# Product Requirement Document (PRD): Digital Census Pro

**Project Name:** Digital Census Application

**Version:** 1.0

**Status:** Final / For Development

**Target Stack:** React (Frontend), Django REST Framework (Backend)

## 1. Executive Summary

The Digital Census Pro is a mission-critical web application designed to transition national census operations from paper-based methodologies to a secure, digital-first environment. Specifically designed for Government Teachers (Surveyors), the platform focuses on offline-first data entry, real-time validation, and centralized administrative control.

## 2. Problem Statement

* **Data Latency:** Paper records take months to digitize, delaying policy decisions.
* **High Error Rate:** Manual transcription results in illegible data and logical inconsistencies.
* **Operational Cost:** Printing, transporting, and storing thousands of physical forms is resource-intensive.
* **Accountability Gap:** No reliable way to verify field visits or track real-time progress.

## 3. User Personas & Permissions

### 3.1 Surveyor (Government Teacher)

* **Goal:** Efficiently capture household data in various field conditions.
* **Permissions:** View assigned wards, fill/edit questionnaires, save drafts, sync data.

### 3.2 Administrator (Government Official)

* **Goal:** Manage the survey lifecycle and ensure data quality.
* **Permissions:** Create/Edit/Version questionnaires, manage user accounts, view progress analytics, export data to CSV/Excel.

## 4. Functional Requirements

### 4.1 Field Survey Module (React PWA)

* **Authentication:** Secure login with Employee ID and multi-factor authentication (optional).
* **Dynamic Form Engine:** \* Supports multiple field types (Numeric, String, Radio, Date).
  + Skip-logic (Conditional branching) to show relevant questions only.
* **Offline Capability:** \* Utilizes IndexedDB for local persistence.
  + Automatic background sync when internet connectivity (4G/Wi-Fi) is detected.
* **Draft Management:** Ability to save a partial household survey and resume later.
* **Geolocation Capture:** Automatic GPS timestamping upon form submission for verification.

### 4.2 Administrative Control Module (Django REST)

* **Questionnaire Builder:** CRUD interface to define survey structure without code changes.
* **Surveyor Management:** Interface to map specific teachers to geographic blocks/wards.
* **Live Dashboard:** \* Completion percentages by region.
  + Real-time counters for households surveyed vs. targets.
* **Data Audit Trail:** Logs of all data modifications to ensure legal transparency.
* **Export Engine:** Bulk download of validated data in .xlsx or .csv.

## 5. Technical Specifications

| **Component** | **Technology** | **Rationale** |
| --- | --- | --- |
| **Frontend** | React + PWA | High performance, mobile-first, and robust offline state management. |
| **Backend** | Django REST Framework | Built-in security, rapid API development, and mature admin features. |
| **Database** | PostgreSQL | Relational integrity for complex census data and PostGIS support. |
| **State Mgmt** | Zustand / Redux | Managing complex form states and local synchronization. |
| **Auth** | JWT (JSON Web Tokens) | Secure, stateless authentication for distributed users. |

## 6. Test Cases (UAT)

| **ID** | **Module** | **Scenario** | **Expected Outcome** |
| --- | --- | --- | --- |
| **TC-01** | Auth | Login with incorrect role. | Access to Admin dashboard is denied. |
| **TC-02** | Form | Entering "Child" and age "65". | Validation error: "Age inconsistent with category." |
| **TC-03** | Offline | Connectivity loss during entry. | Data persists in local storage; "Saved Locally" UI indicator. |
| **TC-04** | Sync | Reconnecting after 5 offline surveys. | All 5 records are successfully POSTed to Django API. |
| **TC-05** | Admin | Modifying an active survey field. | Prompt to create "Version 2.0" to preserve historical data. |

## 7. Quality & Compliance

* **Security:** Data must be encrypted using AES-256 at rest and TLS 1.3 in transit.
* **Privacy:** Personally Identifiable Information (PII) must be masked in general reporting views.
* **Accessibility:** UI must be usable in high-brightness outdoor conditions (WCAG 2.1 compliance).

## 8. Success Metrics (KPIs)

* **Digitization Speed:** 0 days (immediate) vs. current 6-month paper cycle.
* **Data Accuracy:** <0.5% rejection rate on logic checks.
* **Surveyor Satisfaction:** Average time per household < 15 minutes.