

## **INTRODUCTION**

### **What is Agriculture Production Cooperative?**

An **agricultural cooperative**, also known as a **farmers' co-op**, is a cooperative where farmers pool their resources in certain areas of activity. A broad typology of agricultural cooperatives distinguishes between 'Agricultural Service Cooperatives' and 'Agricultural Production Cooperative'. In **Agriculture Production Cooperative**, production resources (land, machinery) are pooled and members farm jointly.

This method of agriculture is yet to be popularized in India but this simple method can prove to be quite beneficial for farmers with limited resources and result in minimization of poverty among them. This method is followed by countries like the USA, Israel, France etc.

The example of Agricultural Production Cooperative followed in this particular system is as follows:

One admin is responsible for maintaining the information of the members(farmers) participating, records of the crops grown and the combined stock of all the farmers. Farmers/members are further divided into groups consisting of two or more farmers. The admin is also responsible to allocate the land area and resources among the groups.

One group of farmers is required to grow the allocated crop on the allocated area of land. Group allocation is done based on the assets of the farmers. For example, if one farmer has relatively bigger area of land but lacks in the number of working members, and another farmer has a greater number of working members but lesser amount of land, then these two farmers together form one group and share the combined resources. This results in the better yield of crops, thus profiting both the farmers.

Based on the crops grown and the amount of land; fertilizers, pesticides and machineries are distributed. For reference, the data pertaining to each crop is used while carrying out the distribution process.

After the end of the cropping season, each group reports their yield of crops. The total yield of each group is distributed among the group members in the proportionality of the number of individual resources pooled, which is generally in the ratio of 1:1. The individual members can be a part of more than one group annually, each time growing a different crop. At last of one year (or any time interval), the overall yield per member for each crop is analyzed.

## Project Introduction

This project is about the software required for Agriculture Production Cooperative system. It deals with the records of assets of farmers who have decided to practice farming by pooling their resources among themselves (take part in Agriculture Production Cooperative), and the allocation of resources among the groups of farmers. The whole system has been formed using the Python-MySQL Interface. Tables containing data is stored in the backend and the interaction with users is carried out in the frontend. The project consists of a total of 5 tables, some of which store permanent type of data and while some get filled during the running of the system.

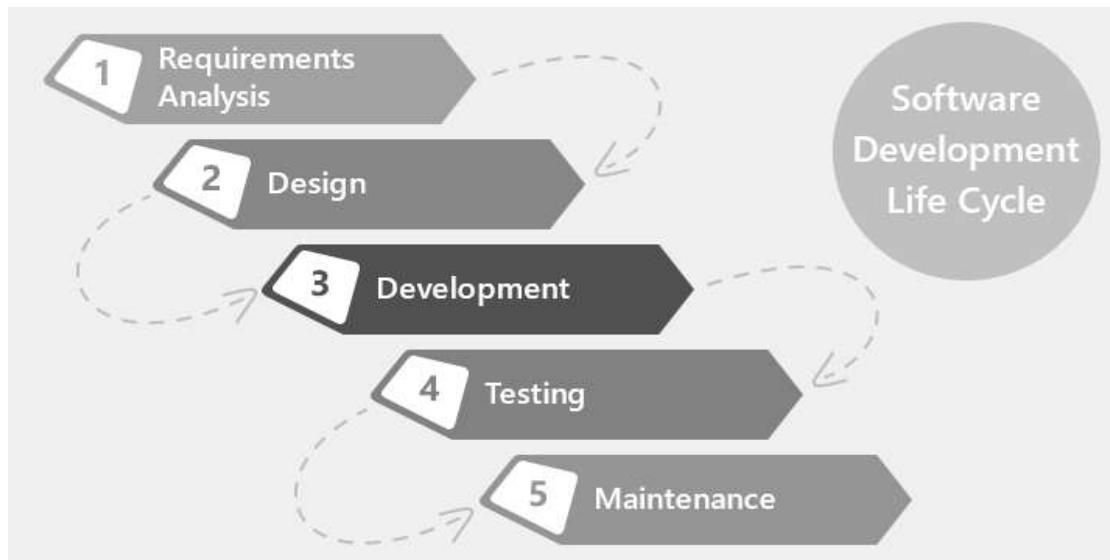
## SOFTWARE DEVELOPMENT LIFE CYCLE (SDLC)

### Waterfall Model

The Software Development Life Cycle (SDLC) is a well-organized process for building software that guarantees the quality and accuracy of the software created.

In "The Waterfall" approach, the whole process of software development is divided into separate phases. In this Waterfall model, typically, the outcome of one phase acts as the input for the next phase sequentially.

The following illustration is a representation of the different phases of the Waterfall Model.



- **Requirement Analysis:** Before creating a product, a core understanding or knowledge of the product is very necessary. The basic knowledge like what to build, who will be the end-user, what is the purpose of the product, etc. needs to be accessed.
- **Design** – The requirement specifications from first phase are studied in this phase and the system design is prepared. This system design helps in specifying hardware and system requirements and helps in defining the overall system architecture.
- **Development** – With inputs from the system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality, which is referred to as Unit Testing.
- **Testing** – All the units developed in the development phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures. Once the functional and non-functional testing is done; the product is deployed in the customer environment or released into the market.
- **Maintenance** – There are some issues which come up in the client environment. To fix those issues, patches are released. Also, to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment

## THEORETICAL BACKGROUND

### **What is a database?**

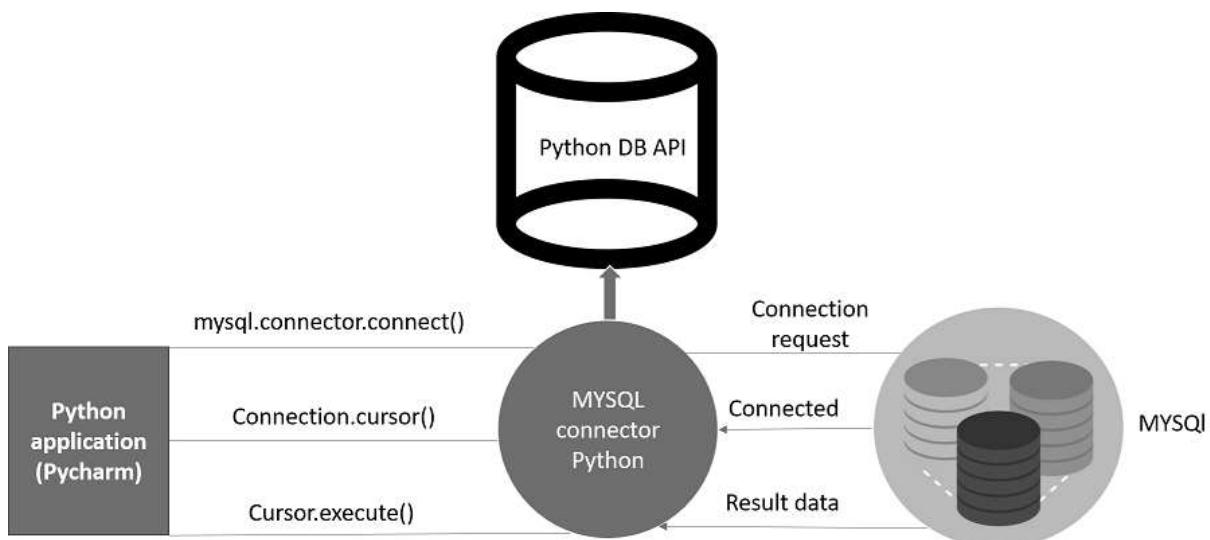
A database is basically a collection of structured data in such a way that it can easily be retrieved, managed and accessed in various ways. One of the simplest forms of databases is a text database. Relational databases are the most popular database system which includes the following:

- MySQL
- Oracle Database
- SQL server
- Sybase
- Informix
- IBM db2
- NO SQL

Among all these databases, **MySQL** is one of the easiest databases to work with. Let me walk you through about this in detail.

### **How does Python connect to a database?**

It is very simple to connect Python with the database. The below image illustrates a Python connection with the database where a connection request is sent to MySQL connector Python, gets accepted from the database and cursor is executed with result data.



The below commands are for installing MySQL in command prompt and PyCharm:

Using Pip:

**Command:**

```
pip install MySQL-connector
```

The parameters required to connect to the database:

- **Username-** It is simply the username you give to work MySQL server with, the Default username is *root*.
- **Password-** Password is given by the user when you have installed the MySQL database.
- **Host Name-** This basically is the server's name or IP address on which your MySQL is running, If it is a 'localhost', then the IP address is 127.0.0.0

**Creating a Database:**

Once the database connection is established, you are ready to create your own database which will be acting as a bridge between your python and MySQL server.

**Database Operations:**

There are numerous operations a programmer can perform using databases and SQL in order to have sound knowledge of database programming and MySQL.

I have demonstrated the CRUD operations below

- **Create-** It is an SQL statement used to create a record in the table or can say it is used for creating a table.
- **Read-** It is used for fetching useful information from the database.
- **Update-** This particular SQL statement is used for updating the records in the table or updating the table.
- **Delete-** As the name itself justifies this command is used for deleting the table.

In Read operation, the "select" SQL statement is used where the actual read operation will take place.

- **fetchall()**- This particular function fetches all the data from the last executed statement.
- **fetchone()**- This particular statement fetches one data from the last executed statement.
- **Fetchmany()**-This particular statement fetches selected amount of data from the last executed statement

## What are MySQL JOINS?

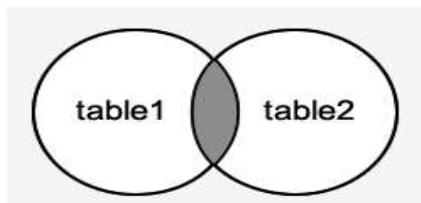
MySQL JOINS are used with SELECT statement. It is used to retrieve data from multiple tables. It is performed whenever you need to fetch records from two or more tables.

There are three types of MySQL joins:

- o MySQL INNER JOIN (or sometimes called simple join)
- o MySQL LEFT OUTER JOIN (or sometimes called LEFT JOIN)
- o MySQL RIGHT OUTER JOIN (or sometimes called RIGHT JOIN)

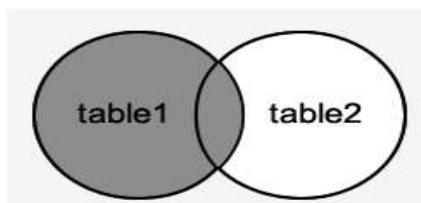
### MySQL Inner JOIN (Simple Join)

The MySQL INNER JOIN is used to return all rows from multiple tables where the join condition is satisfied. It is the most common type of join.



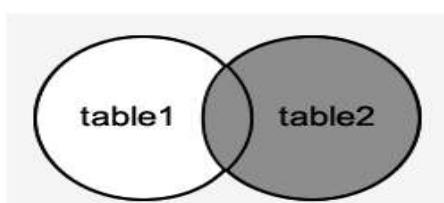
### MySQL Left Outer Join

The LEFT OUTER JOIN returns all rows from the left-hand table specified in the ON condition and only those rows from the other table where the join condition is fulfilled.



### MySQL Right Outer Join

The MySQL Right Outer Join returns all rows from the right-hand table specified in the ON condition and only those rows from the other table where the join condition is fulfilled.



## SYSTEM DATABASE DESIGN

### ➤ FARMER TABLE

farmer_id	name	land_area_owned	num_of_member	equip_id1	count1	equip_id2
1	Mohit	5	2	1	4	2
2	Pankaj	4	6	1	3	2
3	Anmol	6	3	1	4	2
4	Adwit	5	3	1	5	2
5	Ramesh	7	4	1	3	2
6	Vipul	4	5	1	4	2
7	Uday	4	6	1	5	2
8	Akul	7	4	1	4	2
9	Anish	3	5	1	3	2
10	Sameer	4	6	1	5	2

(In continuation)

count2	equip_id3	count3	equip_id4	count4	equip_id5	count5	equip_id6	count6
6	3	5	4	2	5	2	6	8
4	3	3	4	1	5	0	6	3
5	3	5	4	2	5	1	6	6
5	3	4	4	2	5	1	6	7
5	3	3	4	2	5	0	6	5
3	3	4	4	1	5	1	6	5
5	3	4	4	2	5	1	6	5
5	3	7	4	2	5	1	6	8
3	3	4	4	0	5	1	6	4
5	3	5	4	2	5	1	6	6

The FARMER table stores the farmer names and other information like the land area owned, number of workers and individual count of all the equipment. The 'farmer\_id' is the Primary key and 'equip\_id1', 'equip\_id2' etc. are the Foreign keys connecting to the TOOLS\_MACHINERY table.

### ➤ CROPS table

cropid	cropname	harvesting_time_in_months	pesticides_ml_per_sqm	fertilizers_kg_per_sqm	water_l_per_sqm	pesticide_type	fertilizer_type
1	paddy	4	10	0.01	1000	carbaryl	urea,DAP
2	wheat	4	10	0.01	100	pyrethroid	APP,phosphoric acid
3	sunflower	4	10	0.01	100	chlopyrifos	epsom salt, DAP
4	mustard	3	10	0.01	100	chlopyrifos	urea,MP
5	potato	3	10	0.01	150	malathion	APP,MP

The CROPS table stores the information of the crops that will be grown. The information stored are like, crop name, harvesting time, fertilizers type etc. the Primary key is 'cropid'.

## ➤ TOOLS\_MACHINERY table

equip_id	name	count	last_service_date	cost_per_item	maintenance_cost_per_item
1	plough	45	2020-10-30	990	250
2	sickle	46	2020-10-28	245	100
3	rake	44	2020-10-26	360	100
4	tractor	16	2020-11-05	159600	30000
5	harvestor	9	2020-11-10	120640	25000
6	sprinkler	57	2020-11-15	400	100

The TOOLS\_MACHINERY table is an independent table which stores information like equipment names, total count, last service date etc. which is updated by the admin regularly based on the circumstances. The 'equip\_id' is the Primary key.

## ➤ MEMBER\_CROP\_ALLOCATION table

allocation_id	farmer1_id	farmer1_name	farmer2_id	farmer2_name	crop_grown_id	→
1	1	Mohit	9	Anish	1	→
2	3	Anmol	2	Pankaj	1	→
3	4	Adwit	6	Vipul	1	→
4	5	Ramesh	7	Uday	1	→
5	8	Akul	10	Sameer	1	→
6	4	Adwit	9	Anish	2	→
7	1	Mohit	6	Vipul	2	→
8	3	Anmol	10	Sameer	2	→
9	5	Ramesh	2	Pankaj	2	→
10	8	Akul	7	Uday	2	→
11	1	Mohit	7	Uday	3	→
12	8	Akul	9	Anish	3	→
13	5	Ramesh	2	Pankaj	3	→
14	4	Adwit	10	Sameer	3	→
15	3	Anmol	6	Vipul	3	→

(in continuation)

→ crop_name	total_area	fertilizers_amt_in_Kg	pesticide_amt_in_L	harvesting_months
paddy	8	0.08	0.08	Jul-Oct
paddy	10	0.1	0.1	Jul-Oct
paddy	9	0.09	0.09	Jul-Oct
paddy	11	0.11	0.11	Jul-Oct
paddy	11	0.11	0.11	Jul-Oct
wheat	8	0.08	0.08	Dec-March
wheat	9	0.09	0.09	Dec-March
→ wheat	10	0.1	0.1	Dec-March
wheat	11	0.11	0.11	Dec-March
wheat	11	0.11	0.11	Dec-March
sunflower	9	0.09	0.09	Apr-Jun
sunflower	10	0.1	0.1	Apr-Jun
sunflower	11	0.11	0.11	Apr-Jun
sunflower	9	0.09	0.09	Apr-Jun
→ sunflower	10	0.1	0.1	Apr-Jun

The rows in MEMBER\_CROP\_ALLOCATION table is inserted by the admin while operating the system. The admin enters the ‘farmer\_id’s of the farmers who will form a group and the ‘cropid’ of the crop to be grown, and the rest of the columns get filled by the system based on the data stored. The ‘allocation\_id’ is the Primary key. ‘farmer\_id1’ and ‘farmer\_id2’ are Foreign keys connected with the FARMERS table. Also, ‘crop\_grown\_id’ is the Foreign key connected with the CROPS table.

## ➤ GROUPWISE\_CROP\_ALLOCATION table

allocation_id	crop_name	harvesting_months	crop_yield_per_sqm_in_kg	total_amt_of_crop	dividing_ratio
1	paddy	Jul-Oct	0.24	7769.97	1:1
2	paddy	Jul-Oct	0.22	8903.09	1:1
3	paddy	Jul-Oct	0.25	9105.43	1:1
4	paddy	Jul-Oct	0.24	10683.7	1:1
5	paddy	Jul-Oct	0.23	10238.6	1:1
6	wheat	Dec-March	0.35	11331.2	1:1
7	wheat	Dec-March	0.34	12383.4	1:1
8	wheat	Dec-March	0.33	13354.6	1:1
9	wheat	Dec-March	0.36	16025.6	1:1
10	wheat	Dec-March	0.35	15580.4	1:1
11	sunflower	Apr-Jun	0.1	3642.17	1:1
12	sunflower	Apr-Jun	0.12	4856.23	1:1
13	sunflower	Apr-Jun	0.11	4896.7	1:1
14	sunflower	Apr-Jun	0.11	4006.39	1:1
15	sunflower	Apr-Jun	0.115	4653.89	1:1

The GROUPWISE\_CROP\_ALLOCATION table is formed to store the crop yield by each group for one crop, which entered in the ‘ENTER CROP YIELD BASED ON GROUP ALLOCATED’ menu. This table is the mediator between the MEMBER\_CROP\_ALLOCATION table and INDIVIDUAL\_CROP\_YIELD table. Here also, ‘allocation\_id’ is the Primary key and also a Foreign key connected with the MEMBER\_CROP\_ALLOCATION table.

## ➤ INDIVIDUAL\_CROP\_YIELD table

yield_id	farmer_id	farmer_name	allocation_id1	crop_name	individual_yield_in_kg
1	1	Mohit	1	paddy	3884.99
2	9	Anish	1	paddy	3884.99
3	3	Anmol	2	paddy	4451.55
4	2	Pankaj	2	paddy	4451.55
5	4	Adwit	3	paddy	4552.72
6	6	Vipul	3	paddy	4552.72
7	5	Ramesh	4	paddy	5341.85
8	7	Uday	4	paddy	5341.85
9	8	Akul	5	paddy	5119.28
10	10	Sameer	5	paddy	5119.28
11	4	Adwit	6	wheat	5665.6
12	9	Anish	6	wheat	5665.6
13	1	Mohit	7	wheat	6191.7
14	6	Vipul	7	wheat	6191.7
15	3	Anmol	8	wheat	6677.32
16	10	Sameer	8	wheat	6677.32
17	5	Ramesh	9	wheat	8012.78
18	2	Pankaj	9	wheat	8012.78
19	8	Akul	10	wheat	7790.21
20	7	Uday	10	wheat	7790.21
21	1	Mohit	11	sunflower	1821.09
22	7	Uday	11	sunflower	1821.09
23	8	Akul	12	sunflower	2428.12
24	9	Anish	12	sunflower	2428.12
25	5	Ramesh	13	sunflower	2448.35
26	2	Pankaj	13	sunflower	2448.35
27	4	Adwit	14	sunflower	2003.2
28	10	Sameer	14	sunflower	2003.2
29	3	Anmol	15	sunflower	2326.94
30	6	Vipul	15	sunflower	2326.94

This is a hidden table which formed by the system from the GROUPWISE\_CROP\_YIELD table through further calculations. Only a part of this table is viewed by the member when they enter a particular 'farmer\_id' in the 'VIEW CROP YIELD PER MEMBER' menu. Here, 'yield\_id' is the Primary key which gets added through auto-increment.  
 'farmer\_id' is the Foreign key connected with the FARMERS table and  
 'allocation\_id1' is the Foreign key connected with the MEMBER\_CROP\_ALLOCATION table.

## PROJECT VIEW

```
In [1]: runfile('C:/Users/HP/OneDrive/Documents/Python Scripts/Agriculture Supply Cooperative')
```

```
*****
BHARAT AGRICULTURAL PRODUCTION COOPERATIVE SOCIETY
BELGAON, BULANDSHAHAR
UTTAR PRADESH
```

MAIN MENU

- 1. MEMBER
- 2. ADMINISTRATOR
- 3. EXIT

```
*****  
Please select an option(1 to 3): 2
```

```
Enter the password: 12345
```

WRONG PASSWORD!

```
*****
BHARAT AGRICULTURAL PRODUCTION COOPERATIVE SOCIETY
BELGAON, BULANDSHAHAR
UTTAR PRADESH
```

MAIN MENU

- 1. MEMBER
- 2. ADMINISTRATOR
- 3. EXIT

```
*****  
Please select an option(1 to 3): 2
```

```
Enter the password: 123456789
```

```
~~~~~  
Welcome Mr. Admin
```

MAIN ADMIN MENU

- 1. MEMBER INFORMATION
- 2. CROP INFORMATION
- 3. EQUIPMENTS STOCK
- 4. CROP ALLOCATION
- 5. BACK TO MAIN MENU

```
~~~~~  
Please select your option(1 to 5): 1
```

```
-----  
SUBMENU
```

- 1. EDIT INFORMATION
- 2. ADD NEW MEMBER
- 3. REMOVE MEMBER
- 4. VIEW TABLE
- 5. BACK TO ADMIN MENU

```
-----
```

Please select your option(1 to 5): 1

ENTER FARMER ID OF THE RECORD TO BE UPDATED: 5

COLUMN TO BE UPDATED? count6

SET NEW VALUE: 6

UPDATED TABLE

farmer_id	name	land_area_owned	num_of_member	equip_id1	count1	\
0	1	Mohit	5.0	2	1	4
1	2	Pankaj	4.0	6	1	3
2	3	Anmol	6.0	3	1	4
3	4	Adwit	5.0	3	1	5
4	5	Ramesh	7.0	4	1	3
5	6	Vipul	4.0	5	1	4
6	7	Uday	4.0	6	1	5
7	8	Akul	7.0	4	1	4
8	9	Anish	3.0	5	1	3
9	10	Sameer	4.0	6	1	5

equip_id2	count2	equip_id3	count3	equip_id4	count4	equip_id5	count5	\
0	2	6	3	5	4	2	5	2
1	2	4	3	3	4	1	5	0
2	2	5	3	5	4	2	5	1
3	2	5	3	4	4	2	5	1
4	2	5	3	3	4	2	5	0
5	2	3	3	4	4	1	5	1
6	2	5	3	4	4	2	5	1
7	2	5	3	7	4	2	5	1
8	2	3	3	4	4	0	5	1
9	2	5	3	5	4	2	5	1

equip_id6	count6							
0	6	8						
1	6	3						
2	6	6						
3	6	7						
4	6	6						
5	6	5						
6	6	5						
7	6	8						
8	6	4						
9	6	6						

SUBMENU

1. EDIT INFORMATION
2. ADD NEW MEMBER
3. REMOVE MEMBER
4. VIEW TABLE
5. BACK TO ADMIN MENU

Please select your option(1 to 5): 5

~~~~~

Welcome Mr. Admin

MAIN ADMIN MENU

1. MEMBER INFORMATION
2. CROP INFORMATION

3. EQUIPMENTS STOCK

4. CROP ALLOCATION

5. BACK TO MAIN MENU

~~~~~  
Please select your option(1 to 5): 2

-----  
SUBMENU

1. EDIT

2. ADD CROP

3. DELETE CROP INFO

4. VIEW TABLE

5. BACK TO ADMIN MENU

-----  
Please select your option(1 to 5): 3

ENTER THE CROP ID OF RECORD TO BE REMOVED: 4

CROP TABLE

cropid	cropname	harvesting_time_in_months	pesticides_ml_per_sqm	\
0	1 paddy	4	10.0	
1	2 wheat	4	10.0	
2	3 sunflower	4	10.0	
3	5 potato	3	10.0	

	fertilizers_kg_per_sqm	water_L_per_sqm	pesticide_type	\
0	0.01	1000.0	carbaryl	
1	0.01	100.0	pyrethroid	
2	0.01	100.0	chlopyrifos	
3	0.01	150.0	malathion	

	fertilizer_type	cost_per_kg
0	urea,DAP	None
1	APP,phosphoric acid	None
2	epsom salt, DAP	None
3	APP,MP	None

-----  
SUBMENU

1. EDIT

2. ADD CROP

3. DELETE CROP INFO

4. VIEW TABLE

5. BACK TO ADMIN MENU

-----  
Please select your option(1 to 5): 5

~~~~~  
Welcome Mr. Admin

MAIN ADMIN MENU

1. MEMBER INFORMATION

2. CROP INFORMATION

3. EQUIPMENTS STOCK

4. CROP ALLOCATION

5. BACK TO MAIN MENU

~~~~~  
Please select your option(1 to 5): 3

-----  
SUBMENU

1. EDIT

2. ADD NEW EQUIPMENT

3. DELETE EQUIPMENT(S)

4. VIEW EQUIPMENTS STOCK

5. BACK TO ADMIN MENU

-----  
Please select your option(1 to 5): 4

TOOLS\_MACHINERY TABLE

equip_id	name	count	last_service_date	cost_per_item	\
0	1	plough	45	2020-10-30	990.0
1	2	sickle	46	2020-10-28	245.0
2	3	rake	44	2020-10-26	360.0
3	4	tractor	16	2020-11-05	159600.0
4	5	harvestor	9	2020-11-10	120640.0
5	6	sprinkler	57	2020-11-15	400.0

-----  
maintenance\_cost\_per\_item

0	250.0
1	100.0
2	100.0
3	30000.0
4	25000.0
5	100.0

-----  
SUBMENU

1. EDIT

2. ADD NEW EQUIPMENT

3. DELETE EQUIPMENT(S)

4. VIEW EQUIPMENTS STOCK

5. BACK TO ADMIN MENU

-----  
Please select your option(1 to 5): 5

-----  
~~~~~  
Welcome Mr. Admin

MAIN ADMIN MENU

1. MEMBER INFORMATION

2. CROP INFORMATION

3. EQUIPMENTS STOCK

4. CROP ALLOCATION

5. BACK TO MAIN MENU

Please select your option(1 to 5): 4

CROP-MEMBER ALLOCATION

MEMBERS WITH MORE THAN 4 ACRES OF LAND

| farmer_id | name   | land_area_owned | num_of_member | equip_id1 | count1 | \         |        |   |
|-----------|--------|-----------------|---------------|-----------|--------|-----------|--------|---|
| 0         | 1      | Mohit           | 5.0           | 2         | 1      | 4         |        |   |
| 1         | 3      | Anmol           | 6.0           | 3         | 1      | 4         |        |   |
| 2         | 4      | Adwit           | 5.0           | 3         | 1      | 5         |        |   |
| 3         | 5      | Ramesh          | 7.0           | 4         | 1      | 3         |        |   |
| 4         | 8      | Akul            | 7.0           | 4         | 1      | 4         |        |   |
| equip_id2 | count2 | equip_id3       | count3        | equip_id4 | count4 | equip_id5 | count5 | \ |
| 0         | 2      | 6               | 3             | 5         | 4      | 2         | 5      | 2 |
| 1         | 2      | 5               | 3             | 5         | 4      | 2         | 5      | 1 |
| 2         | 2      | 5               | 3             | 4         | 4      | 2         | 5      | 1 |
| 3         | 2      | 5               | 3             | 3         | 4      | 2         | 5      | 0 |
| 4         | 2      | 5               | 3             | 7         | 4      | 2         | 5      | 1 |
| equip_id6 | count6 |                 |               |           |        |           |        |   |
| 0         | 6      | 8               |               |           |        |           |        |   |
| 1         | 6      | 6               |               |           |        |           |        |   |
| 2         | 6      | 7               |               |           |        |           |        |   |
| 3         | 6      | 6               |               |           |        |           |        |   |
| 4         | 6      | 8               |               |           |        |           |        |   |

MEMBERS WITH MORE THAN 4 WORKERS

| farmer_id | name   | land_area_owned | num_of_member | equip_id1 | count1 | \         |        |   |
|-----------|--------|-----------------|---------------|-----------|--------|-----------|--------|---|
| 0         | 2      | Pankaj          | 4.0           | 6         | 1      | 3         |        |   |
| 1         | 6      | Vipul           | 4.0           | 5         | 1      | 4         |        |   |
| 2         | 7      | Uday            | 4.0           | 6         | 1      | 5         |        |   |
| 3         | 9      | Anish           | 3.0           | 5         | 1      | 3         |        |   |
| 4         | 10     | Sameer          | 4.0           | 6         | 1      | 5         |        |   |
| equip_id2 | count2 | equip_id3       | count3        | equip_id4 | count4 | equip_id5 | count5 | \ |
| 0         | 2      | 4               | 3             | 3         | 4      | 1         | 5      | 0 |
| 1         | 2      | 3               | 3             | 4         | 4      | 1         | 5      | 1 |
| 2         | 2      | 5               | 3             | 4         | 4      | 2         | 5      | 1 |
| 3         | 2      | 3               | 3             | 4         | 4      | 0         | 5      | 1 |
| 4         | 2      | 5               | 3             | 5         | 4      | 2         | 5      | 1 |
| equip_id6 | count6 |                 |               |           |        |           |        |   |
| 0         | 6      | 3               |               |           |        |           |        |   |
| 1         | 6      | 5               |               |           |        |           |        |   |
| 2         | 6      | 5               |               |           |        |           |        |   |
| 3         | 6      | 4               |               |           |        |           |        |   |
| 4         | 6      | 6               |               |           |        |           |        |   |

CREATE MEMBER\_CROP\_ALLOCATION TABLE

ENTER NEW ALLOCATION\_ID TO INSERT: 14

ENTER FARMER\_ID OF FIRST FARMER: 4

ENTER FARMER\_ID OF SECOND FARMER: 10

ENTER CROP\_ID OF THE CROP ALLOTTED: 3

ENTER THE HARVESTING MONTHS: Apr-Jun

DO YOU WANT TO ADD MORE?(y/n): y

CREATE MEMBER\_CROP\_ALLOCATION TABLE

ENTER NEW ALLOCATION\_ID TO INSERT: 15

ENTER FARMER\_ID OF FIRST FARMER: 3

ENTER FARMER\_ID OF SECOND FARMER: 6

ENTER CROP\_ID OF THE CROP ALLOTTED: 3

ENTER THE HARVESTING MONTHS: Apr-Jun

DO YOU WANT TO ADD MORE?(y/n): n

NEW RECORDS SUCCESSFULLY ADDED

MEMBER\_CROP\_ALLOCATION TABLE

|    | allocation_id | farmer1_id | farmer1_name | farmer2_id | farmer2_name | \ |
|----|---------------|------------|--------------|------------|--------------|---|
| 0  | 1             | 1          | Mohit        | 9          | Anish        |   |
| 1  | 2             | 3          | Anmol        | 2          | Pankaj       |   |
| 2  | 3             | 4          | Adwit        | 6          | Vipul        |   |
| 3  | 4             | 5          | Ramesh       | 7          | Uday         |   |
| 4  | 5             | 8          | Akul         | 10         | Sameer       |   |
| 5  | 6             | 4          | Adwit        | 9          | Anish        |   |
| 6  | 7             | 1          | Mohit        | 6          | Vipul        |   |
| 7  | 8             | 3          | Anmol        | 10         | Sameer       |   |
| 8  | 9             | 5          | Ramesh       | 2          | Pankaj       |   |
| 9  | 10            | 8          | Akul         | 7          | Uday         |   |
| 10 | 11            | 1          | Mohit        | 7          | Uday         |   |
| 11 | 12            | 8          | Akul         | 9          | Anish        |   |
| 12 | 13            | 5          | Ramesh       | 2          | Pankaj       |   |
| 13 | 14            | 4          | Adwit        | 10         | Sameer       |   |
| 14 | 15            | 3          | Anmol        | 6          | Vipul        |   |

|    | crop_grown_id | crop_name | total_area | fertilizers_amt_in_Kg | \ |
|----|---------------|-----------|------------|-----------------------|---|
| 0  | 1             | paddy     | 8          | 0.08                  |   |
| 1  | 1             | paddy     | 10         | 0.10                  |   |
| 2  | 1             | paddy     | 9          | 0.09                  |   |
| 3  | 1             | paddy     | 11         | 0.11                  |   |
| 4  | 1             | paddy     | 11         | 0.11                  |   |
| 5  | 2             | wheat     | 8          | 0.08                  |   |
| 6  | 2             | wheat     | 9          | 0.09                  |   |
| 7  | 2             | wheat     | 10         | 0.10                  |   |
| 8  | 2             | wheat     | 11         | 0.11                  |   |
| 9  | 2             | wheat     | 11         | 0.11                  |   |
| 10 | 3             | sunflower | 9          | 0.09                  |   |
| 11 | 3             | sunflower | 10         | 0.10                  |   |
| 12 | 3             | sunflower | 11         | 0.11                  |   |
| 13 | 3             | sunflower | 9          | 0.09                  |   |
| 14 | 3             | sunflower | 10         | 0.10                  |   |

|    | pesticide_amt_in_L | harvesting_months |
|----|--------------------|-------------------|
| 0  | 0.08               | Jul-Oct           |
| 1  | 0.10               | Jul-Oct           |
| 2  | 0.09               | Jul_Oct           |
| 3  | 0.11               | Jul-Oct           |
| 4  | 0.11               | Jul-Oct           |
| 5  | 0.08               | Dec-March         |
| 6  | 0.09               | Dec-March         |
| 7  | 0.10               | Dec-March         |
| 8  | 0.11               | Dec-March         |
| 9  | 0.11               | Dec-March         |
| 10 | 0.09               | Apr-Jun           |
| 11 | 0.10               | Apr-Jun           |
| 12 | 0.11               | Apr-Jun           |
| 13 | 0.09               | Apr-Jun           |
| 14 | 0.10               | Apr-Jun           |

~~~~~  
Welcome Mr. Admin

MAIN ADMIN MENU

1. MEMBER INFORMAION
  2. CROP INFORMAION
  3. EQUIPMENTS STOCK
  4. CROP ALLOCATION
  5. BACK TO MAIN MENU
- ~~~~~

Please select your option(1 to 5): 5

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BHARAT AGRICULTURAL SUPPLY COOPERATIVE SOCIETY  
BELGAON, BULANDSHAHAR  
UTTAR PRADESH

MAIN MENU

1. MEMBER
  2. ADMINISTRATOR
  3. EXIT
- \*\*\*\*\*

Please select an option(1 to 3): 1

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MAIN MEMBER MENU

1. VIEW ALLOCATED GROUPS
  2. ENTER CROP YIELD BASED ON GROUP ALLOCATED
  3. VIEW CROP YIELD PER MEMBER
  4. BACK TO MAIN MENU
- ~~~~~

Please select your option(1 to 4): 1

MEMBER\_CROP\_ALLOCATION TABLE

|    | allocation_id | farmer1_id | farmer1_name | farmer2_id | farmer2_name | \ |
|----|---------------|------------|--------------|------------|--------------|---|
| 0  |               | 1          | Mohit        | 9          | Anish        |   |
| 1  |               | 2          | Anmol        | 2          | Pankaj       |   |
| 2  |               | 3          | Adwit        | 6          | Vipul        |   |
| 3  |               | 4          | Ramesh       | 7          | Uday         |   |
| 4  |               | 5          | Akul         | 10         | Sameer       |   |
| 5  |               | 6          | Adwit        | 9          | Anish        |   |
| 6  |               | 7          | Mohit        | 6          | Vipul        |   |
| 7  |               | 8          | Anmol        | 10         | Sameer       |   |
| 8  |               | 9          | Ramesh       | 2          | Pankaj       |   |
| 9  |               | 10         | Akul         | 7          | Uday         |   |
| 10 |               | 11         | Mohit        | 7          | Uday         |   |
| 11 |               | 12         | Akul         | 9          | Anish        |   |
| 12 |               | 13         | Ramesh       | 2          | Pankaj       |   |
| 13 |               | 14         | Adwit        | 10         | Sameer       |   |
| 14 |               | 15         | Anmol        | 6          | Vipul        |   |

|    | crop_grown_id | crop_name | total_area | fertilizers_amt_in_Kg | \ |
|----|---------------|-----------|------------|-----------------------|---|
| 0  | 1             | paddy     | 8          | 0.08                  |   |
| 1  | 1             | paddy     | 10         | 0.10                  |   |
| 2  | 1             | paddy     | 9          | 0.09                  |   |
| 3  | 1             | paddy     | 11         | 0.11                  |   |
| 4  | 1             | paddy     | 11         | 0.11                  |   |
| 5  | 2             | wheat     | 8          | 0.08                  |   |
| 6  | 2             | wheat     | 9          | 0.09                  |   |
| 7  | 2             | wheat     | 10         | 0.10                  |   |
| 8  | 2             | wheat     | 11         | 0.11                  |   |
| 9  | 2             | wheat     | 11         | 0.11                  |   |
| 10 | 3             | sunflower | 9          | 0.09                  |   |
| 11 | 3             | sunflower | 10         | 0.10                  |   |
| 12 | 3             | sunflower | 11         | 0.11                  |   |
| 13 | 3             | sunflower | 9          | 0.09                  |   |
| 14 | 3             | sunflower | 10         | 0.10                  |   |

|    | pesticide_amt_in_L | harvesting_months |
|----|--------------------|-------------------|
| 0  | 0.08               | Jul-Oct           |
| 1  | 0.10               | Jul-Oct           |
| 2  | 0.09               | Jul_Oct           |
| 3  | 0.11               | Jul-Oct           |
| 4  | 0.11               | Jul-Oct           |
| 5  | 0.08               | Dec-March         |
| 6  | 0.09               | Dec-March         |
| 7  | 0.10               | Dec-March         |
| 8  | 0.11               | Dec-March         |
| 9  | 0.11               | Dec-March         |
| 10 | 0.09               | Apr-Jun           |
| 11 | 0.10               | Apr-Jun           |
| 12 | 0.11               | Apr-Jun           |
| 13 | 0.09               | Apr-Jun           |
| 14 | 0.10               | Apr-Jun           |

~~~~~

#### MAIN MEMBER MENU

1. VIEW ALLOCATED GROUPS
  2. ENTER CROP YIELD BASED ON GROUP ALLOCATED
  3. VIEW CROP YIELD PER MEMBER
  4. BACK TO MAIN MENU
- ~~~~~

Please select your option(1 to 4): 2

---Enter valid allocation\_id from member\_allocation\_table---

ENTER THE ALLOCATION\_ID: 14

ENTER THE CROP YIELD PER SQ. M IN KG: 0.11

RATIO IN WHICH YIELD BE DIVIDED AMONG INDIVIDUAL MEMBERS: 1:1

DO YOU WANT TO ADD MORE?(y/n): y

---Enter valid allocation\_id from member\_allocation\_table---

ENTER THE ALLOCATION\_ID: 15

ENTER THE CROP YIELD PER SQ. M IN KG: 0.115

RATIO IN WHICH YIELD BE DIVIDED AMONG INDIVIDUAL MEMBERS: 1:1

DO YOU WANT TO ADD MORE?(y/n): n

NEW RECORDS SUCCESSFULLY ADDED

allocation_id	crop_name	harvesting_months	crop_yield_per_sqm_in_kg	\
0	1	paddy	Jul-Oct	0.240
1	2	paddy	Jul-Oct	0.220
2	3	paddy	Jul_Oct	0.250
3	4	paddy	Jul-Oct	0.240
4	5	paddy	Jul-Oct	0.230
5	6	wheat	Dec-March	0.350
6	7	wheat	Dec-March	0.340
7	8	wheat	Dec-March	0.330
8	9	wheat	Dec-March	0.360
9	10	wheat	Dec-March	0.350
10	11	sunflower	Apr-Jun	0.100
11	12	sunflower	Apr-Jun	0.120
12	13	sunflower	Apr-Jun	0.110
13	14	sunflower	Apr-Jun	0.110
14	15	sunflower	Apr-Jun	0.115

	total_amt_of_crop	dividing_ratio
0	7769.97	1:1
1	8903.09	1:1
2	9105.43	1:1
3	10683.70	1:1
4	10238.60	1:1
5	11331.20	1:1
6	12383.40	1:1
7	13354.60	1:1
8	16025.60	1:1
9	15580.40	1:1
10	3642.17	1:1
11	4856.23	1:1
12	4896.70	1:1
13	4006.39	1:1
14	4653.89	1:1

MAIN MEMBER MENU

1. VIEW ALLOCATED GROUPS
2. ENTER CROP YIELD BASED ON GROUP ALLOCATED
3. VIEW CROP YIELD PER MEMBER
4. BACK TO MAIN MENU

Please select your option(1 to 4): 3

ENTER FARMER\_ID: 5

RECORD OF CROP YIELDS OF FARMER WITH FARMER\_ID 5

yield_id	farmer_id	farmer_name	allocation_id1	crop_name	\
0	7	5	Ramesh	4	paddy
1	19	5	Ramesh	9	wheat
2	27	5	Ramesh	13	sunflower

individual\_yield\_in\_kg

0	5341.85
1	8012.78
2	2448.35

MAIN MEMBER MENU

1. VIEW ALLOCATED GROUPS
2. ENTER CROP YIELD BASED ON GROUP ALLOCATED
3. VIEW CROP YIELD PER MEMBER
4. BACK TO MAIN MENU

Please select your option(1 to 4): 3

ENTER FARMER\_ID: 7

RECORD OF CROP YIELDS OF FARMER WITH FARMER\_ID 7

yield_id	farmer_id	farmer_name	allocation_id1	crop_name	\
0	8	7	Uday	4	paddy
1	22	7	Uday	10	wheat
2	24	7	Uday	11	sunflower

individual\_yield\_in\_kg

0	5341.85
1	7790.21
2	1821.09

MAIN MEMBER MENU

1. VIEW ALLOCATED GROUPS
2. ENTER CROP YIELD BASED ON GROUP ALLOCATED
3. VIEW CROP YIELD PER MEMBER

4. BACK TO MAIN MENU

~~~~~

Please select your option(1 to 4): 4

\*\*\*\*\*  
BHARAT AGRICULTURAL PRODUCTION COOPERATIVE SOCIETY  
BELGAON, BULANDSHAHAR  
UTTAR PRADESH

MAIN MENU

- 1. MEMBER
- 2. ADMINISTRATOR
- 3. EXIT

\*\*\*\*\*  
Please select an option(1 to 3): 3

-----SYSTEM CLOSED-----

## REPORTS GENERATED

### **1. Member- Crop Allocation Table**

Each ‘allocation\_id’ represents a group of 2 farmers who have together grown one particular crop in a particular duration of time. This table shows the total number of groups and the names of the farmers forming each group. Also, the crop grown by each group, total land area given, fertilizers, pesticides required etc. is shown. This Report gets generated when the admin is performing “CROP ALLOCATION” in the system.

It is viewed by the members when “VIEW ALLOCATED GROUPS” menu is chosen in the MEMBER MAIN MENU.

| allocation_id | farmer1_id | farmer1_name | farmer2_id | farmer2_name | crop_grown_id | → |
|---------------|------------|--------------|------------|--------------|---------------|---|
| 1             | 1          | Mohit        | 9          | Anish        | 1             | → |
| 2             | 3          | Anmol        | 2          | Pankaj       | 1             | → |
| 3             | 4          | Adwit        | 6          | Vipul        | 1             | → |
| 4             | 5          | Ramesh       | 7          | Uday         | 1             | → |
| 5             | 8          | Akul         | 10         | Sameer       | 1             | → |
| 6             | 4          | Adwit        | 9          | Anish        | 2             | → |
| 7             | 1          | Mohit        | 6          | Vipul        | 2             | → |
| 8             | 3          | Anmol        | 10         | Sameer       | 2             | → |
| 9             | 5          | Ramesh       | 2          | Pankaj       | 2             | → |
| 10            | 8          | Akul         | 7          | Uday         | 2             | → |
| 11            | 1          | Mohit        | 7          | Uday         | 3             | → |
| 12            | 8          | Akul         | 9          | Anish        | 3             | → |
| 13            | 5          | Ramesh       | 2          | Pankaj       | 3             | → |
| 14            | 4          | Adwit        | 10         | Sameer       | 3             | → |
| 15            | 3          | Anmol        | 6          | Vipul        | 3             | → |

(in continuation below)

| → crop_name | total_area | fertilizers_amt_in_Kg | pesticide_amt_in_L | harvesting_months |
|-------------|------------|-----------------------|--------------------|-------------------|
| paddy       | 8          | 0.08                  | 0.08               | Jul-Oct           |
| paddy       | 10         | 0.1                   | 0.1                | Jul-Oct           |
| paddy       | 9          | 0.09                  | 0.09               | Jul-Oct           |
| paddy       | 11         | 0.11                  | 0.11               | Jul-Oct           |
| paddy       | 11         | 0.11                  | 0.11               | Jul-Oct           |
| wheat       | 8          | 0.08                  | 0.08               | Dec-March         |
| → wheat     | 9          | 0.09                  | 0.09               | Dec-March         |
| wheat       | 10         | 0.1                   | 0.1                | Dec-March         |
| wheat       | 11         | 0.11                  | 0.11               | Dec-March         |
| wheat       | 11         | 0.11                  | 0.11               | Dec-March         |
| sunflower   | 9          | 0.09                  | 0.09               | Apr-Jun           |
| sunflower   | 10         | 0.1                   | 0.1                | Apr-Jun           |
| sunflower   | 11         | 0.11                  | 0.11               | Apr-Jun           |
| sunflower   | 9          | 0.09                  | 0.09               | Apr-Jun           |
| → sunflower | 10         | 0.1                   | 0.1                | Apr-Jun           |

## 2. Individual Output Table (of Each Farmer Per Annum)

This table is shown for one farmer whose farmer\_id was entered. It shows the total amount of each crop acquired by one farmer along with the mention of their id, name, group's allocation\_id and name of the crops. This Report gets generated when the admin is performing “CROP ALLOCATION” in the system and also, when the members enter their yield in the “ENTER CROP YIELD BASED ON GROUP ALLOCATED” menu in the MAIN MEMBER MENU. It is viewed by the members when “VIEW CROP YIELD PER MEMBER” menu is chosen in the MEMBER MAIN MENU.

- Farmer 1

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 1        | 1         | Mohit       | 1              | paddy     | 3884.99                |
| 15       | 1         | Mohit       | 7              | wheat     | 6191.7                 |
| 23       | 1         | Mohit       | 11             | sunflower | 1821.09                |

- Farmer 2

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 4        | 2         | Pankaj      | 2              | paddy     | 4451.55                |
| 20       | 2         | Pankaj      | 9              | wheat     | 8012.78                |
| 28       | 2         | Pankaj      | 13             | sunflower | 2448.35                |

- Farmer 3

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 3        | 3         | Anmol       | 2              | paddy     | 4451.55                |
| 17       | 3         | Anmol       | 8              | wheat     | 6677.32                |
| 31       | 3         | Anmol       | 15             | sunflower | 2326.94                |

- Farmer 4

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 5        | 4         | Adwit       | 3              | paddy     | 4552.72                |
| 13       | 4         | Adwit       | 6              | wheat     | 5665.6                 |
| 29       | 4         | Adwit       | 14             | sunflower | 2003.2                 |

- Farmer 5

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 7        | 5         | Ramesh      | 4              | paddy     | 5341.85                |
| 19       | 5         | Ramesh      | 9              | wheat     | 8012.78                |
| 27       | 5         | Ramesh      | 13             | sunflower | 2448.35                |

- Farmer 6

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 6        | 6         | Vipul       | 3              | paddy     | 4552.72                |
| 16       | 6         | Vipul       | 7              | wheat     | 6191.7                 |
| 32       | 6         | Vipul       | 15             | sunflower | 2326.94                |

- Farmer 7

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 8        | 7         | Uday        | 4              | paddy     | 5341.85                |
| 22       | 7         | Uday        | 10             | wheat     | 7790.21                |
| 24       | 7         | Uday        | 11             | sunflower | 1821.09                |

- Farmer 8

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 9        | 8         | Akul        | 5              | paddy     | 5119.28                |
| 21       | 8         | Akul        | 10             | wheat     | 7790.21                |
| 25       | 8         | Akul        | 12             | sunflower | 2428.12                |

- Farmer 9

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 2        | 9         | Anish       | 1              | paddy     | 3884.99                |
| 14       | 9         | Anish       | 6              | wheat     | 5665.6                 |
| 26       | 9         | Anish       | 12             | sunflower | 2428.12                |

- Farmer 10

| yield_id | farmer_id | farmer_name | allocation_id1 | crop_name | individual_yield_in_kg |
|----------|-----------|-------------|----------------|-----------|------------------------|
| 10       | 10        | Sameer      | 5              | paddy     | 5119.28                |
| 18       | 10        | Sameer      | 8              | wheat     | 6677.32                |
| 30       | 10        | Sameer      | 14             | sunflower | 2003.2                 |

## **APPLICATIONS OF THE SOFTWARE**

Agriculture Production Cooperative system is useful in the Agricultural industry. The currant software can be used by 10 farmers together who have decided to form a cooperative.

The system is broadly divided into two parts, namely Members and Admin.

- ✓ The Admin section is protected through a password, thus allowing restricted entry. In this section, Real-time management of the personal assets of the farmers, crop information management, equipment stock management is possible.
- ✓ The most crucial part of the cooperative that is, forming groups of farmers and allocation of land area among the groups can be done easily by entering just 3 variables asked by the system.
- ✓ The crops to be grown in a particular duration by a group is decided during the allocation process in the Admin section.
- ✓ In the Members section, viewing of the decided groups along with the crops to be grown, can be done.
- ✓ Members can do the entry of the crop yield per group.
- ✓ the system will generate a table for individual members showing the total crop amount they possess.

The whole system/software is generated in loop form which shows a unique set of menus for a particular option chosen and performs all the above functions when the user asks.

## **INSTALLATION OF THE SOFTWARE**

The installation of the software can be easily done after the following requirements are met:

### **Hardware requirement-**

- ◆ Intel CORE i5 or similar processor, based PC at Client/Server end.
- ◆ 4GB DDR4 RAM with 256 MB or more storage (for Database).
- ◆ Standard I/O devices like keyboard, monitor, mouse etc.
- ◆ Printer (for hard-copy reports)
- ◆ Local Area Network (LAN) (for Client/Server Installation)

### **Software requirement-**

- ◆ Windows XP/2010/2013 OS
- ◆ Python along with MySQL interface
- ◆ MySQL Ver 8.0 or MySQL Workbench 8.0 CE with Library Database

After acquiring the above requirements, the software needs to be downloaded and opened in the Python-MySQL Interface. The software is ready to function.

The password required for entering the Admin section in the current software is “123456789”.

## **SCOPE OF IMPROVEMENT**

- In “ENTER CROP YIELD BASED ON GROUP ALLOCATED” menu of MEMBER MENU, an error gets generated if the allocation\_id entered is not present in the member\_crop\_allocation table due to the foreign constraint of individual\_crop\_yield table with member\_crop\_allocation table.
- Also, when a spelling mistake occurs while entering a particular field when asked, it also generates error.
- This system only deals with the record keeping and distribution of the resources. The money related aspects of a cooperative, like the profit generated by each member, the maintenance of all the equipment, is not included.

## **BIBLIOGRAPHY**

The following books/sites were referred to during the development of the system:

- Computer Science textbook Class 12 by Sumita Arora
- Youtube.com
- Stackoverflow.com
- Realpython.com