

DATA APPLICATIONS

AGRICULTURAL DATABASE

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Introduction

"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the cornfield."

Our platform, **the agricultural database management system** is to keep tracking records of various aspects of farming and trading. In order to maintain yields and meet the food demands of a growing population parallelly protecting natural resources, we need to make a few changes, database management can determine a lot. Intuitive decision making plays a key role in farming, database management systems provide insights to make the right decisions possible. This stored information helps farmers to identify efficiencies that lead to higher productivity and profit.

Data helps farmers eliminate volatility and risk which is beneficial not just to the grower but also to the supplier. So the supplier is more convenient to work with that farmer on a long-term basis. At the same time, the data allows the producer to work with the supply chain to help companies and retailers increase the transparency of their ingredients. This process is helping farmers to get financial assistance from the bank and co-operative societies. In the marketing process of various agricultural products, they can also get assistance with this agricultural database system. Government officials like MRO's or farmers can understand how farming is going on and the methods followed by other farmers in different places. Also, it is easy for the farmer to analyze their crop values. Government sectors are also getting helped with this type of database system for providing various schemes like *Kisan Yojana*, *Raithu Barossa*. Helps to estimate the cropping pattern of

the particular local area. We can use this database system for marketing communications with the market to sell the crop by staying in the home itself.

Database Requirements

Entity types

1. Farmer
2. Land
3. Crop
4. Village
5. Scheme
6. Buyer
7. Loan
8. Workers
9. Irrigation type

The entity with two key attributes

1. Farmer
 - ☐ Aadhar number
 - ☐ passbook account number
2. Scheme
 - ☐ Scheme name
 - ☐ Land Passbook number
3. Buyer
 - ☐ Buyer account number
 - ☐ Aadhar card number

Two weak entity types

1. Crop
2. Irrigation type

Relationship types explanation

1. Farmer to land:
 - a. A farmer can have (0,n) lands. Land can belong to (1,1) farmers.
 - b. Cardinality ratio: 1:N
2. Land to crop

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- a. Many crops can be grown in one land. (0,N). A crop can be grown in (0,N) lands.
 - b. Cardinality ratio: N:M
 3. Farmer to his personal details
 - a. A farmer can have (1,N) details. A detail can belong to (1,N) farmers.
 - b. Cardinality ratio: N:M
 4. Farmers to buyers
 - a. A Farmer can have relationships with (1,N) buyers. A buyer can have a relationship with (1,N) farmers.
 - b. Cardinality ratio: N:M
 5. Buyers to market
 - a. A buyer can have a relationship with (1,N) markets. A market can have a relationship with (1,M) buyers.
 - b. Cardinality ratio: M:N
 6. Land to soil type
 - a. Land can have (1,1) Soil type. A soil type may belong to (0,N) lands.
 - b. Cardinality ratio: N:1
 7. Crop to fertilizers
 - a. A crop may use (0,M) fertilizers. Fertilizer may be used to (0,N) crops.
 - b. Cardinality ratio: N: M
 8. Farmers to scheme
 - a. A Farmer may be eligible to (0, M) schemes. A scheme may be applicable to (0,N) farmers.
 - b. Cardinality ratio: N:M

Relationships of n>3

- ❑ Farmer -> land -> crop -> buyer
- ❑ Government schemes -> panchayat -> bank -> farmers

Subclass

1. The crop is a subclass of farmer

Farmer to crop :

Crop -> price, fertilizer , insecticide, Insurance , Workers, seeds.

2. Irrigation system is a subclass of crop

Attributes types

1. Composite:
 - ☐ Farmers address
 - ☐ bank account
 - ☐ crop types
2. Multi-valued
 - ☐ Crop
 - ☐ fertilizers
 - ☐ Insecticides
3. derived attributes
 - ☐ Profit depends on crop price, crop price depends on the buyer.
 - ☐ Investment depends on the crop. The crop yield depends on land.

Bonus

1. Relationship type with the same participating entity type in distinct roles

A person can be a farmer as well as a buyer. A farmer who buys from other farmers. In this relationship, there exists a relationship between farmer and buyer who is also a farmer.

2. A farmer can have a relationship with (0,N) buyers. A buyer can have a relationship with (0,N) farmers.

Functional requirements

1.Retrieval

1) Selection:

- ☐ Store complete data tuples of farmers farming.
- ☐ Store complete data tuples of crops cultivated.
- ☐ Storing the loan details on farmers.

2)Projection:

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- ☐ Names of all farmers whose land is ≥ 5 acres
 - ☐ Names of all farmers who cultivated maize in a particular year.

3)Aggregate:

- ☐ The total sum of crop prices cultivated by farmers in a particular year.
- ☐ The average income in crops for farmers.
- ☐ Minimum yield wasted through a disaster.

4)Search:

- ☐ "Mai" will match with " Maize"
- ☐ "ground" will match with "groundnut"

Analysis:

- ☐ No of farmers whose income is greater than the average income all over the year.
- ☐ The number of farmers who are benefited by (under) the government schemes every year.
- ☐ Crops that yield more than specified quantity per acre in a particular season.

Modifications:

Insertion of Data

Insert operation lets you insert new records or new data if it does not violate integrity constraints into the database management system.

- ☐ Inserting the new farmer's details and their land details.
- ☐ Collecting crop-wise data every year.
- ☐ Inserting the seed types and fertilizers they are using.
- ☐ The details of the farmer's loan will be inserted.

Integrity constraints:

1. Same land can't be enrolled by multiple owners.

Update operation

Update Operation lets you update the existing one or more records in the database depending on the condition.

- ☐ Updating the farmer's farm size details.
- ☐ Updating the crop details from season to season.

Delete operation

Delete Operation helps to delete one or more records from the database depending on the condition.

- ☐ If the farmer loses their land, then the details of that farmer will be deleted.