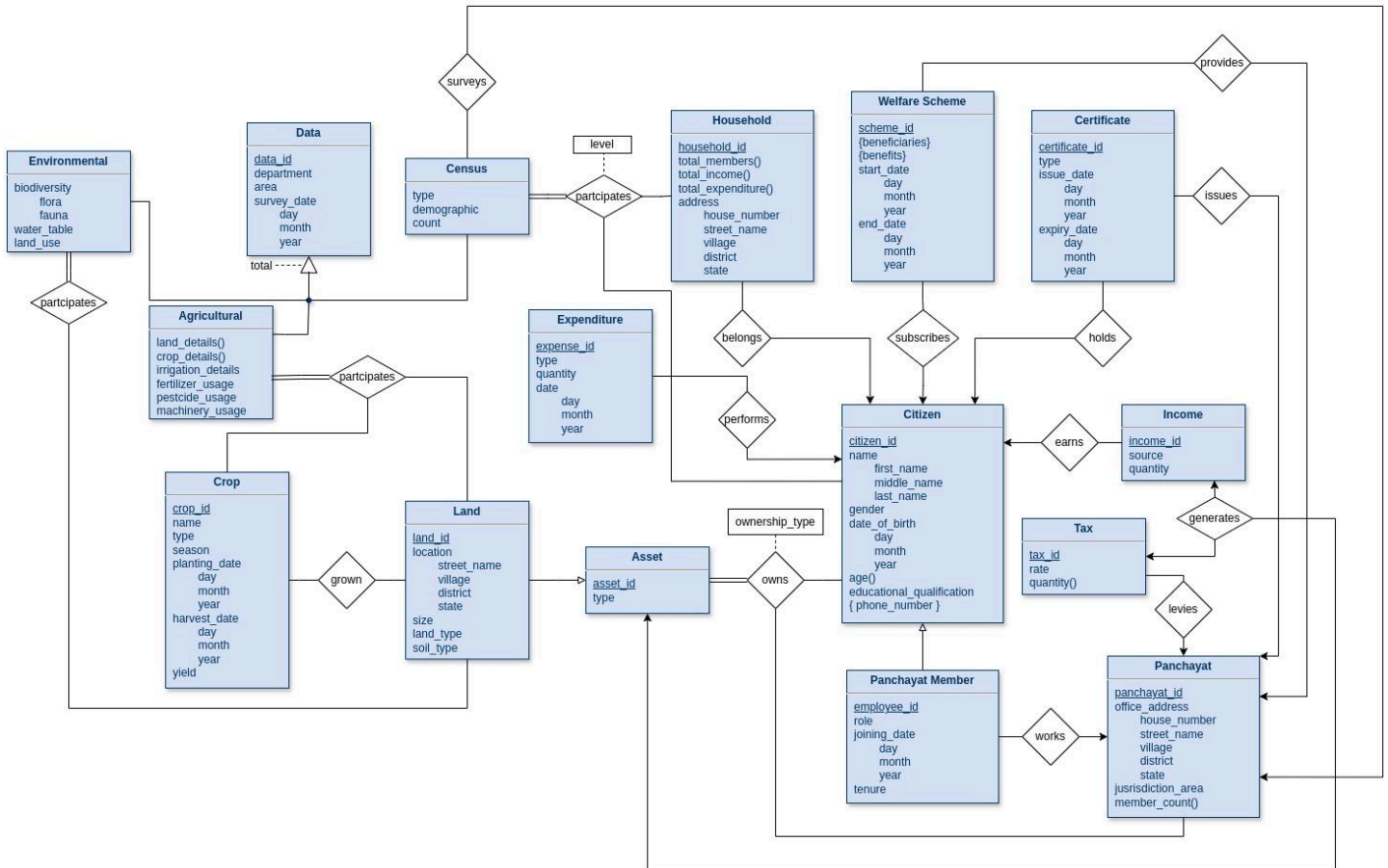


DBMS Lab Assignment-2

SQL

Original ER Diagram (Assignment-1)



Design Choices

- The design is *Citizen-centric*, with the citizen being linked to several other entities: *Asset*, *Income*, *Expenditure*, *Household*, *Certificate*, *Welfare Scheme*
- Being a database for Gram Panchayat Management System, *Panchayat* is designed to provide facilities, own assets, levy taxes, and collect data; by linking the entity to entities *Tax*, *Certificate*, *Welfare Scheme*, *Asset*, *Census*. Panchayat is run by *Panchayat Members*; this entity is a specialization of *Citizen*
- Environmental*, *Agricultural*. Census data are generalized to a *Data* entity. The generalization is total and disjoint. Census can be of two levels – citizen-level or household-level, which is indicated by the descriptive attribute *level*

- The *Household* entity aggregates citizens and their financial details and participates in *Census* data..
- Each *Asset* is owned by either a *Citizen* or the *Panchayat*, which is indicated by the descriptive attribute *ownership_type*.
- *Land* is a specialization of *Asset*, which is linked to *Crop* and participates in *Agricultural & Environmental* data.
- *Citizens' Income* and *Assets* generate *Tax* which is levied by the *Panchayat*.
- *Citizens* can hold multiple *Certificates* and subscribe to *Welfare Schemes*, both provided by the *Panchayat*.

Normalization:

Proper entity separation for scalability (citizens, households, land, etc.).

Avoids redundancy and maintains data integrity.

Modular Structure:

Divided based on major domains (citizen-centric, agricultural, administrative, financial).

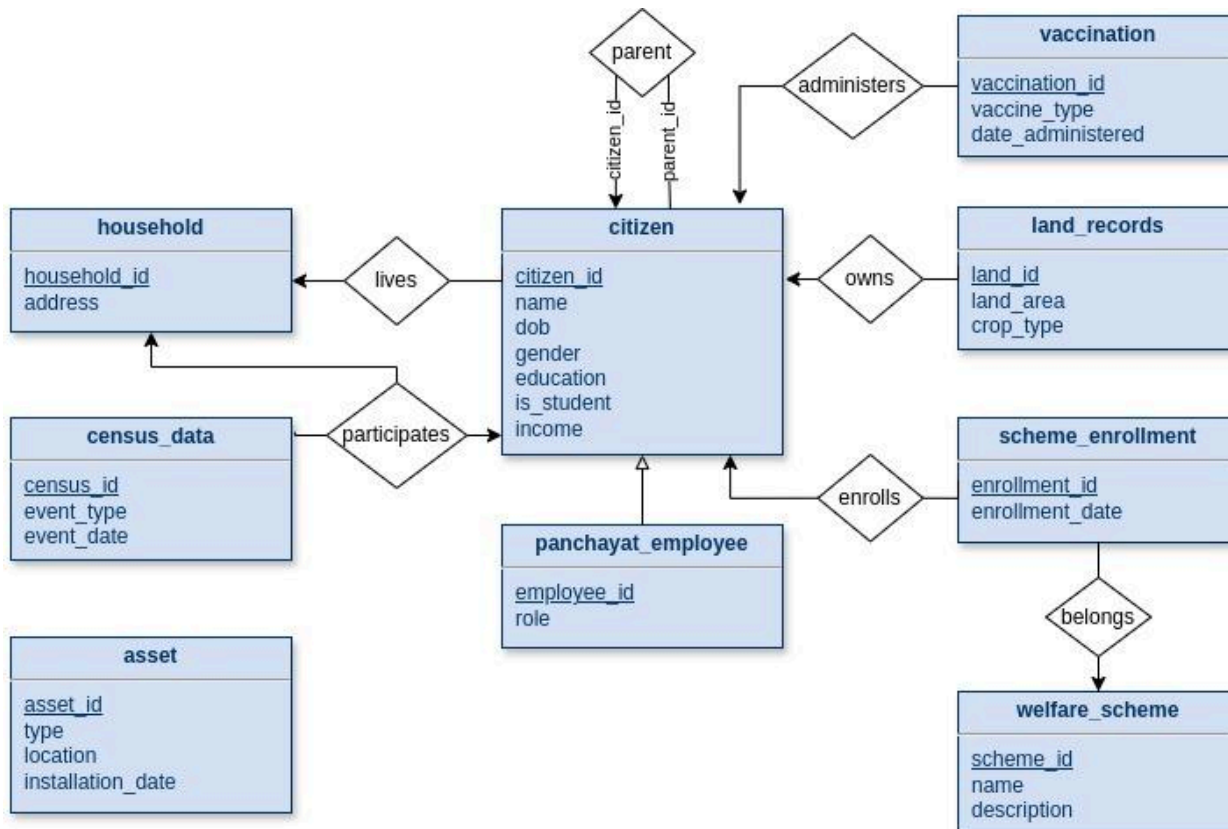
Easily extendable for additional attributes or entities.

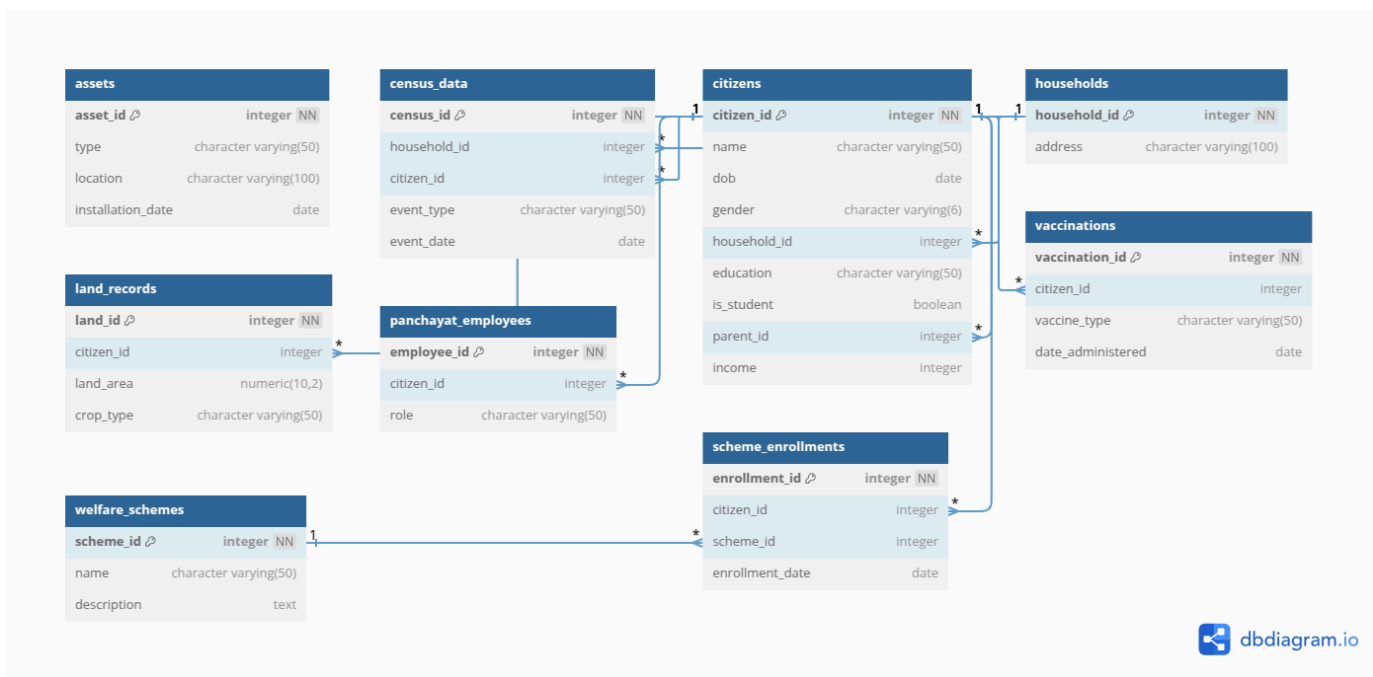
Temporal Data Tracking:

Dates are managed using separate fields (day, month, year) for tracking surveys, planting, tax, etc.

Schemas Used for this assignment

ER Diagram





SQL Queries to Create Tables

```

CREATE TABLE households (
    household_id SERIAL PRIMARY KEY,
    address VARCHAR(100)
);

CREATE TABLE citizens (
    citizen_id SERIAL PRIMARY KEY,
    name VARCHAR(50),
    dob DATE,
    gender VARCHAR(6),
    household_id INT REFERENCES households(household_id),
    education VARCHAR(50),
    is_student BOOLEAN,
    parent_id INT REFERENCES citizens(citizen_id),
    income INT
);

CREATE TABLE land_records (
    land_id SERIAL PRIMARY KEY,
    citizen_id INT REFERENCES citizens(citizen_id),
    land_area NUMERIC(10, 2),
    crop_type VARCHAR(50)
);

CREATE TABLE panchayat_employees (
    employee_id SERIAL PRIMARY KEY,
    citizen_id INT REFERENCES citizens(citizen_id),

```

```
    role VARCHAR(50)
);
CREATE TABLE assets (
    asset_id SERIAL PRIMARY KEY,
    type VARCHAR(50),
    location VARCHAR(100),
    installation_date DATE
);
CREATE TABLE welfare_schemes (
    scheme_id SERIAL PRIMARY KEY,
    name VARCHAR(50),
    description TEXT
);
CREATE TABLE scheme_enrollments (
    enrollment_id SERIAL PRIMARY KEY,
    citizen_id INT REFERENCES citizens(citizen_id),
    scheme_id INT REFERENCES welfare_schemes(scheme_id),
    enrollment_date DATE
);
CREATE TABLE vaccinations (
    vaccination_id SERIAL PRIMARY KEY,
    citizen_id INT REFERENCES citizens(citizen_id),
    vaccine_type VARCHAR(50),
    date_administered DATE
);
CREATE TABLE census_data (
    census_id SERIAL PRIMARY KEY,
    household_id INT REFERENCES households(household_id),
    citizen_id INT REFERENCES citizens(citizen_id),
    event_type VARCHAR(50),
    event_date DATE
);
```

SQL Queries

A. Show names of all citizens who hold more than 1 acre of land

```
SELECT c.name
FROM citizens AS c
JOIN land_records AS l ON c.citizen_id = l.citizen_id
WHERE l.land_area > 1.00;
```

B. Show name of all girls who study in school with household income less than 1 Lakh per year

```
SELECT c1.name
FROM citizens AS c1
JOIN households AS h ON c1.household_id = h.household_id
WHERE c1.gender = 'Female'
AND c1.is_student = TRUE
AND
( SELECT SUM(c2.income)
FROM citizens AS c2
WHERE c2.household_id = h.household_id
)
< 100000;
```

C. How many acres of land cultivate rice

```
SELECT SUM(land_area)
FROM land_records
WHERE crop_type ILIKE 'rice';
```

D. Number of citizens who are born after 1.1.2000 and have educational qualification of 10th class

```
SELECT COUNT(*)
FROM citizens
WHERE dob > '2000-01-01'
AND education ILIKE '10th';
```

E. Name of all employees of panchayat who also hold more than 1 acre land

```
SELECT c.name
FROM citizens AS c
JOIN panchayat_employees AS p ON c.citizen_id = p.citizen_id
JOIN land_records AS l ON p.citizen_id = l.citizen_id
WHERE l.land_area > 1.00;
```

F. Name of the household members of Panchayat Pradhan

```
SELECT c1.name
FROM citizens AS c1
JOIN households AS h ON h.household_id = c1.household_id
JOIN citizens AS c2 ON c2.household_id = h.household_id
JOIN panchayat_employees AS p ON p.citizen_id = c2.citizen_id
WHERE p.role ILIKE 'Pradhan';
```

G. Total number of street light assets installed in a particular locality named Phulera that are installed in 2024

```
SELECT COUNT(*)
FROM assets
WHERE type ILIKE 'Street Light'
AND location ILIKE 'Phulera'
AND EXTRACT(YEAR FROM installation_date) = 2024;
```

H. Number of vaccinations done in 2024 for the children of citizens whose educational qualification is class 10

```
SELECT COUNT(*)
FROM vaccinations AS v
JOIN citizens AS c1 ON v.citizen_id = c1.citizen_id
JOIN citizens AS c2 ON c1.parent_id = c2.citizen_id
WHERE EXTRACT(YEAR FROM v.date_administered) = 2024
AND c2.education ILIKE '10th';
```

I. Total number of births of boy child in the year 2024

```
SELECT COUNT(*) FROM citizens
WHERE gender = 'Male'
AND EXTRACT(YEAR FROM dob) = 2024;
```

J. Number of citizens who belong to the household of at least one panchayat employee.

```
SELECT COUNT(DISTINCT c1)
FROM citizens AS c1
JOIN households AS h ON h.household_id = c1.household_id
JOIN citizens AS c2 ON c2.household_id = h.household_id
JOIN panchayat_employees AS p ON p.citizen_id = c2.citizen_id;
```