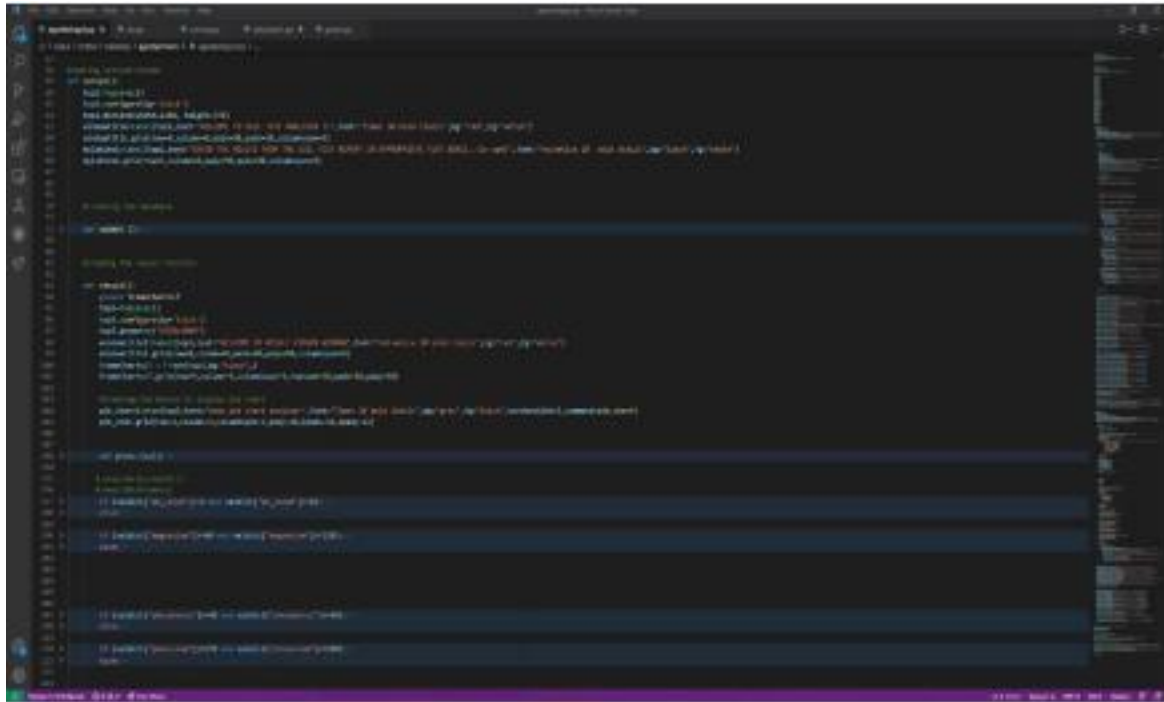


Figure 4.1.1 A Screenshot of the code of the application

The above diagram showing the the project.it includes the code configuration of the window. code of the program which contains the different functions of to add background image to the window and setting the

Also it contained the code to execute the pie chart generated based on the inputs given by the farmer to analyse the content of the soil .This code executes the main function of the project.

```

C:\Users\91960\Desktop> agrotechmini > agrotechpjct.py > optop2 > query
107
108 def press (val):
109     top4=Toplevel()
110     top4.configure(bg='black')
111     top4.minsize(width=1280, height=770)
112     windowtitle2=Label(top4,text="TIPS AND SUGGESTIONS",font="Times 30 bold italic",bg="red",fg="black")
113     windowtitle2.grid(row=0,column=0)
114     exitb=Button(top4,text="QUIT",command=top4.destroy,font="Times 20 bold")
115     exitb.grid(row=2,column=0,ipadx=20)
116
117     if(val==1):
118         f2=open("ph1.txt","r")
119         x1=f2.read()
120         f2.close()
121         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
122         sugtext1.grid(row=1,column=0)
123         sugtext1.insert(END,x1)
124     elif(val==2 or val==5):
125         f2=open("magnesium.txt","r")
126         x1=f2.read()
127         f2.close()
128         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
129         sugtext1.grid(row=1,column=0)
130         sugtext1.insert(END,x1)
131     elif(val==3):
132         f2=open("phosphorous.txt","r")
133         x1=f2.read()
134         f2.close()
135         sugtext1=Text(top4,height=20,width=100,font="Times 20 bold",bg="black",fg="white")
136         sugtext1.grid(row=1,column=0)
137         sugtext1.insert(END,x1)
138     elif(val==4):
139         f2=open("potassium.txt","r")
140         x1=f2.read()
141         f2.close()
142         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
143         sugtext1.grid(row=1,column=0)
144         sugtext1.insert(END,x1)
145
146     elif(val==6):
147         f2=open("boron.txt","r")
148         x1=f2.read()
149         f2.close()
150         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
151         sugtext1.grid(row=1,column=0)
152         sugtext1.insert(END,x1)
153     elif(val==7):
154         f2=open("iron.txt","r")
155         x1=f2.read()
156         f2.close()
157         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
158         sugtext1.grid(row=1,column=0)
159         sugtext1.insert(END,x1)
160     elif(val==8):
161         f2=open("zinc.txt","r")
162         x1=f2.read()
163         f2.close()
164         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
165         sugtext1.grid(row=1,column=0)
166         sugtext1.insert(END,x1)
167     elif(val==9):
168         f2=open("manganese.txt","r")
169         x1=f2.read()
170         f2.close()
171         sugtext1=Text(top4,height=10,width=100,font="Times 20 bold",bg="black",fg="white")
172         sugtext1.grid(row=1,column=0)
173         sugtext1.insert(END,x1)
174

```

Figure 4.1.2 A Screenshot of the code of the application)

The above diagram contains the code which is very helpful to create the entry widgets and label widgets to create the user friendly graphical user interface also it contains the main core part of the project where the program runs based on the if and else statements ,loops and file handling

Reading file and storing the content to the variable and printing the content into the textbox widget on the graphical user interface.

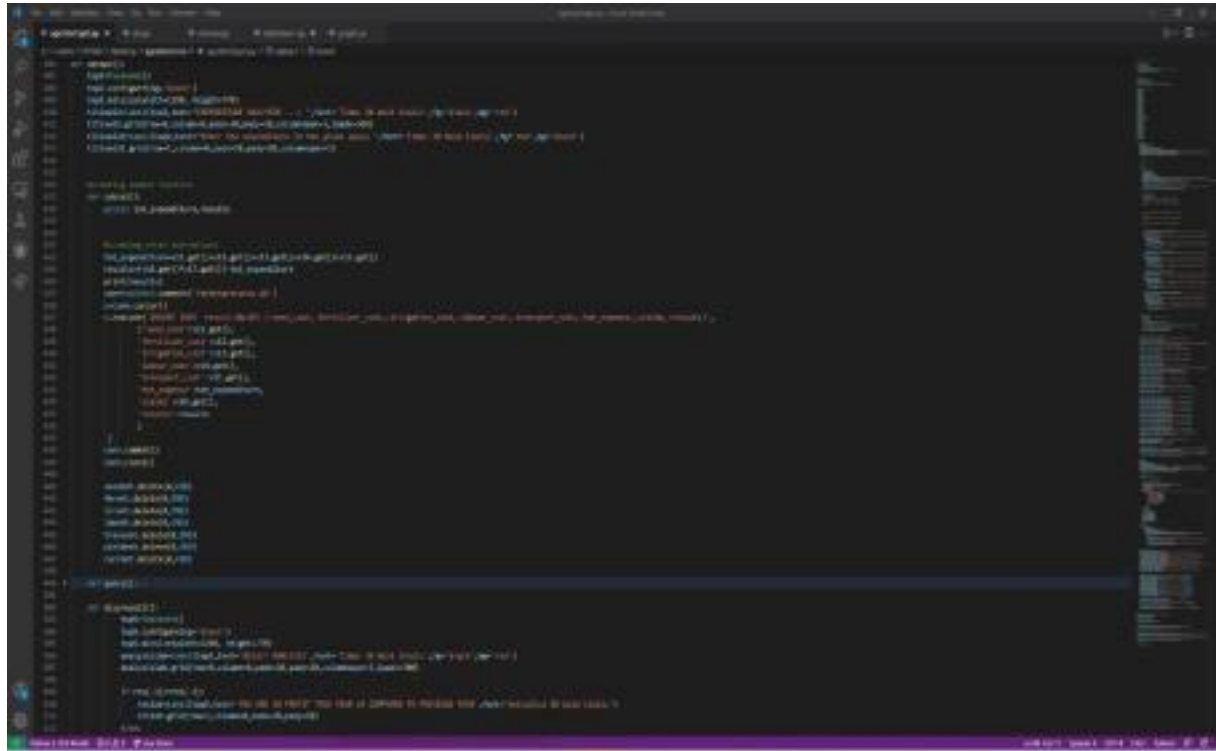


Figure 4.1.3 A Screenshot of the code of the application

The above diagram showing the code of the second main function ‘expenditure analyser’, which is used to calculate the total expenditure of the farmer annually.

The sqlite3 is used to create database file where every years data is stored and using that information farmer can track his annual income and also analyse the loss or profit gained.

The project is very useful to them to keep exact information of the farmer whether they are in loss or profit as compared to previous years.

4.2 Results

Screenshots of the working project

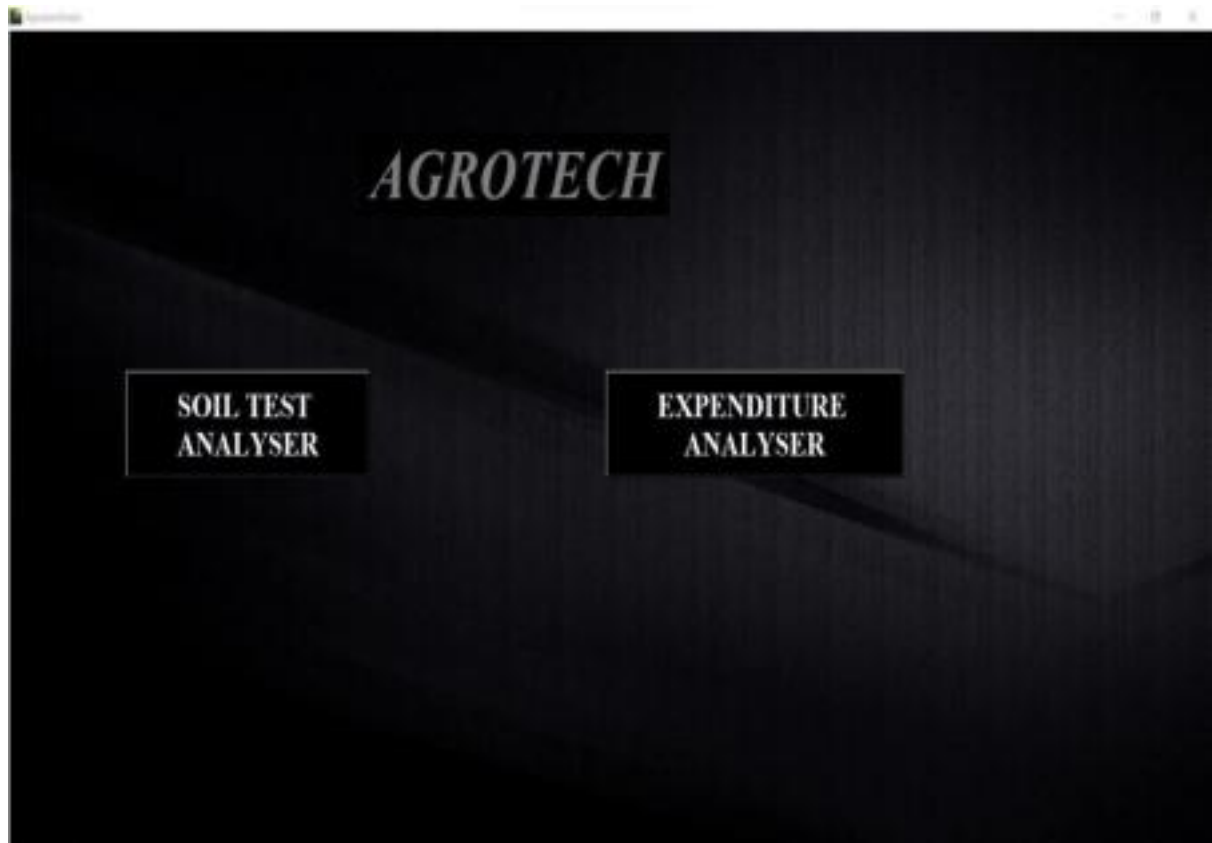


Figure 4.2.4(A Screenshot of working of the application)

In the figure 4.4, it is applications home window where user can choose from 2 options I.e, 1.soil test analyser ,2. Expenditure analyser

Main window of the project which is implemented using gui.

WELCOME TO SOIL TEST ANALYSER !!

ENTER THE RESULTS FROM THE SOIL TEST REPORT IN APPROPRIATE TEXT BOXES..(in ppm)

MACRO NUTRIENTS .		MICRO NUTRIENTS .	
PH VALUE	7	BORON	250
MAGNESIUM	1000	IRON	2050
PHOSPHORUS	3500	ZINC	280
POTASSIUM	4000	MANGANESE	150
CALCIUM	5000		

SELECT THE SOIL TYPE: RED SOIL

VERIFY & SUBMIT VIEW RESULT

Figure 4.2.5 (A Screenshot of giving inputs in the application)

in the Figure 4.5, it is the window which comes when user has selected the option SOIL TEST ANALYSER, here user can give all the values of minerals present in soil ,ones the soil test is done. All the values given should be in the ppm macronutrients are required in large quantity while micro required in small quantity.

This user interface contains the entrybox widgets and also dropdown menus ,some buttons andlabel widgets.

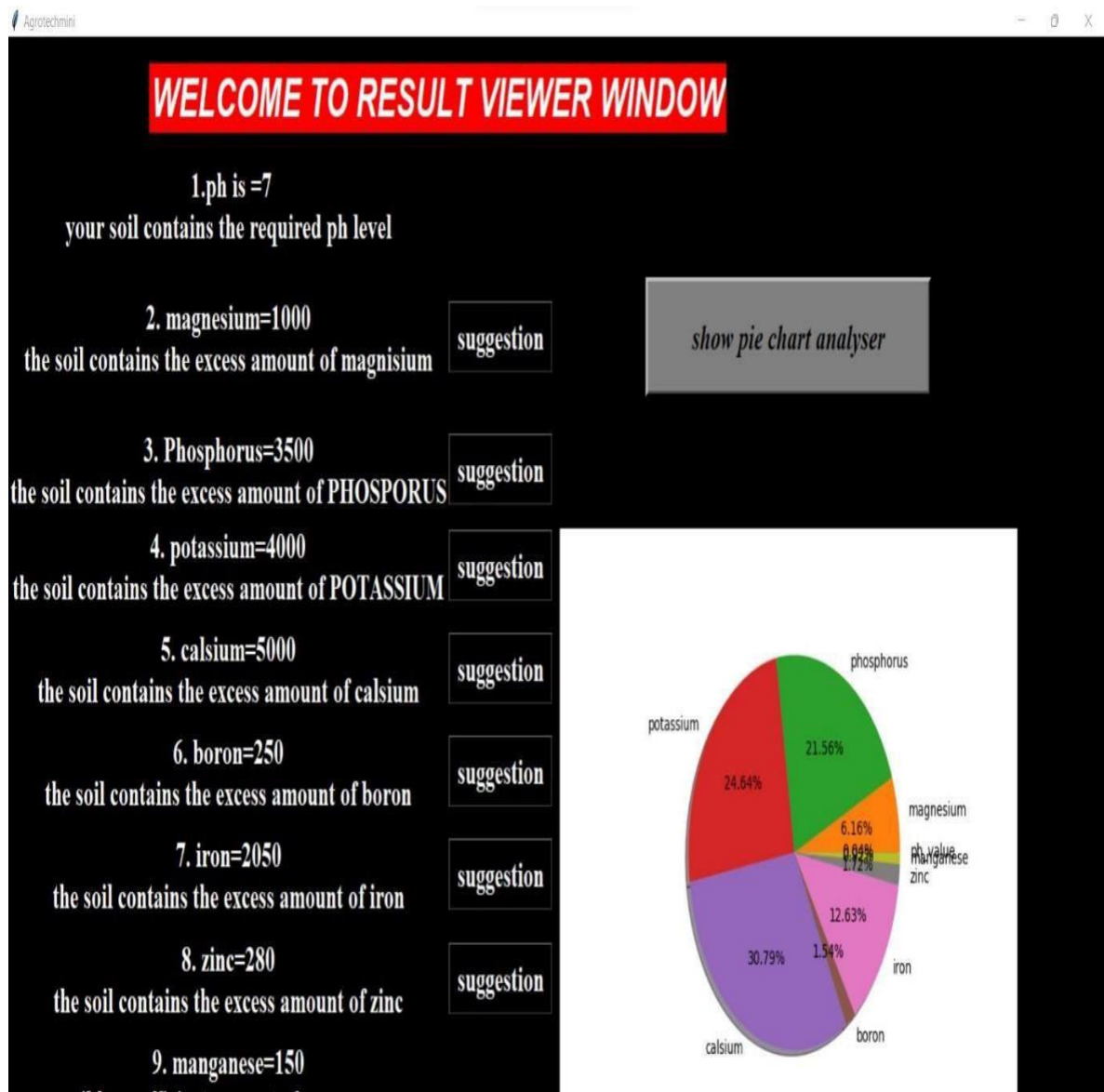


Figure 4.2.6 A Screenshot the result given by the application according to inputs

In the Figure 4.6, this window comes when user has given all the values and selected view results. As we can see here application shows the suggestion to places where minerals are not ideal for the soil. And a pie char to know easily of all the minerals present in soil.

The screenshot shows a web application titled "EXPENDITURE ANALYSER ...!". Below the title, a red banner contains the instruction "Enter the expenditure in the given space". The main form area has a black background with white text labels for various costs and yield. Each label is followed by a white input field containing a numerical value. At the bottom, there are three buttons: "SUBMIT", "GRAPH ANALYSIS", and "RESULT ANALYSIS".

SEED COST	5000
FERTILIZER COST	7000
IRRIGATION COST	3000
LABOUR COST	8000
TRANSPORTATIONAL CHARGES	4000
YIELD (in kgs)	5000
PRICE OF CROP (per kg)	25

SUBMIT **GRAPH ANALYSIS** **RESULT ANALYSIS**

Figure 4.2.7 A Screenshot expenditure analyser, an option in application

In this figure, a user can keep track of his expenditure by recording the expences spent by him every year by entering the values here. The entered values will be stored in databse for every single entries.The button graph anlysis is used and also result analyser is used as the main functions .

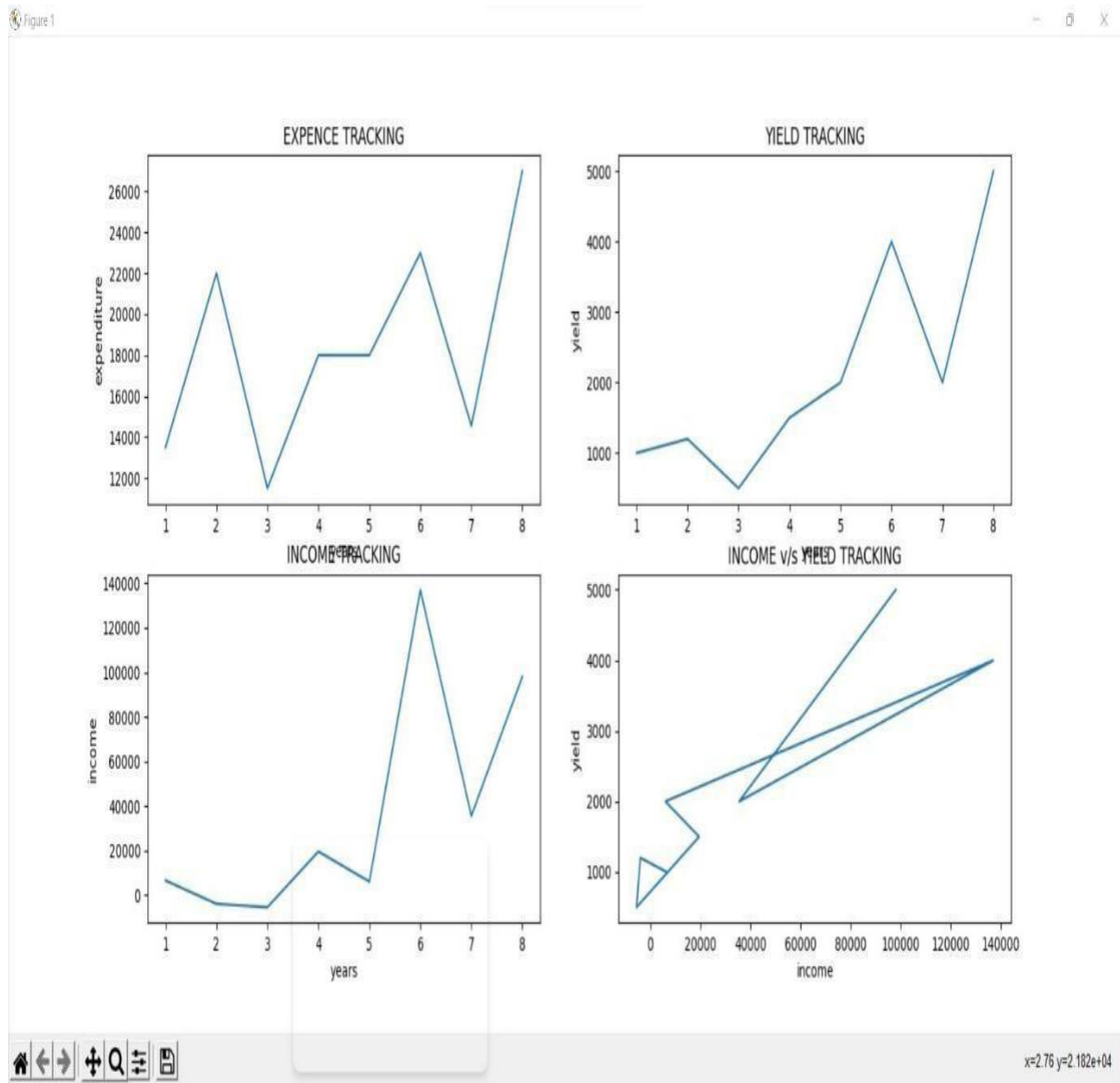


Figure 4.2.8 A Screenshot of graphs given after analysing inputs of expenditure analyser

Once the user has given all the values, this window tells the values using graphs making it easier for the user to keep track of his expenses which is easier and simpler for anyone to keep the record in track.

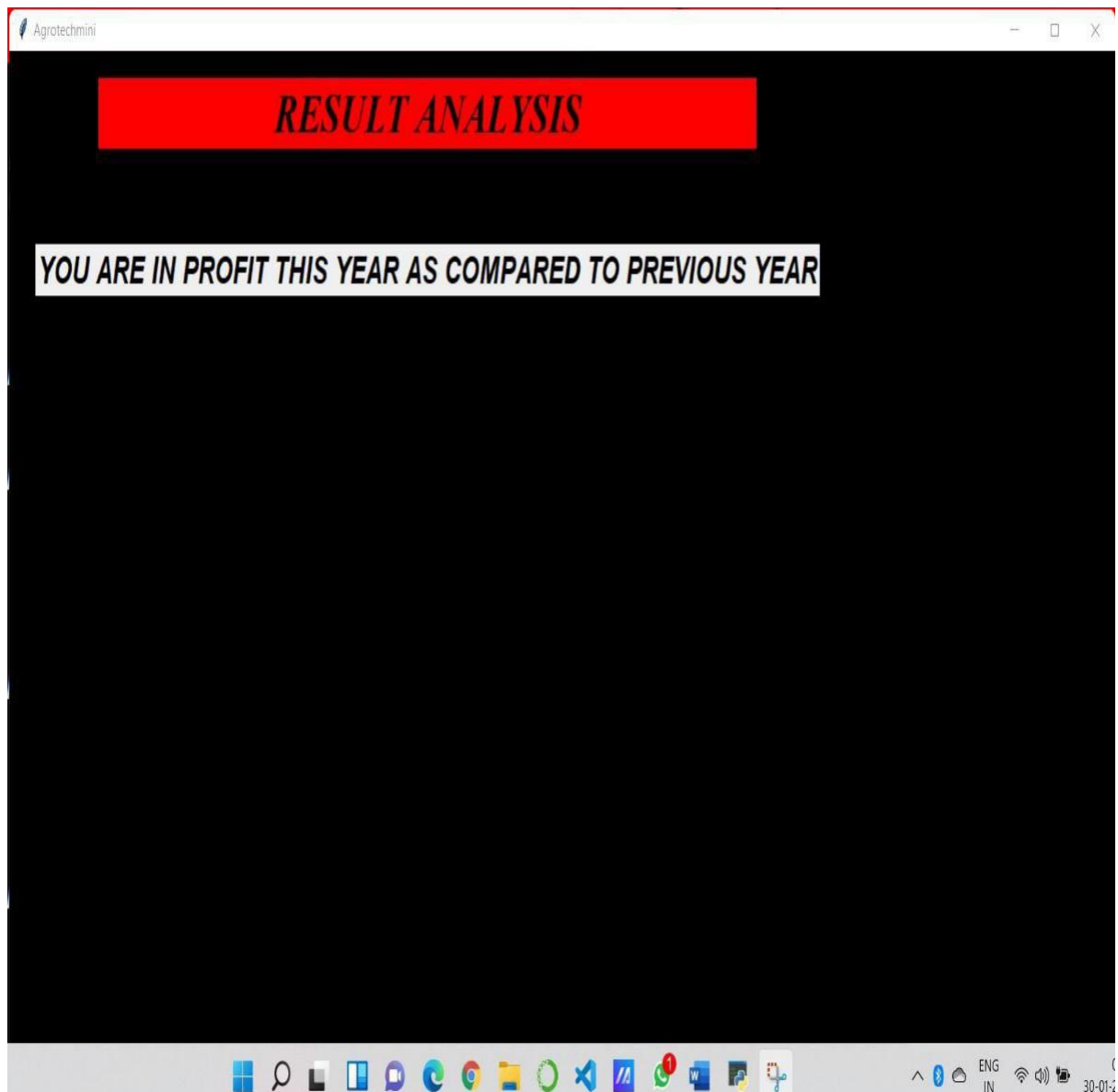


Figure 4.2.9 A Screenshot of working of the application

This is the final window which tells user that he /she is in profit/lose as compared to the previous year in the same land ,by using this knowledge they can improve ther methods and techniques of earning more.

Chapter 5

Conclusion and Future Enhancement

As mentioned earlier India is agriculture-based country and nearly 50% of workforce comes from agriculture and it contributes nearly 17-18% of the country's GDP.

So, the scope of future development is huge without any doubt, with the right mindset and hard work this application can make farmers life better, it can even have machine learning to enhance result and the farmers can benefit more from this application.

Since we are in digital era technology plays very important role in every field so there will be ever demand for our project .



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