**SMART AGRICULTURE MONITORING SYSTEM**

**Description**

The "Smart Agriculture Monitoring System" represents a comprehensive approach to modernizing and optimizing agricultural practices through the integration of advanced technologies and data-driven strategies. This domain is particularly relevant in tackling the multifaceted challenges faced by the agricultural sector, aiming to enhance efficiency, resource utilization, and sustainability.

**Relevance**

The relevance of the Smart Agriculture Monitoring System is underscored by its ability to address critical challenges in modern agriculture. As the global population continues to grow, there is an increasing demand for food production. However, traditional farming practices face limitations in resource efficiency, environmental sustainability, and resilience to climate changes.

The Smart Agriculture Monitoring System addresses these challenges by leveraging technology to optimize resource use, enhance operational efficiency, and promote sustainable farming practices.

Its real-time data insights, precision farming techniques, and adaptive management contribute to increased productivity, reduced environmental impact, and improved resilience against climate uncertainties. In an era where agriculture must meet rising demands while navigating environmental concerns, the Smart Agriculture Monitoring System emerges as a crucial and relevant solution for ensuring food security, sustainable farming, and the long-term viability of the agricultural sector.

**Table's attributes, data types, and constraints**

* **Farm table**

**farm\_id**: Integer (Primary Key, Auto Increment)

**farm\_name**:VARCHAR

**farm\_location**:VARCHAR

**size:** Decimal(Non-negative)

* **Crop table**

**crop\_id**: Integer (Primary Key, Auto Increment)

**crop\_type**: VARCHAR

**crop\_name**:VARCHAR

* **Equipment table**

**equipment\_id**: Integer (Primary Key, Auto Increment)

**equipment\_name**:VARCHAR

**manufacturer**: VARCHAR

* **Pesticide table**

**pesticide\_id**: Integer (Primary Key, Auto Increment)

**pesticide\_name**:VARCHAR

**application\_method**:VARCHAR

* **Soil table**

**soil\_id**: Integer (Primary Key, Auto Increment)

**soil\_type**: VARCHAR

**ph\_level**: Decimal (Non-negative)

**moisture\_level**: Decimal (Non-negative)

* **Farmer Registration table**

**farmer\_registration\_id:** Integer (Primary Key, Auto Increment))

**farm\_id**: Integer (Foreign Key referencing Farms)

**soil\_id**: Integer (Foreign Key referencing Soil)

**registration\_date**: Date (Not Null)

**end\_date**: Date

**registration\_status**:VARCHAR

* **Crop Soil table**

**crop\_soil\_type\_id**: Integer (Primary Key, Auto Increment))

**soil\_id**: Integer (Foreign Key referencing Soil)

**crop\_id**: Integer (Foreign Key referencing Crop)

* **Farm equipment table**

**farm\_equipment\_id**: Integer (Primary Key, Auto Increment))

**farm\_id**: Integer (Foreign Key referencing Farms)

**equipment\_id**: Integer (Foreign Key referencing Equipment)

**start\_date**: Date (Not Null)

**end\_date**: Date

* **Farm pesticide table**

**farm\_pesticide\_id**: Integer (Primary Key, Auto Increment))

**farm\_id**: Integer (Foreign Key referencing Farms)

**pesticide\_id**: Integer (Foreign Key referencing Pesticide)

**quantity**: Decimal(Non-negative)

* **Equipment Fare table**

**equipment\_fare\_id**: Integer (Primary Key, Auto Increment))

**equipment\_id**: Integer (Foreign Key referencing Equipment)

**quantity**: Integer (Non-negative)

**fare**: Decimal (Non-negative)

* **Pesticide fare table**

**pesticide\_fare\_id**: Integer (Primary Key, Auto Increment))

**pesticide\_id**: Integer (Foreign Key referencing Pesticide)

**quantity**: Integer (Non-negative)

**fare**: Decimal (Non-negative)

* **Farmer monthly fare table**

**monthly\_fare\_id**: Integer (Primary Key, Auto Increment))

**farm\_id**: Integer (Foreign Key referencing Farms)

**amount**: Decimal (Non-negative)

**receipt\_creation\_date**: DateTime

**receipt\_sent\_date**: DateTime

**Query**

create database agriculture\_db;

use agriculture\_db;

CREATE TABLE Farm (

farm\_id INT PRIMARY KEY AUTO\_INCREMENT,

farm\_name VARCHAR(25),

farm\_location VARCHAR(25),

size DECIMAL(10, 2) CHECK (size >= 0)

);

CREATE TABLE Crop (

crop\_id INT PRIMARY KEY AUTO\_INCREMENT,

crop\_type VARCHAR(25),

crop\_name VARCHAR(25)

);

CREATE TABLE Equipment (

equipment\_id INT PRIMARY KEY AUTO\_INCREMENT,

equipment\_name VARCHAR(25),

manufacturer VARCHAR(25)

);

CREATE TABLE Pesticide (

pesticide\_id INT PRIMARY KEY AUTO\_INCREMENT,

pesticide\_name VARCHAR(25),

application\_method VARCHAR(25)

);

CREATE TABLE Soil (

soil\_id INT PRIMARY KEY AUTO\_INCREMENT,

soil\_type VARCHAR(25),

ph\_level DECIMAL(5, 2) CHECK (ph\_level >= 0),

moisture\_level DECIMAL(5, 2) CHECK (moisture\_level >= 0)

);

CREATE TABLE FarmerRegistration (

farmer\_registration\_id INT PRIMARY KEY AUTO\_INCREMENT,

farm\_id INT,

soil\_id INT,

registration\_date DATE NOT NULL,

end\_date DATE,

registration\_status VARCHAR(25),

FOREIGN KEY (farm\_id) REFERENCES Farm(farm\_id),

FOREIGN KEY (soil\_id) REFERENCES Soil(soil\_id)

);

CREATE TABLE CropSoil (

crop\_soil\_type\_id INT PRIMARY KEY AUTO\_INCREMENT,

soil\_id INT,

crop\_id INT,

FOREIGN KEY (soil\_id) REFERENCES Soil(soil\_id),

FOREIGN KEY (crop\_id) REFERENCES Crop(crop\_id)

);

CREATE TABLE FarmEquipment (

farm\_equipment\_id INT PRIMARY KEY AUTO\_INCREMENT,

farm\_id INT,

equipment\_id INT,

start\_date DATE NOT NULL,

end\_date DATE,

FOREIGN KEY (farm\_id) REFERENCES Farm(farm\_id),

FOREIGN KEY (equipment\_id) REFERENCES Equipment(equipment\_id)

);

CREATE TABLE FarmPesticide (

farm\_pesticide\_id INT PRIMARY KEY AUTO\_INCREMENT,

farm\_id INT,

pesticide\_id INT,

quantity DECIMAL CHECK (quantity >= 0),

FOREIGN KEY (farm\_id) REFERENCES Farm(farm\_id),

FOREIGN KEY (pesticide\_id) REFERENCES Pesticide(pesticide\_id)

);

CREATE TABLE EquipmentFare (

equipment\_fare\_id INT PRIMARY KEY AUTO\_INCREMENT,

equipment\_id INT,

quantity INT CHECK (quantity >= 0),

fare DECIMAL CHECK (fare >= 0),

FOREIGN KEY (equipment\_id) REFERENCES Equipment(equipment\_id)

);

CREATE TABLE PesticideFare (

pesticide\_fare\_id INT PRIMARY KEY AUTO\_INCREMENT,

pesticide\_id INT,

quantity INT CHECK (quantity >= 0),

fare DECIMAL CHECK (fare >= 0),

FOREIGN KEY (pesticide\_id) REFERENCES Pesticide(pesticide\_id)

);

CREATE TABLE FarmerMonthlyFare (

monthly\_fare\_id INT PRIMARY KEY AUTO\_INCREMENT,

farm\_id INT,

amount DECIMAL CHECK (amount >= 0),

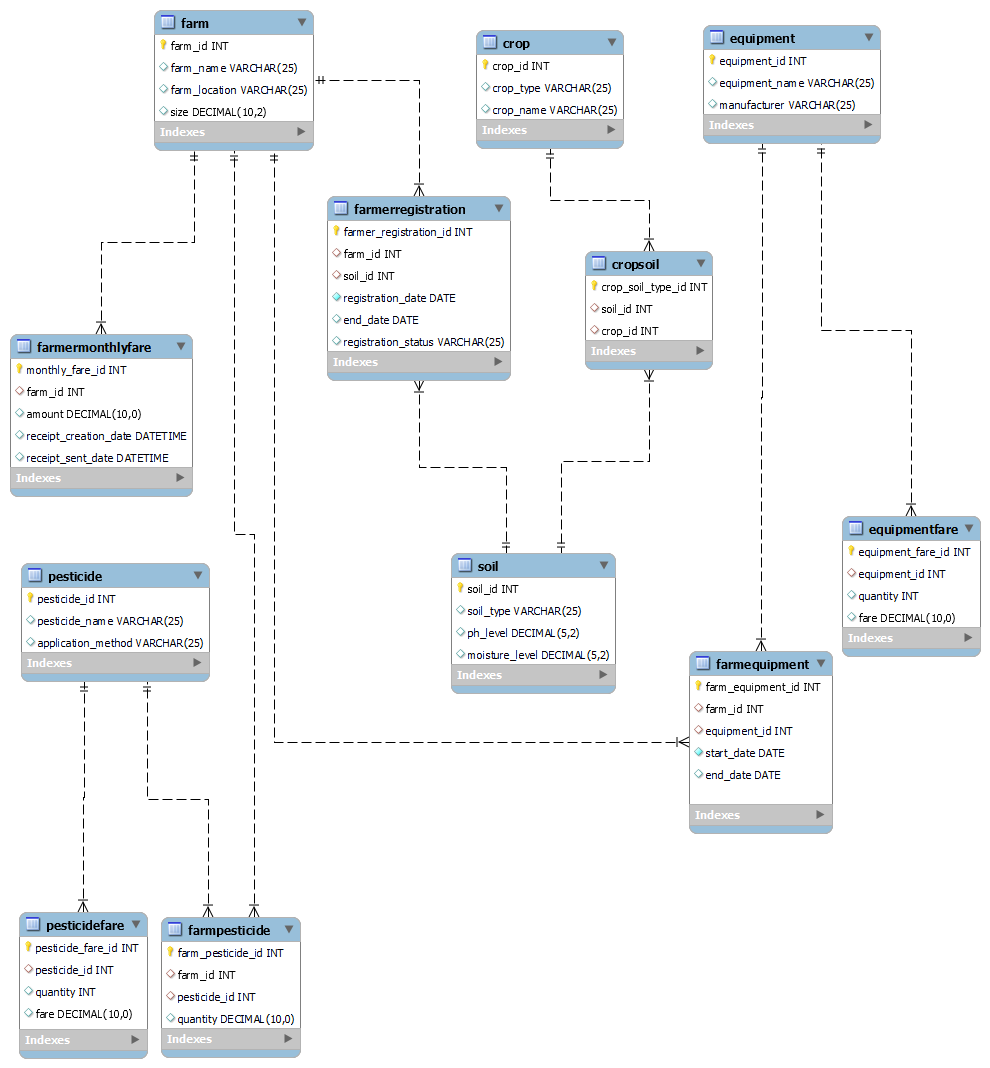
receipt\_creation\_date DATETIME,

receipt\_sent\_date DATETIME,

FOREIGN KEY (farm\_id) REFERENCES Farm(farm\_id)

);

**Entity Relationship Diagram**

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