# Farm Management System Database Schema

## 1. Farmer Table

*Stores farmer information.*

```
CREATE TABLE statement:
CREATE TABLE Farmer (
    farmer_id NUMBER PRIMARY KEY,
    first_name VARCHAR2(50) NOT NULL,
    last_name VARCHAR2(50) NOT NULL,
    farm_name VARCHAR2(100),
    address VARCHAR2(200),
    city VARCHAR2(50),
    phone VARCHAR2(20) NOT NULL,
    email VARCHAR2(100) UNIQUE,
    registration_date DATE DEFAULT SYSDATE NOT NULL,
       status VARCHAR2(20) DEFAULT 'ACTIVE' CHECK (status IN ('ACTIVE', 'INACTIVE',
'SUSPENDED'))
);

Sample INSERT statement:
INSERT INTO Farmer (
        farmer_id, first_name, last_name, farm_name, address, city, phone, email,
registration_date, status
) VALUES (
    1, 'Abebe', 'Kebede', 'GreenLand Farm', '123 Main Road', 'Bahir Dar', '0912345678',
'abebe.kebede@example.com', SYSDATE, 'ACTIVE'
);
```

## 2. Employee Table

*Stores employee data with roles and contact info.*

```
CREATE TABLE statement:
CREATE TABLE Employee (
    employee_id NUMBER PRIMARY KEY,
    first_name VARCHAR2(50) NOT NULL,
    last_name VARCHAR2(50) NOT NULL,
    role VARCHAR2(50) NOT NULL CHECK (role IN ('MANAGER', 'SUPERVISOR', 'FIELD_WORKER',
'ADMIN')),
    department VARCHAR2(50),
    hire_date DATE DEFAULT SYSDATE NOT NULL,
    termination_date DATE,
    salary NUMBER(10,2),
```

```
    address VARCHAR2(200),
    phone VARCHAR2(20) NOT NULL,
    email VARCHAR2(100) UNIQUE,
    emergency_contact VARCHAR2(100),
    emergency_phone VARCHAR2(20),
       status VARCHAR2(20) DEFAULT 'ACTIVE' CHECK (status IN ('ACTIVE', 'ON_LEAVE',
'TERMINATED'))
);

Sample INSERT statement:
INSERT INTO Employee (
    employee_id, first_name, last_name, role, department, salary, phone, email, status
) VALUES (
          7,  'Sisay',  'Alemu',  'SUPERVISOR',  'Livestock',  7000.00,  '0709876543',
'sisalemu@example.com', 'ACTIVE'
);
```

## 3. Field Table

*Information about farm fields.*

```
CREATE TABLE statement:
CREATE TABLE Field (
    field_id NUMBER PRIMARY KEY,
    field_name VARCHAR2(100) NOT NULL,
    location_description VARCHAR2(200),
     soil_type VARCHAR2(50) CHECK (soil_type IN ('CLAY', 'SAND', 'LOAM', 'SILT', 'PEAT',
'CHALK')),
    irrigation_type VARCHAR2(50),
       status VARCHAR2(20) DEFAULT 'ACTIVE' CHECK (status IN ('ACTIVE', 'FALLOW',
'RETIRED'))
);

Sample INSERT statement:
INSERT INTO Field (
    field_id, field_name, location_description, soil_type, irrigation_type
) VALUES (
    1, 'North Farm', 'Near the Blue Nile', 'LOAM', 'Drip Irrigation'
);
```

## 4. Crop Table

# Farm Management System Database Schema

*Store crop info with details.*

```
CREATE TABLE statement:
CREATE TABLE Crop (
    crop_id NUMBER PRIMARY KEY,
    crop_name VARCHAR2(100) NOT NULL,
    variety VARCHAR2(100),
    scientific_name VARCHAR2(100),
    family VARCHAR2(50),
    growth_duration_days NUMBER(5),
       season VARCHAR2(20) CHECK (season IN ('WINTER', 'SPRING', 'SUMMER', 'FALL',
'YEAR_ROUND')),
    water_requirements_mm NUMBER(6,2),
    harvest_window_days NUMBER(5)
);

Sample INSERT statement:
INSERT INTO Crop (
     crop_id, crop_name, variety, scientific_name, family, growth_duration_days, season,
water_requirements_mm, harvest_window_days
) VALUES (
    1, 'Tomato', 'Roma', 'Solanum lycopersicum', 'Solanaceae', 90, 'SUMMER', 600.50, 10
);
```

## 5. Plantings Table

*Records planting activities linking crops, fields, farmers, employees.*

```
CREATE TABLE statement:
CREATE TABLE Plantings (
    planting_id NUMBER PRIMARY KEY,
    crop_id NUMBER NOT NULL REFERENCES Crop(crop_id),
    field_id NUMBER NOT NULL REFERENCES Field(field_id),
    farmer_id NUMBER NOT NULL REFERENCES Farmer(farmer_id),
    planting_date DATE NOT NULL,
    planting_method VARCHAR2(50),
    seed_source VARCHAR2(100),
    seed_quantity NUMBER(10,2),
    seed_unit VARCHAR2(20),
    expected_germination_date DATE,
    expected_harvest_date DATE NOT NULL,
    actual_harvest_date DATE,
       status VARCHAR2(20) DEFAULT 'PLANNED' CHECK (status IN ('PLANNED', 'PLANTED',
```

```
'GROWING', 'HARVESTED', 'FAILED'))
);
```

```
Sample INSERT statement:
INSERT INTO Plantings (
        planting_id, crop_id, field_id, farmer_id, planting_date, planting_method,
seed_source, seed_quantity, seed_unit,
    expected_germination_date, expected_harvest_date, actual_harvest_date, status
) VALUES (
    1, 1, 1, 2, TO_DATE('2025-06-01', 'YYYY-MM-DD'), 'Direct Seeding', 'Local Supplier',
50.00, 'kg',
       TO_DATE('2025-06-15', 'YYYY-MM-DD'), TO_DATE('2025-09-30', 'YYYY-MM-DD'), NULL,
'PLANNED'
);
```

## 6. Harvestings Table

*Store harvest data related to plantings.*

```
CREATE TABLE statement:
CREATE TABLE Harvestings (
    harvest_id NUMBER PRIMARY KEY,
    planting_id NUMBER NOT NULL REFERENCES Plantings(planting_id),
    harvest_date DATE NOT NULL,
    yield_kg NUMBER(10, 2) CHECK (yield_kg >= 0),
    quality_grade VARCHAR2(20) CHECK (quality_grade IN ('PREMIUM', 'STANDARD', 'SECOND',
'FEED')),
    storage_location VARCHAR2(100)
);
```

```
Sample INSERT statement:
INSERT INTO Harvestings (
    harvest_id, planting_id, harvest_date, yield_kg, quality_grade, storage_location
) VALUES (
    2, 1, TO_DATE('2025-10-01', 'YYYY-MM-DD'), 1200.50, 'PREMIUM', 'Main Storage Unit A'
);
```

## 7. Chemical_Applications Table

*Records chemical (pesticide, fertilizer, etc.) applications on fields.*

```
CREATE TABLE statement:
CREATE TABLE Chemical_Applications (
```

```
    application_id NUMBER PRIMARY KEY,
    field_id NUMBER NOT NULL REFERENCES Field(field_id),
    planting_id NUMBER REFERENCES Plantings(planting_id),
      application_type VARCHAR2(20) NOT NULL CHECK (application_type IN ('PESTICIDE',
'HERBICIDE', 'FUNGICIDE', 'FERTILIZER')),
    product_name VARCHAR2(100),
    active_ingredient VARCHAR2(100),
    manufacturer VARCHAR2(100),
    application_date DATE DEFAULT SYSDATE,
    application_method VARCHAR2(50),
    quantity NUMBER(8,2) CHECK (quantity > 0),
    unit VARCHAR2(20) CHECK (unit IN ('LITERS', 'KILOGRAMS', 'POUNDS', 'GALLONS')),
    equipment_used VARCHAR2(100)
);
```

Sample INSERT statement:

```
INSERT INTO Chemical_Applications (
           application_id,  field_id,  planting_id,  application_type,  product_name,
active_ingredient,
    manufacturer, application_method, quantity, unit, equipment_used
) VALUES (
    1, 1, 1, 'PESTICIDE', 'Super Pest Kill', 'Imidacloprid', 'AgroChem Co.', 'Spraying',
15.5, 'LITERS', 'Backpack Sprayer'
);
```

## 8. Equipments Table

*Stores equipment info used on the farm.*

CREATE TABLE statement:

```
CREATE TABLE Equipments (
    equipment_id NUMBER PRIMARY KEY,
    name VARCHAR2(100),
    type VARCHAR2(50) CHECK (type IN ('TRACTOR', 'IRRIGATION', 'TRUCK', 'OTHER')),
    model VARCHAR2(100),
    purchase_date DATE DEFAULT SYSDATE,
    purchase_cost NUMBER(12,2),
    expected_life_years NUMBER(3),
    current_hours NUMBER(10),
        status VARCHAR2(20) DEFAULT 'OPERATIONAL' CHECK (status IN ('OPERATIONAL',
'MAINTENANCE', 'RETIRED')),
    location VARCHAR2(100)
);
```

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Sample INSERT statement:

```
INSERT INTO Equipments (
    equipment_id, name, type, model, purchase_cost, expected_life_years, current_hours, status, location
) VALUES (
    1, 'John Deere Tractor', 'TRACTOR', 'JD X1000', 55000.00, 10, 500, 'OPERATIONAL', 'Farm A'
);
```