SUSTAINABLE AGRICULTURE PRODUCTIVITY PROJECT

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MINISTRY OF AGRICULTURE, ANIMAL HUSBANDRY AND FISHERIES

SIXTH AGRICULTURAL CENSUS 2025

METHODOLOGY AND IMPLEMENTATION REPORT



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SIXTH AGRICULTURE CENSUS 2025

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Ministry of Agriculture, Animal Husbandry and Fisheries (MAAHF)

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Sixth Agricultural Census of Suriname

Methodology and Implementation Report

Ministry of Agriculture, Animal Husbandry and Fisheries

August 2026

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Executive Summary

The **Sixth Agricultural Census 2025** represents a major milestone in strengthening the country's agricultural statistical system. Conducted by the Ministry of Agriculture, Animal Husbandry and Fisheries (MAAHF), with technical support from the Food and Agriculture Organization of the United Nations (FAO), the census provides comprehensive structural information on agricultural holdings across the country and establishes a solid foundation for evidence-based agricultural policy, planning, and monitoring.

The census was conducted under the legal framework approved by Parliament on **30 December 2024** and published on **31 December 2024**, following extensive preparatory work that began in **March 2023**. Although initially planned for 2024, data collection was carried out between **January and March 2025**, with **13 January 2025** serving as the census reference day for variables such as land area and livestock numbers. The census followed the *FAO World Programme for the Census of Agriculture 2020 (FAO WCA 2020)* recommendations and was implemented as a **complete enumeration** of all agricultural holdings meeting the national threshold.

This report documents the **methodology and implementation** of the census. It does not present analytical results, which will be published separately in a Preliminary Report with the **Key Findings**, followed by thematic reports and a Final Report of the Sixth Agricultural Census 2025. The census collected structural data on land use, crops, livestock, aquaculture, agricultural practices, labor, assets, and land tenure. A specific module was included to support the direct compilation of **SDG indicator 5.a.1** on women's ownership and control of agricultural land.

A key innovation of the census was the full adoption of **Computer-Assisted Personal Interviewing (CAPI)** using **Survey Solutions**, hosted on the Ministry's own server infrastructure. This marked the first time MAAHF implemented a fully digital data collection system for an agricultural census. FAO provided extensive technical assistance and training to Ministry staff, covering questionnaire programming, fieldwork management, supervision, and IT administration. The digital approach improved data quality through built-in validation rules, real-time supervision, and secure data transmission.

The census was preceded by multiple rounds of in-house and field pre-testing, followed by a **full pilot census in Saramacca District in December 2023**. These activities informed refinements to the questionnaire, field procedures, and CAPI system. Enumeration was supported by an updated national list frame, which will also serve as the basis for a new **annual agricultural survey programme** currently being established with FAO support.

To assess census quality, a **Post-Enumeration Survey (PES)** was conducted independently after fieldwork. The PES evaluated coverage and content accuracy using a stratified sample of enumeration areas and standard reconciliation procedures. Results confirmed generally good coverage and provided valuable insights for future improvements in listing, training, and field operations.

Overall, the Sixth Agricultural Census 2025 demonstrates significant progress in methodological rigor, use of digital technologies, and national capacity development. The census provides a robust statistical foundation for agricultural development planning, food security monitoring, and sustainable rural development in Suriname over the coming decade.

1. Introduction

Agriculture remains a key component of Suriname's economy and rural livelihoods, despite structural changes over the past several decades. The sector provides employment for a significant share of the population, supports food and nutrition security, contributes to exports, and underpins economic activity in several coastal districts. Yet, the development and monitoring of agricultural policies in Suriname have long been constrained by gaps in the availability, quality, and timeliness of agricultural statistics.

Recognizing these challenges, the MAAHF, with technical assistance from the Food and Agriculture Organization of the United Nations (FAO), undertook the planning and implementation of the **Sixth Agricultural Census**. Technical preparations, including methodological design, sampling strategy, questionnaire development, and operational planning, began in **March 2023**. The census was implemented with financial support from the **Inter-American Development Bank (IDB)** through the Sustainable Agricultural Productivity Program (SU-L1052).

The Sixth Agricultural Census is the first national agricultural census conducted in Suriname since 2008. In the absence of more recent structural data, agricultural planning and the design of sectoral interventions have increasingly relied on projections derived from ageing information and partial surveys. These limitations have become more visible in the context of recent economic shocks, climate variability, and shifts in domestic and export-oriented agriculture. The renewed census therefore provides an essential empirical basis for evidence-based policymaking, investment planning, and monitoring of national and regional commitments—including the CARICOM agri-food systems agenda.

The agricultural census is the primary source of structural data on agriculture and forms a core component of the national statistical system. In Suriname, the census also plays a pivotal role in strengthening the **Agricultural Information System (AIS)**, serving as the main benchmark for designing and calibrating annual crop, livestock, and production surveys. Importantly, the census enables alignment with the international methodological framework of the **FAO WCA 2020**, facilitating cross-country comparability and adherence to global statistical standards (FAO 2015).

Although the census was originally planned for August 2024, implementation was postponed because the legal framework authorizing the Sixth Census of Agriculture had not yet been approved. The enabling legislation was passed by the National Assembly on **30 December 2024** and published on **31 December 2024**, allowing field operations to begin at the start of 2025. Data collection was subsequently carried out from **January to March 2025**.

The census provides a comprehensive snapshot of the structure of agriculture in Suriname, including land use, production systems, irrigation, livestock, demographic characteristics of agricultural holders, agricultural practices, and other variables that change slowly over time. In combination with administrative data and annual agricultural surveys, the census

establishes a baseline for monitoring long-term trends, identifying structural gaps, and estimating production statistics more accurately.

This Methodology and Implementation Report describe the conceptual framework, statistical design, and operational processes used for the Sixth Census of Agriculture. It documents the definitions and classifications applied, the questionnaire development process, the sampling and enumeration strategies, data collection procedures, quality assurance mechanisms, and the methods used for estimation and weighting. The report aims to ensure transparency, promote good statistical practice, and support the correct interpretation and use of the forthcoming census outputs, including the Preliminary report with the Key Findings, thematic analyses, and the Final report of the Sixth Agricultural Census 2025.

1.1 Relevance of the Census

The census is the primary source of structural data on a country's agricultural sector and forms the backbone of its agricultural statistics system. According to the recommendations of the FAO, countries should conduct an agricultural census at least **once every ten years** to ensure that structural information remains current, reliable, and relevant for policymaking (FAO 2015).

In Suriname, the relevance of the census is particularly high due to the absence of a regular program of agricultural surveys. The MAAHF currently rely mainly on **administrative data collected by Ressort officers**, which — while valuable for routine monitoring — do not provide the statistical completeness, coverage, or methodological consistency required to capture the structural characteristics of the sector. Many key variables, such as land use, the number and distribution of agricultural holdings, demographic characteristics of agricultural holders, livestock inventories, and irrigation systems, cannot be accurately measured using administrative sources alone.

The census therefore addresses a major information gap. Conducted seventeen years after the previous census in 2008 (Ministerie van Landbouw, Veeteelt en Visserij, 2014), it provides an updated and nationally comparable dataset at a time when agriculture in Suriname has undergone significant environmental, demographic, and economic changes. These include the impacts of climate variability, the emergence of new farming practices, shifts in labour availability, and changes in both domestic and export markets. Without updated structural data, it becomes difficult for policymakers to identify needs, allocate resources, or design effective interventions.

From a statistical perspective, the census performs several essential functions:

- **Benchmarking:** It provides the national reference point for measuring long-term changes in agricultural structure and for calibrating future surveys and administrative estimates.

- **Sampling Frame:** It establishes the sampling frame for any future agricultural surveys—an essential requirement for the development of a robust Agricultural Information System (AIS). Without a census, representative sampling becomes technically and financially more complicated.

- **Geographic Disaggregation:** The census provides structural data at the lowest possible geographic levels — including districts, ressorts, and, in some cases, communities and villages — supporting local-level planning and targeted interventions.

- **Standardization:** The adoption of international standards from the FAO WCA 2020 (FAO 2018) ensures methodological consistency and allows comparisons over time and across countries.

- **Monitoring and Development Planning:** The structural information collected supports planning in areas such as land management, irrigation, agricultural extension, food security, and resilience to climate change.

Regarding the Sustainable Development Goals (SDGs), the census directly supports the compilation of **one indicator: SDG 5.a.1**, which measures women's ownership and secure rights over agricultural land. A specific module was included in the questionnaire to collect the information required for this indicator. While certain census variables may contribute indirectly to broader SDG monitoring, such as those related to agricultural employment or land use, the census was **not designed to directly measure additional SDG indicators**.

Given these considerations, the census represents a foundational statistical operation for Suriname. It provides the essential baseline needed to modernize the agricultural statistics system, strengthen evidence-based planning, and support future survey development and policymaking.

1.2 Uses of Census Data

1.2.1 Uses for Agricultural Statistics and Survey Development

The census plays an essential methodological role in strengthening Suriname's agricultural statistics system:

Sampling frame for future surveys

The census establishes the **only complete and statistically valid sampling frame** for agricultural holdings in Suriname. This frame is indispensable for the development of agricultural surveys and the broader Agricultural Information System (AIS).

FAO is currently supporting the MAAHF in establishing an **annual agricultural survey focused on crop and livestock production**. This survey has already been **designed, tested, and piloted**, using the list frame created through the Sixth Agricultural Census. Once fully

operationalized, this survey will provide timely annual production statistics and complement the structural information obtained from the census.

1.2.2 Benchmark for Administrative Data

While Ressort officers collect important administrative information, these data are not standardized and do not fully represent the agricultural structure. Census results provide the essential benchmark for:

- validating administrative registers;
- calibrating annual estimates;
- improving data consistency across MAAHF systems.

1.2.3 Time Series and Trend Analysis

The census re-establishes a national benchmark after a seventeen-year gap since the 2008 census, enabling the analysis of structural changes in agricultural production, land use, demographics, and farming systems.

1.2.4 Support for SDG Monitoring

The census directly supports the compilation of **SDG Indicator 5.a.1**, through a dedicated module on land ownership and rights. It also provides complementary information that may indirectly support analysis for selected SDG indicators, although it was **not designed to measure most SDG indicators directly**.

1.3 Historical Background

Suriname has a long and consistent history of conducting agricultural censuses, reflecting the Government's sustained commitment to monitoring structural changes in the agricultural sector and supporting evidence-based policy development. Over the past seventy years, **five agricultural censuses** have been implemented, making Suriname one of the most regular and reliable producers of agricultural census data in the Caribbean region.

The first Agricultural Census of Suriname was conducted in **1953**, followed by subsequent rounds in **1959**, **1969**, and **1981**. After a pause of nearly three decades, the fifth Agricultural Census was implemented in **2008**, providing a comprehensive update on agricultural holdings, land use, livestock, and production systems.

This consistent effort highlights the Government's recognition of the critical role that high-quality agricultural data play in understanding long-term sectoral trends, identifying emerging challenges and opportunities, and informing policies aimed at sustainable agricultural development, food security, and the resilience of rural livelihoods. The current

operation — the **Sixth Agricultural Census 2025** — continues this tradition while incorporating modern statistical standards, digital data collection technologies, and updated methodological approaches consistent with the FAO WCA 2020.

2. Conceptual Framework and Definitions

2.1 Statistical Unit

The **statistical unit** of the census is the **agricultural holding**, consistent with the definitions and recommendations of the FAO WCA 2020. The agricultural holding is the fundamental unit of enumeration, data collection, analysis, and tabulation, and forms the basis for all structural indicators produced by the census.

An **agricultural holding** is defined as:

An economic unit of agricultural production under single management, comprising all land and livestock used wholly or partly for agricultural production, regardless of ownership, legal status, or the number of parcels and locations involved.

This definition emphasizes several key components:

Single Management

A holding is managed by one person, household, or legal entity (such as a cooperative or enterprise), who makes the major decisions regarding resource use and agricultural operations. "Single management" refers to unified decision-making, even if agricultural activities are dispersed across multiple locations or parcels.

Agricultural Production

The holding must engage in at least one agricultural activity during the census reference period. Agricultural production includes crop cultivation, livestock raising, aquaculture, horticulture, and apiculture. Holdings may consist solely of crop or livestock activities, or a combination of both.

Inclusion of All Parcels and Locations

A holding may operate more than one parcel of land, and these parcels may be located in different geographic areas. All parcels and livestock belonging to the same management are treated as part of a single holding.

Type of Management Unit

An agricultural holding may be managed by:

- an **individual household** (most common in Suriname),
- a **non-household entity** such as a corporation, institution, cooperative, or government unit, or
- a **group of individuals** managing the holding collectively.

Presence of Land or Livestock

A holding may consist of agricultural land, livestock, or both. Holdings without land but with livestock (e.g., poultry farms, pig operations, or cattle holdings without owned land) are fully included.

2.1.0.1 Operational definition used for screening

For enumeration purposes, an economic unit was treated as an **agricultural holding** if it met the above conceptual definition *and* satisfied at least one of the national minimum activity thresholds listed below during the census reference period. These thresholds were applied uniformly during the short (screening) interview to decide whether the long questionnaire should be administered.

2.1.0.2 National minimum thresholds for inclusion

A unit qualified as an agricultural holding if it met **any** of the following at the time of screening:

- **Land / crops**
    - ≥ **0.01 hectares of Annual crops** *(cereals for grains, oleaginous crops, root crops, vegetables, etc.)*; or
    - ≥ **0.01 hectares of Fallow land**; or
    - ≥ **0.01 hectares of Semi-permanent crops** *(banana, plantains, passion fruits, dragon fruit, sugarcane, pineapple, papaya)*; or
    - ≥ **0.05 hectares of Permanent crops** *(citrus fruit trees, mango trees, coconut trees, etc.)*; or
    - ≥ **0.5 hectares of Pastures and meadows (grassland)**; or
    - ≥ **20 m^2 of ornamental plants and flowers** (*for sale*); or
    - ≥ **20 m^2 of leek, celery, leaf onions**; or
- **Livestock / poultry / bee-keeping**
    - ≥ **1 head of cattle**; or
    - ≥ **2 goats**; or
    - ≥ **2 sheep**; or
    - ≥ **2 pigs**; or
    - ≥ **1 sow** (breeding pig); or
    - ≥ **10 chickens**; or

- ≥ **10 ducks, geese or turkeys**; or
- ≥ **5 beehives**.

- **Aquaculture**
  - ≥ **1 Fish pond (for aquaculture activity)**[1]

A unit meeting **any single** threshold above was included and administered the long questionnaire. Units below all thresholds were treated as non-holdings for the purposes of the census (though information from the short questionnaire was retained for coverage and frame-building).

Other inclusion / exclusion rules (operational guidance)

- **Holdings with temporary absence of production** (for example, livestock temporarily off-hold due to disease control, seasonal fallow, or temporary land lease) were included if the holding normally met the thresholds or if the manager confirmed continued agricultural management of the unit during the reference period.
- **Multiple parcels / dispersed holdings.** All parcels and livestock under the same single management were treated as one holding even if located in different administrative areas. During screening, enumerators asked whether the respondent's farm included additional parcels elsewhere; related parcels were linked during data processing.
- **Household vs non-household holdings.** The same thresholds applied to both household-managed and non-household-managed operations (e.g., companies, cooperatives, institutions). Non-household entities that carried out primary agricultural production above the thresholds were enumerated as separate holdings.
- **Units excluded from the agricultural census.** The following were not enumerated as holdings:
  - Units engaged only in forestry, logging, hunting for wild game, or industrial processing (e.g.dairies, fish processing) that did **not** carry out primary agricultural production;
  - Kennels, pet-breeding establishments not engaged in production for food/commerce;
  - Parks, public gardens and purely ornamental plantings;

[1] This is only for the screening sheet. The households that have only fish ponds will not enter with the extended questionnaire

- Cattle sale yards, markets or slaughterhouses that do not themselves carry out agricultural production.

Reference period for determining thresholds

- Crop- and land-related thresholds were assessed against the most recent crop cycle or the calendar year preceding enumeration (as appropriate).
- Livestock thresholds considered animals present **at any time during** the 12 months prior to interview to capture seasonal movements and holdings temporarily without stock.
- Aquaculture used the most recent production cycle within the last 12 months.

2.2 Coverage Rules

Coverage rules specify **what**, **who**, and **where** is included in the agricultural census. In the 2025 operation, coverage rules were designed to ensure consistency with the conceptual definition of the agricultural holding, the national operational thresholds (Section 2.1), and the mixed enumeration strategy (complete enumeration and sample enumeration) described in (Chapter 4).

Suriname's coverage rules comprise three main dimensions:

1. **Geographical coverage**
2. **Population coverage**
3. **Activity coverage**

2.2.1 Geographical Coverage

The census covered **all ten administrative districts** of Suriname, applying different enumeration modalities depending on agricultural intensity, settlement patterns, accessibility, and resource requirements.

Complete Enumeration Areas (Coastal Area)

The following districts were **fully enumerated**:

- Wanica
- Commewijne
- Saramacca
- Coronie

- Nickerie
- Para
- Marowijne (coastal/accessible area only)

These districts contain the vast majority of agricultural holdings, including nearly all medium - and large-scale agricultural operations. Complete coverage ensured full enumeration of all potential holdings.

Sample Enumeration Areas

To ensure cost-effectiveness and operational feasibility, sample enumeration was used in two domains:

- **District Paramaribo**, which is an urban area and where it is expected to have sparse agricultural activity. Enumeration Blocks (EBs) served as Primary Sampling Units.
- **Interior Districts**, including:
    - Brokopondo
    - Sipaliwini
    - The interior portion of Marowijne

For these areas, probability sampling was applied using villages as the primary sampling units. All households within selected PSUs were screened.

2.2.2 Population Coverage

Households

All private households within the selected census areas (complete enumeration districts + sampled EBs/villages) were included in the **screening stage**. Every household was asked whether it engaged in agricultural activities and whether it met the national minimum thresholds.

Non-Household Agricultural Units

Non-household institutions and entities engaged in agricultural production were also covered, including:

- companies and enterprises;
- farms managed by cooperatives or associations;
- agricultural schools or research farms;
- religious or community institutions involved in agricultural production.

Separate listing procedures were used to ensure their inclusion.

Exclusions

The census did **not** cover:

- institutions without agricultural production;
- purely industrial processors (mills, abattoirs, factories);
- forestry-only enterprises;
- households engaged solely in ornamental or decorative gardening.

2.2.3 Activity Coverage

Coverage was based on the presence of **agricultural production**, defined consistent with FAO WCA 2020 (FAO 2015). The census covered all agricultural activities meeting the thresholds in Section 2.1, including:

- Crop production (annual, semi-permanent and permanent crops)
- Fallow land
- Ornamentals (for sale)
- Livestock raising
- Poultry
- Bee-keeping
- Seedling and nursery production
- Aquaculture
- Other primary agricultural activities

Excluded activities included:

- forestry, logging, and wild plant/forest product gathering;
- hunting, trapping, or wildlife exploitation;
- ornamental plants and landscaping not intended for food, sale, or commercial production.

2.2.4 Temporal Coverage

The census captured agricultural activity during the **12 months preceding enumeration**. This window was chosen to reflect the complete agricultural cycle and to align with the FAO WCA 2020 guidance for mixed crop–livestock systems typical in Suriname.

2.2.5 Unit of Enumeration

The unit of enumeration was:

- the **household**, when agricultural production was managed by an individual or family;
- the **non-household agricultural entity**, when production was managed by a legal person or institution.

In both cases, all land parcels and livestock under the same management were treated as one holding.

2.3 Reference Periods

Reference periods define the time frames used for reporting agricultural activities and conditions during the census. In the census, two types of temporal references were used:

1. **A fixed Reference Day**
2. **The reference periods (reference year)**

This dual approach ensures internal consistency and aligns with the FAO WCA 2020 recommendations.

2.3.1 Reference Day: 13 January 2025

The census used **13 January 2025** as the official **Reference Day**. All *stock variables* were measured **as they existed on that specific date**, regardless of the interview date.

Stock variables referenced to 13 January 2025 include:

- **Number of livestock and poultry animals**
- **Area under crops at the reference day** (e.g., standing perennial crops, area currently planted)
- **Total area of the holding**, including all parcels under the same management
- **Number of fish ponds in operation**
- **Number of bee-hives**

- **Agricultural machinery and equipment owned**
- **Agricultural buildings or structures**
- **Irrigation equipment installed**

Enumerators were trained to refer respondents explicitly to conditions **on 13 January 2025**, even if the interview occurred days or weeks later.

2.3.2 General Reference Period - Reference Year

In addition to the reference day, the census used a **reference period of 12 months**, **the reference year**, for the agriculture-related production variables. This period was from **January 1, 2024, to December 31, 2024**. All agriculture-related production variables that were present during the reference year were recorded, regardless of the date on which the interview was conducted.

This period was used to determine:

- whether the unit met the **minimum agricultural activity threshold** (Section 2.1);
- agricultural work performed;
- input use;
- sales and other production-related activities.

2.3.3 Activity-Specific Reference Periods

Different agricultural activities require specific reference frames, as recommended by the FAO WCA 2020.

(a) Crop Production

Crop-related data referred to the reference year. Respondents reported:

- crops planted or harvested during the reference year;
- area cultivated during the reference year;
- inputs used for those crops during the reference year.

For annual crops a distinction is made between main and secondary crops. The main crop has a main area. Only the main areas are added up for the 'Utilized Agricultural Area' (UAA)

(b) Livestock and Poultry

Livestock ownership was recorded for animals **present at any time during the 12 months prior to 13 January 2025**. However, **the number of animals physically present on the Reference Day** was the primary statistic for stock counts.

(c) Bee-keeping

Bee-keeping activity referred to the most recent full production cycle within the last 12 months, while the number of bee-hives was captured on the reference day

(d) Aquaculture

Aquaculture activity referred to the most recent full production cycle within the last 12 months, while the number of ponds on Reference Day was captured separately.

(e) (Semi-)permanent crops

Production status (fruit-bearing and non-fruit-bearing), planting method, age of the plantation, number of trees/plants, and areas refer to the reference year.

(f) Agricultural Labour

Family and hired labour were reported for the **12-month period preceding the Reference Day**.

2.3.4 Rationale for Mixed Reference Periods

Using both reference periods (the **reference day** and the **reference year)**:

- ensures consistency for structural variables;
- captures seasonal variability across Suriname's agro-ecological zones;
- aligns with international standards;
- reflects the operational realities of mixed farming systems.

2.4 Classifications and Standards Used

The census applied internationally recognized statistical classifications to ensure consistency, comparability, and adherence to the methodological recommendations of the **FAO WCA 2020** (FAO 2015). Where appropriate, these international standards were adapted to reflect national contexts, crop varieties, livestock species, and administrative structures specific to Suriname.

The principal classifications used in the census are summarized below.

2.4.1 Administrative and Geographic Classifications

Administrative Structure

For all geographic identifiers and tabulations, the census used Suriname's official administrative hierarchy:

1. **District**
2. **Ressort**
3. **Village or local community** (used primarily in interior districts)

These units were aligned with the administrative boundaries provided by the **General Bureau of Statistics (ABS)**.

Enumeration Areas

Two types of enumeration areas (EAs) were used depending on the modality:

- **Enumeration Blocks (EBs):** Used in all districts of the Coastal area. In the district of Paramaribo, enumeration areas were used as the primary sampling unit.
- **Village**: Used as the primary sampling unit in the districts of Brokopondo, Sipaliwini, and parts of Marowijne.

All enumeration areas included machine-readable geographic codes.

2.4.2 Classification of Agricultural Activities

Agricultural activities followed the FAO WCA 2020 item structure and adapted national lists.

Crop Classification

Crop types were classified into:

- **Annual crops** (vegetables, rice, maize, cassava, short-cycle crops)
- **(Semi-)permanent crop** (bananas, pineapple, fruit trees, etc.)
- **Mixed and inter-cropping systems**:

  - For annual crops, planting is classified as main crop, secondary crop, or both (alternating between the two).

  - For (semi-)permanent crops, planting is classified as scattered, uniform, or both.

The census used a **standard national crop list** derived from FAO classifications but adjusted to Surinamese terminology and production systems.

Livestock Classification

Livestock species were grouped into:

- **Large ruminants:** cattle

- **Small ruminants:** goats, sheep
- **Pigs**
- **Poultry:** chickens, ducks, geese, turkeys
- **Other livestock:** buffalo's, horses and donkeys
- **Bee-hives**
- **Aquaculture species:** tilapia, cascadura, shrimps etc.

The structure aligns with the FAO WCA 2020, with additions reflecting local production.

2.4.3 Land Use Classification

Land use categories followed the FAO WCA 2020 recommendations and included:

- **Land under annual crops**
- **Land under semi-permanent crops**
- **Land under permanent crops**
- **Nurseries**
- **Fallow land**
- **Unutilized agricultural land** - Include grassland under wood and forest cover
- **Pasture and grazing land** - Land under Grassland (pastures and meadows)
- **Forest and other wooded land** - this excludes grassland under wooded and forest cover
- **Land used for Aquaculture**
- **Land under Buildings, structures, and farmyards**
- **Other land use**

Where a holding included multiple parcels, land use was recorded parcel-by-parcel and aggregated at the holding level.

2.4.4 Economic and Household Classifications

While the census primarily collects agricultural data, selected socioeconomic variables used standard classifications, such as:

- **Sex of holder**

- **Household vs non-household holdings:** as defined in the FAO WCA 2020
- **Legal status of the holding:** individual, family, cooperative, enterprise, institution
- **Type of labour:** household/family labour vs hired labour

These categories support cross-tabulation and SDG 5.a.1 analysis.

2.4.5 Machines/Equipment and Infrastructure Categories

Agricultural machines/equipment and infrastructure were classified into standard groups:

- **Irrigation equipment and systems**
- **Agricultural machinery and tools**
- **Storage, processing, and post-harvest infrastructure**
- **Livestock and aquaculture facilities**
- **Transport equipment**

This allows harmonized reporting and avoids fragmentation in equipment types.

2.4.6 Coding and Metadata Standards

The census employed:

- Standard **numeric codes** for crops, livestock species, land-use categories, and administrative units
- CAPI-integrated **dropdown lists** to standardize enumerator choices
- Metadata structured according the **Generic Statistical Business Process Model (GSBPM)** recommendation

These measures ensured consistency across all stages of data collection and processing.

2.5 Census Modality and Scope

2.5.1 Census Modality

The census was implemented using the **classical (complete structural census)** modality recommended under the FAO WCA 2020. This approach involves collecting a full set of structural data on agricultural holdings during a single, dedicated census operation conducted at long intervals—typically every ten years.

Rationale for Selecting the Classical Census Modality

Several contextual and operational factors justified Suriname's adoption of the classical approach:

1. **Lack of regular agricultural surveys**
   Suriname does not yet operate an ongoing, annual, or multi-year agricultural survey program. As a result, a structural census was necessary to provide a baseline and establish the sampling frame required for future surveys.

2. **Long gap since previous census**
   The last census was conducted in 2008. In the absence of updated structural data for more than seventeen years, a classical census was the most effective way to capture the current agricultural landscape comprehensively.

3. **Need to support the Agricultural Information System (AIS)**
   The classical census modality produces the list frame needed for the annual crop and livestock surveys that FAO is supporting MAAHF to operationalize. A modular census (spread over multiple years) would not have provided a complete frame at the required time.

4. **Operational feasibility**
   Suriname's size, population distribution, and institutional arrangements permitted the organization of a nationwide structural census within a single fieldwork period (January–March 2025), combining complete enumeration and sample-based approaches in different areas.

5. **Alignment with policy and monitoring needs**
   A one-off structural census ensures full coverage of variables required for agricultural policy, rural development, food security analysis, and climate resilience planning.

6. **Consistency with the FAO WCA 2020 Recommendations**

The classical census modality fully aligns with the FAO WCA 2020 guidance for countries that:

- have limited agricultural survey infrastructure;
- require a new list frame for sampling;
- need comprehensive structural data for planning;
- prefer one-time data collection rather than multi-year modular operations.

Implications for Data Users and Future Surveys

By adopting the classical modality, the census allows Suriname to:

- produce a complete structural dataset rich in geographic detail;
- establish a robust sampling frame for annual agricultural surveys;
- ensure continuity and comparability with past census rounds;
- support evidence-based policy and investment decisions.

2.5.2 Scope of the Census

The census was designed to produce a comprehensive structural profile of Suriname's agricultural sector at both **national and district levels**. The scope of the census was defined in accordance with the FAO WCA 2020 and the Sixth Agricultural Census 2025 legislation that authorizes the operation.

The census covered:

- **All agricultural holdings** in Suriname, as defined in Section 2.1
- **All ten administrative districts**, with results representative at the district level
- **All land parcels and livestock** under the management of each agricultural holding
- **Both household and non-household agricultural operations**

The scope of data collection included all **structural agricultural characteristics**, such as:

- Parcel and plot (regular parcel, roadside plot, and shifting cultivation plot)
- Land tenure and land use
- Crop cultivation (annual, semi-permanent and permanent crops)
- Livestock and poultry
- Bee-keeping
- Aquaculture
- Agricultural labour
- Irrigation and water management
- Agricultural assets, equipment, and structures
- Use of inputs (fertilizers, pesticides, seeds)

- Management practices
- Production systems
- Demographic and socioeconomic characteristics of the holder
- Gender (including SDG 5.a.1 module)

The census produced statistical outputs aligned with the three levels of the national administrative system:

- **National-level structural indicators**
- **District-level indicators** (all 10 districts)
- **Ressort-level indicators**

The detailed description of the **enumeration modalities** applied in different geographic areas (full vs. sample enumeration) is provided in Section 5 *(Fieldwork Planning and Implementation)*.

2.6 Themes and Data Items Collected

The census collected a comprehensive set of **structural agricultural data**, following the FAO WCA 2020 framework. Data items were organized into thematic domains that describe the characteristics, resources, and activities of the agricultural holdings.

Two instruments were used:

1. **Short (Screening) Questionnaire** – to identify agricultural holdings
2. **Long Questionnaire** – to collect detailed structural information from all eligible holdings

The themes below reflect the content of the **long questionnaire**, as confirmed by the official census instrument.

2.6.1 Core Structural Themes - FAO WCA 2020 Essential Items

The census collected all the FAO WCA 2020 essential structural items, including:

A. Identification and Characteristics of the Holding

- Holding identification codes (district, ressort, enumeration block/village, household ID)
- Holder characteristics (sex and age)

- Household vs non-household operation
- Contact information for follow-up

B. Land

- Total area of the holding at the **Reference Day (13 January 2025)**
- Number, location and types of parcels (regular parcels, roadside plot, shifting cultivation plot)
- Land tenure status by parcel (owned, rented, leased, right to use, etc.)
- Land use categories:
    - annual crops
    - semi-permanent crops
    - permanent crops
    - fallow land
    - Unutilized agricultural land
    - pasture/grazing areas
    - forest and other wooded land (this excludes grassland under wooded area and forest cover)
    - land use for Aquaculture
    - buildings, structures and farmyards

C. Crops

For both annual, semi-permanent and permanent crops:

- Cultivated area
- Number of trees for (semi-)permanent crops
- Cropping patterns (uniform, mixed, intercropped)
- Use of irrigation
- Use of inputs (fertilizer, pesticides, fungicides)
- Use of improved seeds or planting material

The crop list reflects the specific crops grown in Suriname.

D. Livestock and Poultry

- Number of animals **on the Reference Day** by species (cattle, sheep, goats, pigs, poultry, ducks, geese, etc.)
- Housing and grazing practices
- Purpose (breeding, fattening, dual purpose)

E. Bee-keeping

- Number of beehives
- Amount of product harvested (Honey, pollen, propolis, bee wax)

F. Aquaculture

- Number and size of fish ponds/tanks
- Species cultivated (e.g., tilapia)
- Water source and infrastructure

F. Agricultural Labour

- Family labour
- Permanent hired labour
- Temporary labour
- Sex

G. Agricultural Practices

- Irrigation and drainage
- Crop protection practices (pesticides, fungicides, herbicides)
- Mechanization and use of agricultural machinery
- Use of organic and chemical fertilizers
- Hydroponics and aquaponics

2.6.2 Additional Frame and Management Items

The census collected several **additional structural items** (also recommended in the FAO WCA 2020) that support:

- the establishment of a **national agricultural list frame**, and

- future annual agricultural surveys.

These include:

- Details of agricultural machinery, tools, and equipment
- Post-harvest and storage infrastructure
- Access to extension or advisory services
- Use of irrigation and drainage
- Exposure to pests or diseases
- Agricultural practices relevant to sustainability and risk management

These items are structural in nature and do not require annual updates.

2.6.3 SDG Module: SDG 5.a.1- Land Ownership and Rights

A dedicated gender and land rights module for privately owned land was included to enable compilation of **SDG Indicator 5.a.1**, covering:

- Ownership of agricultural land by sex
- Documentation of land rights
- Rights to sell, transfer, or bequeath land
- Decision-making over land and agricultural resources

This was the **only SDG indicator module** collected directly through the census.

3. Questionnaire Development

3.1 Structure of the Questionnaires

The census used a **two-stage questionnaire system** consisting of:

1. a **Short (Screening) Questionnaire**, administered to all households and non-household units within the enumeration blocks and selected villages; and
2. a **Long Questionnaire**, administered **only to units identified as agricultural holdings** according to the national minimum thresholds.

This structure follows the FAO WCA 2020 recommendation for efficient identification of holdings while ensuring that detailed information is collected only from eligible agricultural producers.

3.1.1 Short Questionnaire - Screening

The screening questionnaire served two key purposes:

- **Identification of agricultural activity** within every household or non-household unit; and
- **Assessment of eligibility** against the national minimum thresholds.

The short form collected:

- Basic identification information (district, ressort, EB/village, household number)
- Required demographic information (head of household, sex, age)
- A set of **screening questions** to determine whether the household:
    - cultivated crops;
    - raised livestock or poultry;
    - number of beehives
    - satisfied at least one national minimum threshold

If a unit met any threshold, the interviewer proceeded to the long questionnaire. If not, the interview ended after the short form.

3.1.2 Long Questionnaire

The long questionnaire collected **comprehensive structural data** on all identified agricultural holdings. The questionnaire was organized into thematic sections consistent with the FAO WCA 2020, including:

1. **Identification and characteristics of the holder and the holding**
2. **Types of land, land tenure and land use**
3. **Annual, semi-permanent and permanent crops**
4. **Irrigation and Agricultural practices**
5. **Livestock, poultry and bee-keeing**
6. **Grazing systems, housing facilities and manure storage**
7. **Financial support and extension services**
8. **Machinery and equipment**
9. **Buildings, structure and farmyards**
10. **Agricultural labour (including SDG 5.a.1: module on land ownership and rights)**
11. **Other gainful activities and Aquaculture**

Each section was structured using:

- clear skip patterns,
- internal consistency checks, and
- pre-coded response lists integrated into the CAPI system.

3.1.3 Use of CAPI - Computer-Assisted Personal Interviewing

The census was implemented entirely using **CAPI** via **tablets**, which allowed:

- automated skip patterns;
- real-time validation checks;
- standardized coding of crops, livestock, land-use categories, and administrative units;
- elimination of manual data-entry errors;
- GPS-assisted verification of household and parcel locations, when relevant.

The digital questionnaire incorporated:

- drop-down menus for major classifications;
- embedded definitions to guide enumerators;

- soft and hard validation rules to reduce inconsistencies.

3.1.4 Alignment with International Standards

The questionnaire design followed:

- The FAO WCA 2020 (FAO 2018)
- The Sixth Agricultural Census 2025 legislation
- Suriname's agricultural priorities and production systems

The final content was agreed upon through collaboration between the MAAHF, FAO and other national stakeholders.

3.2 Questionnaire Design Process

The development of the census questionnaire followed a structured, iterative, and evidence-based process led jointly by the MAAHF and the FAO. The process combined international methodological standards with extensive national validation to ensure the instrument was both technically sound and operationally feasible.

3.2.1 Initial Technical Design

MAAHF and FAO began questionnaire development in **March 2023**, during the early planning phase of the census. The initial design process included:

- reviewing the questionnaire used in the census of 2008;
- identifying gaps relative to the FAO WCA 2020;
- incorporating new national priorities (e.g., hydroponics system, greenhouse farming, bee-keeping, livestock systems);
- integrating the **SDG 5.a.1 module** on land ownership and rights;
- updating crop and livestock classifications to reflect current production practices;
- simplifying outdated or redundant question sequences.

This phase established the conceptual framework and ensured compatibility with the census methodology being developed in parallel.

3.2.2 Stakeholder Consultations

Throughout 2023, several rounds of consultations were held with:

- technical divisions within MAAHF (Crops, Livestock, Fisheries, Extension Services, Statistics, etc.);
- ressort offices;
- FAO specialists in agricultural censuses and survey design.

These consultations helped:

- validate item relevance for Suriname;
- refine crop lists, livestock species, and land-use categories;
- confirm the balance between short (screening) and long questionnaires;
- ensure coherence with national policy and data needs.

Feedback from these sessions informed multiple revisions of the draft questionnaire.

3.2.3 Multiple In-House and Field Pre-Tests

Before conducting a full pilot, MAAHF carried out **several rounds of internal (in-house)** and **small-scale field pre-tests**.

These pre-tests were used to evaluate:

- the clarity of questions and definitions;
- comprehension by both enumerators and respondents;
- adequacy of response categories and code lists;
- functioning of skip patterns and logic in CAPI;
- interview duration and operational workflow.

Each pre-test led to targeted refinements, improving the structure, wording, and routing of the questionnaire.

3.2.4 Second Pilot Census in Region East

A second full **Pilot Census** was conducted from **20 May to 9 June 2024** in **Region East** which has the districts of Commewijne and Marowijne.

- First the questionnaire was tested with fake data and with fill out questionnaires from the previous census. Then two pre-tests with field visits were done by the Census Working Group (CWG). Pretest-1 in Ressort Wanica-C, 25 farmers visited and interviewed, period 7-8 November 2023. Pretest-2 in Ressorts Wanica-B and Wanica-D, 25 farmers visited and interviewed, period 21-22 November 2023. The selected farmers are from the listing of these ressort offices for the regular statistics. Ressort Wanica-B, -D and -C are the administrative ressort areas of the MAAHF.

- Pre-test 3 in District Saramacca was originally planned as the Pilot Census, and the Census was scheduled for March 2024. For various reasons, including logistical issues in getting all the materials ready by March, it turned out not to be feasible. Therefore, the Census in District Saramacca did not proceed as a Pilot and was referred to as pre-test 3. It was also decided to visit only holdings, not to conduct door-to-door visits. The list of holdings included in the selected enumeration areas was obtained from an Excel file from the previous Census. The list of the holdings contains the name and the address of the holder.

- Full Pilot in Region East, which covers two Districts, Commewijne and Marowijne. In District Marowijne there are Tribal Communities where Shifting cultivation is practiced. Therefore, easily reachable villages are chosen to test the questions regarding Shifting cultivation. The Commewijne River divides District Commewijne into two main areas, the right bank, and the left bank of the Commewijne River. On the left bank are the Ressorts Alkmaar and Tamanredjo and the EB's of these Ressorts are chosen because of the presence of a diversity of agricultural sectors and in these EB's there are also agricultural holdings of the juridical type. On the right bank are the Ressorts Margaretha and Bakkie. These Ressorts are chosen to test the logistics aspects of the boat.

- Field enumeration was done in 20 days from 20 May to 9 June 2024 which includes Saturdays and Sundays. In total 12 EBs where chosen, 11 in Commewijne and one in Marowijne. During the training, trainees were identified as Enumerators and Supervisors. For the role as Supervisor, trainees were identified that showed to have a better understanding of the questionnaire, but also their current positions in the Ministry played a role in this. In the assignment of EB's to the Enumerators, the principle applied is one EB per Enumerator.

- A total of 14 enumerators, 5 supervisors, and one coordinator were involved in the implementation.

Objectives of the Pilot Census

The pilot aimed to test:

- the operational functionality of the questionnaire under real field conditions;
- the performance of CAPI (digital data collection);
- the adequacy of training materials;
- enumerator workload and interview flow;
- the accuracy and utility of skip patterns, validation rules, and code lists;
- field logistics and supervision mechanisms.

Results and Feedback

FAO received comprehensive feedback from the CWG on:

- operational challenges during fieldwork;
- sections that required clarification or simplification;
- adjustments needed to reduce interview time without losing essential data;
- improvements needed in CAPI logic, validation checks, and enumerator instructions.

The pilot census produced valuable empirical evidence that directly informed the final design of the questionnaire.

3.2.5 Finalization of the Questionnaire

Following the pilot and subsequent refinements:

- the questionnaire underwent several additional revisions throughout 2024;
- CAPI programming was updated to reflect all changes;
- code lists for crops, livestock, inputs, and land-use categories were finalized;
- the layout and structure were validated for both tablets and enumerator training materials.

The final version of the long and short questionnaires was approved in **late 2024**, following the adoption of the **Sixth Agricultural Census 2025 Legislation** by Parliament on **30 December 2024**.

3.2.6 Translation and Enumerator Preparation

Although the questionnaire was drafted in English and translated automatically in Dutch in CAPI/Survey Solutions, enumerators were trained to conduct interviews primarily in **Dutch**, **Sranan Tongo**, or other local languages as needed. Training included:

- full walkthroughs of each question;
- definitions and reference day instructions;
- practice in CAPI navigation;
- mock interviews and supervised role-play sessions.

This ensured consistent understanding and standardized field implementation.

3.3 CAPI Design and Digital Questionnaire Development

The census was implemented entirely using **Survey Solutions** (The World Bank (2025)), a CAPI (Computer-Assisted Personal Interviewing) platform developed by the World Bank. This was the **first time** that the MAAHF conducted a large-scale data collection exercise using a digital CAPI system. As a result, substantial capacity building and technical support were provided by the FAO to ensure smooth deployment and sustainable national capacity.

3.3.1 Platform and System Setup

The Survey Solutions platform was implemented within the **Government's E-gov server infrastructure** following coordination among the E-gov Department, the MAAHF and the FAO.
FAO supported the MAAHF in:

- installing and configuring the Survey Solutions **Headquarters** and **Server** applications;
- setting up secure backup systems;
- preparing user account structures;
- ensuring adequate server performance and storage capacity;
- discussing long-term hosting options and required specifications.

This ensured that all data collection, synchronization, and supervision processes were managed **locally by the MAAHF**, enhancing national ownership and data security.

3.3.2 Capacity Building and FAO Training Support

Because Survey Solutions and CAPI workflows were new to the MAAHF, FAO provided comprehensive training during a mission from **28 September to 6 October 2023**, delivered

by an FAO CAPI expert.
Training activities included:

A. CAPI Designer Workshop

- In-depth training on Survey Solutions Designer
- Hands-on development of a workshop questionnaire
- Instruction on advanced syntax (validation rules, enabling conditions, rosters)

B. Field Management (Headquarters)

- Set-up of Survey Solutions HQ
- Creation of user accounts and roles
- Assignment management
- Data monitoring (review of incoming interviews and data quality checks)

C. Enumerator and Supervisor Training

- Use of the Interviewer App
- Mock interviews with the census instrument
- Understanding skip logic, validation messages, and help features

D. IT-System Consultation and Support

- Review of the Ministry's ICT Division's readiness
- Recommendations for hosting requirements
- Discussion of backup, redundancy, and performance monitoring systems

These trainings ensured that Ministry staff could confidently use Survey Solutions for questionnaire design, field operations, and IT administration.

3.3.3 Questionnaire Programming and Logic Integration

Following training, the census questionnaire (short and long forms) was fully programmed into Survey Solutions. This included:

- question text and response options;
- skip logic and enabling conditions;
- rosters for parcels, crops, livestock, and household members;

- soft and hard validation rules;
- pre-loaded code lists for crops, livestock, land-use categories, and irrigation methods;
- embedded definitions accessible to enumerators;
- multilingual readiness (English and Dutch), with the Dutch version being used primarily for fieldwork.

All CAPI functions were thoroughly tested during pre-tests and the **Pilot Census in Region East**.

3.3.4 Workflow Structure and Supervision

Survey Solutions enabled a robust hierarchical workflow:

Enumerators

- Collected interviews offline during field visits
- Completed automatic validation checks
- Synchronized data to HQ when internet was available

Supervisors

- Reviewed completed interviews
- Approved or rejected assignments
- Monitored field progress
- Verified GPS coordinates and paradata

Headquarters Staff

- Oversaw global field progress
- Managed assignments and batches
- Reviewed data quality trends
- Maintained server functionality

This workflow matched Survey Solutions' strong design for census operations.

3.3.5 Synchronization, Data Security, and Storage

MAAHF manages its server on the E-gov network:

- all data were stored **locally** and securely;
- synchronization occurred whenever enumerators gained internet access;
- communication between tablets and server was encrypted;
- daily backups and system monitoring were implemented;
- FAO provided guidance on ensuring data integrity and server stability.

3.3.6 Testing and Validation

The CAPI instrument underwent extensive testing, including:

- in-house pre-tests by CWG
- small-scale field pre-tests
- the full **Pilot Census in Region East** involving 14 enumerators, 5 supervisors and 1 Coordinator.

Feedback from all the pre-tests and the Pilot Census was incorporated into multiple rounds of improvements, ensuring stability, usability, and operational suitability.

3.3.7 Benefits of Using Survey Solutions

The integration of Survey Solutions provided:

- real-time supervision and quality control
- reduced data-entry errors
- standardized coding and classifications
- efficient assignment management
- faster processing and validation
- secure handling and storage of data
- enhanced national capacity for future digital surveys

This represented a significant modernization milestone in Suriname's agricultural statistical system.

4. Survey methodology

The data collection phase for the Sixth Agricultural Census of Suriname has been concluded, and the subsequent data processing is nearing completion. The next logical and critical step in the census lifecycle is the aggregation of data to produce meaningful statistics. However, before this process can commence, it is essential to detail the methodology used to include agricultural holdings across the nation, as this directly influences the estimation procedure.

The sampling design for the current census, consistent with the previous one, employs different methodologies tailored to the unique characteristics of the geographical regions being studied. For the purpose of this census, the country was strategically divided into three distinct domains:

1. **The Coastal Area:** Characterized by its accessibility and higher concentration of agricultural activity.
2. **District Paramaribo:** The nation's capital and its surrounding suburbs, notable for its urban and peri-urban agriculture.
3. **The Interior:** A vast and less accessible region, primarily composed of remote villages, which presents significant logistical challenges.

4.1 Sampling Design

The census design employed a mixed-methodology approach, tailoring the data collection strategy to the geography of each district. For the districts located entirely within the coastal areas, a complete enumeration (census) was implemented. In contrast, for the non-coastal regions, where distinct settlement patterns and logistical challenges prevail, two different probability-based sampling plans were developed and executed.

A notable exception is the district of Marowijne, which straddles both of these geographical zones. For this reason, a hybrid approach was applied: the majority of Marowijne was fully enumerated, while areas with remote villages were included in the census through a sampling approach.

4.1.1 Design for the Coastal Area

For the districts situated entirely within the coastal areas of Suriname, the census employed a complete enumeration methodology. This approach, also known as a full census, involved identifying and administering a questionnaire to every agricultural holding within these districts. This method was chosen for the coastal region due to its greater accessibility and higher concentration of agricultural activity, making a comprehensive survey feasible.

4.1.2 One-Stage Cluster Sampling in District Paramaribo

In the capital region (district of Paramaribo), a one-stage cluster sampling design was employed. The primary sampling units (PSUs) were the Enumeration Blocks (EBs). From the complete list of all EBs in district of Paramaribo, a 10% sample was selected using a simple random sampling technique. Subsequently, all agricultural holdings identified within the boundaries of these selected EBs were fully enumerated. The specific procedure for selecting these EBs for each ressort is documented in the technical report (Martosatiman 2025a).

4.1.3 Stratified Cluster Sampling in the Interior

A specialized sampling design was implemented for the vast and logistically complex interior regions of Suriname. This domain comprises the entirety of District Brokopondo and District Sipaliwini, as well as the areas with the most remote villages in District Marowijne. It is noteworthy that District Sipaliwini, while accounting for over 75% of Suriname's land area, contains only about 6% of its population, highlighting the sparse settlement patterns that necessitate a sampling approach.

For these districts, a stratified single-stage cluster design was employed, with the **village** serving as the Primary Sampling Unit (PSU). To improve the efficiency and representativeness of the sample, villages were stratified based on their estimated population size and indirectly on ethnicity and tribe as well. Three strata were defined:

- **Stratum 1 (Certainty Stratum):** This stratum includes all large villages with an estimated population of over 1,000 inhabitants. These villages were selected **with certainty**, meaning they were all automatically included in the census for complete enumeration.
- **Stratum 2:** This stratum consists of medium-sized villages with a population of more than 500 but less than or equal to 1,000 inhabitants.
- **Stratum 3:** This stratum comprises all small villages with a population of 500 or fewer inhabitants.

From Strata 2 and 3, a sample of villages was drawn, and all agricultural holdings within these selected villages were then fully enumerated.

Detailed selection protocol for villages in Sipaliwini, Brokopondo, and Marowijne is described in a separate report (Martosatiman 2025b).

4.2 Estimation and Weighting for District Paramaribo

Estimates for key agricultural variables will be derived at various geographical levels by combining the data from the fully enumerated coastal region with the data from the sampled regions. In what follows, we provide the details about the weighting process for *district Paramaribo*. As mentioned above, 10% of the EBs in Paramaribo were selected. as can be seen in Figure 4.1, EBs were allocated at the Ressort level, proportionally to the number of EBs in the Ressort.

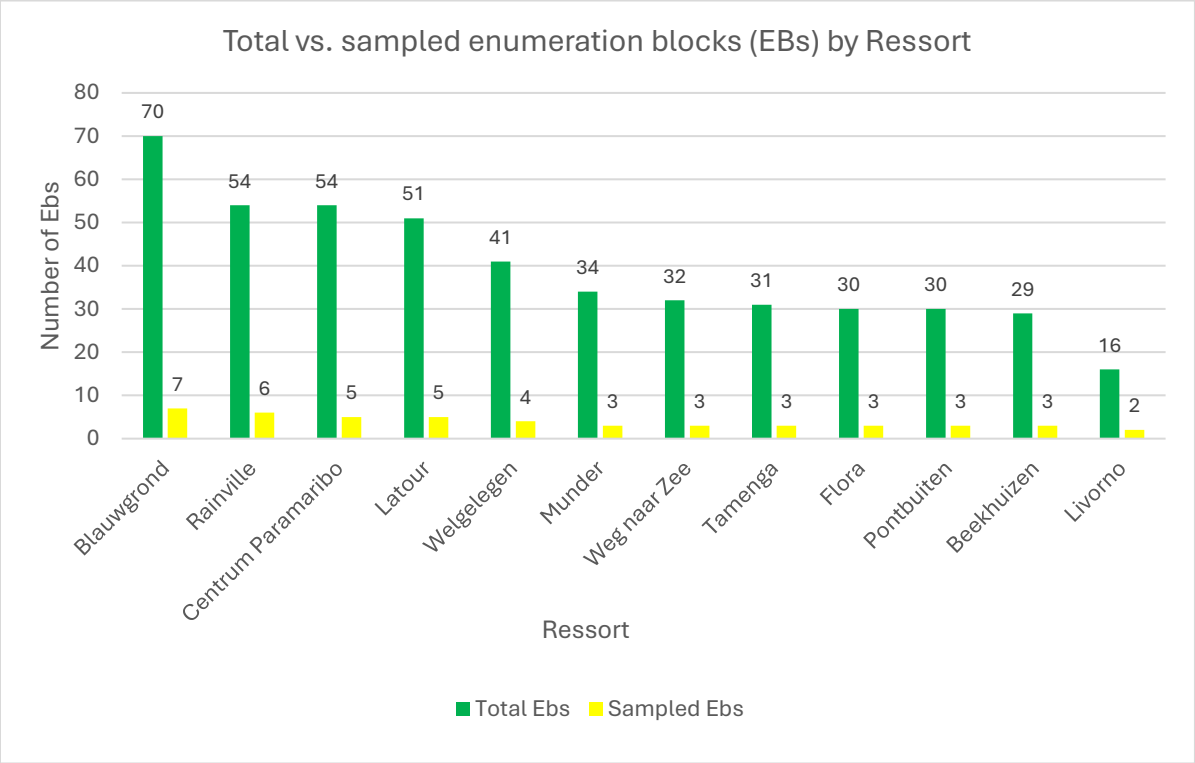


Figure 4.1: Total vs. Sampled Enumeration Blocks (EBs) by Ressort

4.3 Estimation and Weighting

4.3.1 Sampling Fractions

The sampling target for Paramaribo was 10%. However, since a whole number of EBs must be selected from each ressort, the actual sampling fraction varies slightly. Table 4.1 details these variations.

Table 4.1: Analysis of Sampling Fraction by Ressort

	Total EBs (N)	Sampled EBs (n)	Actual Fraction (f=n/N)
Blauwgrond	70	7	10.00%
Rainville	54	6	11.11%
Munder	34	3	8.82%
Centrum Paramaribo	54	5	9.26%
Beekhuizen	29	3	10.34%
Weg naar Zee	32	3	9.38%
Welgelegen	41	4	9.76%
Tamenga	31	3	9.68%
Flora	30	3	10.00%
Latour	51	5	9.80%
Pontbuiten	30	3	10.00%
Livorno	16	2	12.50%
Total	472	47	—
Overall	—	—	9.96%

Note: Variation from the 10% target is due to the fact that the enumeration block (EB) had to be selected in its entirety.

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Table 4.2 below, provides a comprehensive overview of the census design applied across all ten districts of Suriname. It details the specific data collection methodology used for each district, alongside its estimated population from the 2012 census and a qualitative assessment of its agricultural intensity. This summary highlights how the census strategy was tailored to the unique demographic and geographic characteristics of each region.

Tabel 4.2: Overview of Census Design and Characteristics by District

Census Data Collection Strategy by District

District	Population (2012)	Agricultural Intensity	Methodology Used
Paramaribo	240,924	Low to Medium (Peri-urban)	Sampling of EBs
Wanica	118,222	High	Enumeration
Nickerie	34,233	High (Rice dominant)	Enumeration
Saramacca	17,480	High	Enumeration
Commewijne	31,420	High	Enumeration
Coronie	3,391	Medium	Enumeration
Para	24,700	Medium	Enumeration
Marowijne	18,294	Medium (Coastal) / Low (Interior)	(Enum. / Sampl.)
Brokopondo	15,909	Low (Subsistence)	Sampling of Villages
Sipaliwini	37,065	Low (Subsistence)	Sampling of Villages

Source for population: General Bureau of Statistics (ABS), 8th Population and Housing Census (2012).
Agriculture intensity is a qualitative assessment for context.
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4.3.2 Estimating Population Characteristics from Weighted Data

The sampling weights calculated in the previous section are the cornerstone of the estimation process. The fundamental principle is that each sampled unit (in this case, an Enumeration Block or EB) does not only represent itself but also a certain number of other non-sampled EBs in the population of that ressort. The weight, therefore, acts as an "inflation" or "expansion" factor. To produce unbiased estimates of population parameters for Paramaribo, every observation from a sampled holding must be multiplied by the weight corresponding to its ressort.

The formulas below detail how to calculate key estimates for a variable of interest, considering the one-stage cluster design.

Notation:

- h: An index for the ressort (stratum).
- i: An index for the sampled Enumeration Block (cluster) within a ressort.
- j: An index for the agricultural holding (farm) within an EB.
- W_h: The single sampling weight calculated for ressort h.
- y_{hij}: The value of a variable y (e.g., hectares of land) for holding j in EB i of ressort h.
- x_{hij}: The value of a second variable x for the same holding.

4.3.3 A. Estimating a Total

The most common estimate is the total of a particular variable (e.g., total land area, total number of livestock). This is achieved by summing the weighted values of the variable across all holdings in all sampled EBs.

The estimated total for a variable y is calculated as:

$$\hat{Y} = \sum_{h} \left(W_h \sum_{i} \sum_{j} y_{hij} \right)$$

Example: To estimate the **total number of cattle in Paramaribo**, we would let y_{hij} be the number of cattle on holding j in EB i of ressort h. We would sum the cattle counts from all surveyed farms, multiply by their corresponding ressort weight (W_h), and then sum these results across all ressorts to get the final estimate.

4.3.4 B. Estimating an Average - Mean

The average value of a variable per holding (e.g., average farm size) is the estimated total of that variable divided by the estimated total number of holdings.

The formula for the average is:

$$\bar{y} = \frac{\hat{Y}}{\widehat{M}} = \frac{\sum_h \left(W_h \sum_i \sum_j y_{hij} \right)}{\sum_h \left(W_h \sum_i \sum_j 1 \right)}$$

Here, $\widehat{M}$ represents the estimated total number of holdings, which is calculated by setting the variable in the denominator to 1 for every single holding.

Example: To find the **average farm size in hectares**, we would let y_{hij} be the size of the farm in hectares. We would calculate the estimated total hectares ($\hat{Y}$) and divide it by the estimated total number of farms ($\widehat{M}$).

4.3.5 C. Estimating a Proportion

A proportion is a special case of a mean where the variable of interest is binary (either 1 or 0). It measures the share of holdings that have a certain characteristic.

The formula for a proportion is:

$$\hat{P}_y = \frac{\widehat{Y'}}{\widehat{M}} = \frac{\sum_h \left(W_h \sum_i \sum_j y'_{hij} \right)}{\sum_h \left(W_h \sum_i \sum_j 1 \right)}$$

Where y'_{hij} is 1 if the holding has the characteristic, and 0 otherwise.

Example: To estimate the **proportion of farms that use irrigation**, y'_{hij} would be 1 for every farm that reported using an irrigation system and 0 for those that did not. The final estimate ($\hat{P}_y$) would tell us the estimated percentage of all farms in Paramaribo that are irrigated.

4.3.6 D. Estimating a Ratio

A ratio compares the totals of two different quantitative variables. This is very useful for calculating yields or densities. The formula for the ratio $\hat{R}$ of variable y to variable x is:

$$\hat{R} = \frac{\hat{Y}}{\hat{X}} = \frac{\sum_h \left(W_h \sum_i \sum_j y_{hij} \right)}{\sum_h \left(W_h \sum_i \sum_j x_{hij} \right)}$$

Example: To estimate the **average yield of cassava in kilograms per hectare**, y_{hij} would be the total kilograms of cassava produced by a farm, and x_{hij} would be the number of hectares the farm used for cassava cultivation. The ratio $\hat{R}$ would provide an estimate of the overall productivity for this crop across the entire district.

4.4 Estimation from Complete Enumeration

For the districts in the coastal areas where a complete enumeration was conducted, the process of calculating estimates is a straightforward special case of the weighted estimation framework. In a census, every agricultural holding in the population is surveyed, meaning the sampling fraction is 1, and therefore, the sampling weight for every single holding is also **1**.

Consequently, the formulas for totals, means, proportions, and ratios presented previously can be applied directly by setting the weight (W_h) to 1. For instance, the formula for an estimated total simplifies to a direct summation:

$$\hat{Y}_{\text{census}} = \sum_{h,i,j} (1 \times y_{hij}) = \sum_{h,i,j} y_{hij}$$

This is the standard definition of a population total calculated from census data. Applying this principle ensures that the estimation methodology is consistent across all regions, whether they were fully enumerated or sampled. This unified approach allows for the seamless aggregation of data from all districts to produce valid national-level statistics.

4.5 Estimation and Weighting for the Interior regions

4.5.1 Analysis of Village Stratification

To assess the feasibility of the proposed three-stratum sampling frame for the interior districts, the distribution of villages was analyzed. The initial stratification plan categorized villages based on population size: Stratum 1 (>1,000 inhabitants), Stratum 2 (500-1,000), and Stratum 3 (<500). The following bar chart visualizes the number of villages in each stratum for the districts of Marowijne, Brokopondo, and Sipaliwini. The chart clearly demonstrates that while the stratification is viable for Sipaliwini, the counts in the upper strata for Marowijne and Brokopondo are too sparse for robust, independent sampling.

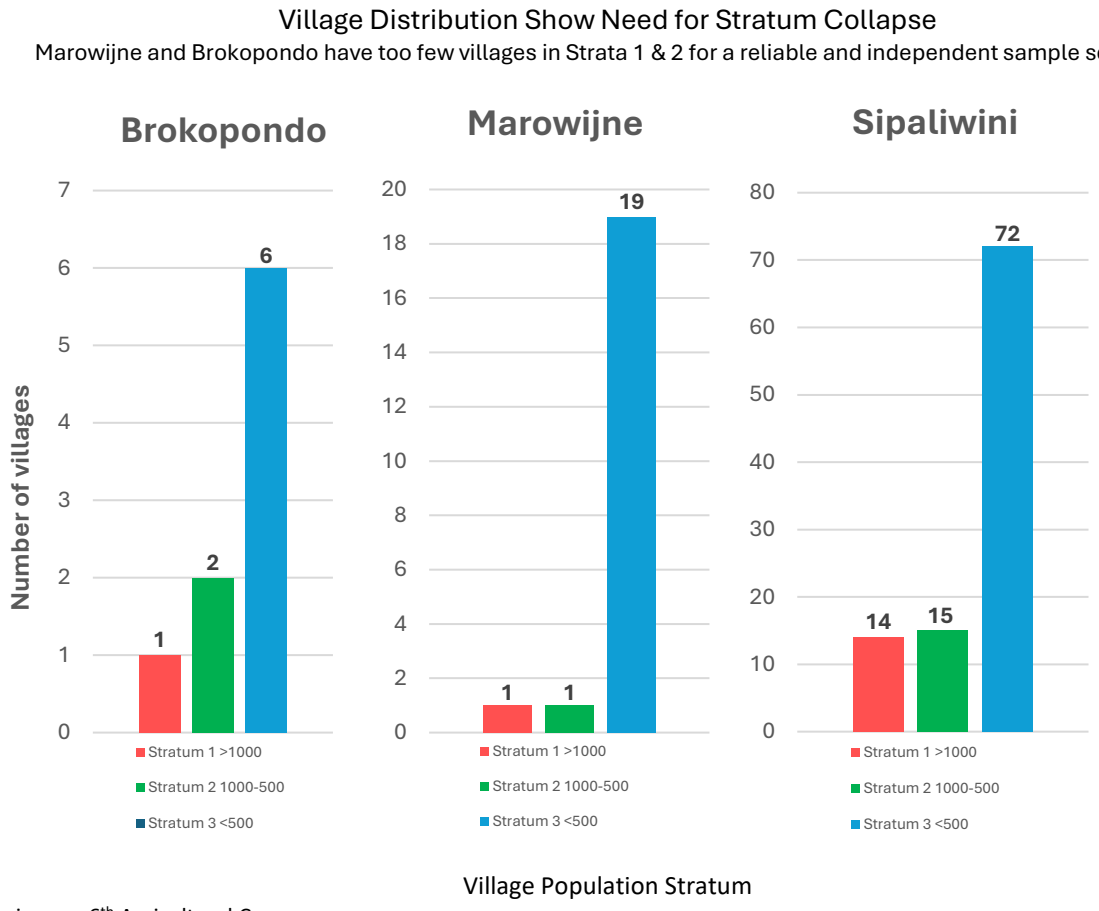


Figure 4.2: Distribution of villages by population stratum for each interior district.

Following the stratification of villages in the interior districts, a sample was allocated to each stratum. The "Certainty Stratum" (Stratum 1) was fully enumerated (i.e., all villages were selected). For the other strata, a sample of villages was drawn. The table below details the proposed sample size (n) relative to the total number of villages (N) for each stratum within

the interior districts. The cells highlighted in yellow indicate strata where the total number of available villages is too low to support a robust, independent sampling inference.

Table 4.3: Revised Sample Allocation of Villages by District and Stratum

Village Sample Allocation for Interior Districts (Revised)

Showing number of villages selected (n) out of total available (N)

District	Population Stratum		
	Stratum 1 (>1,000)	**Stratum 2 (500-1,000)**	**Stratum 3 (<500)**
Marowijne[1]	1/1	1/1	1/19
Brokopondo[1]	1/1	2/2	0/6
Sipaliwini	14/14	6/15	5/72

[1] Highlighted rows indicate districts where all strata must be collapsed due to low/zero sample counts.

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4.5.2 Justification for Collapsing Strata

The sample allocation detailed in Table 4.3 makes the need for a methodological adjustment clear. For the districts of Marowijne and Brokopondo, the upper strata (Stratum 1 and Stratum 2) each contain only one or two villages. Attempting to conduct inference (estimation and analysis) from such small populations would result in estimates that are highly unstable and overly dependent on the specific characteristics of the few villages selected.

Therefore, to ensure statistical robustness, the decision was made to collapse all Strata for these two districts. This creates a single, more populous stratum of “villages with more than 500 inhabitants”, from which a meaningful sample would have been drawn. This issue does not affect Sipaliwini, where the number of villages in all three strata is sufficient to proceed with the original three-stratum design.

4.5.3 Final Sampling Weights for the Interior

Based on the decision to collapse the upper strata for Marowijne and Brokopondo, a final set of sampling weights was calculated. The weight for each stratum is the inverse of its sampling fraction (i.e., the total number of villages divided by the number of villages selected, W = N/n). These weights are essential for inflating the sample data to produce accurate, unbiased estimates for the entire interior region. The table below details the final population counts (N), sample sizes (n), and resulting weights (W) for each stratum. Note that for Sipaliwini’s “Certainty Stratum”, the weight is 1.00, as all villages in that stratum were included in the census.

Table 4.4: Final Sampling Weights Assigned to Each Sampled Village in the Interior

Final Weights Assigned to Each Sampled Village

Sampled Village	Final Weight
Brokopondo	
Balingsuela	3.00
Lebidoti	3.00
Tapoeripa	3.00
Marowijne	
Galibi	7.00
Papatamkondre	7.00
Wanhatti	7.00
Sipaliwini	
Abenaston	2.50
Anapaike	14.40
Apoera	1.00
Aurora	1.00
Benanoe	1.00
Bethel	14.40
Boslanti	14.40
Botopasi	2.50
Cottica	2.50
Godo	1.00

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Table 4.5: Final Sampling Weights Assigned to Each Sampled Village in the Interior (cont'd)

Final Weights Assigned to Each Sampled Village (Continued)

Sampled Village	Final Weight
Sipaliwini	
Godoholo	1.00
Goejaba	1.00
Hekoenoe	2.50
Kajapati	1.00
Kwamalasamoetoe	1.00
Langatabiki	1.00
Manlobie	1.00
Moitakie	2.50
Pijeiti	14.40
Pikien Slee	1.00
Poesoegroenoe	14.40
Section/Washabo	2.50
Semoise	1.00
Tabbikie	1.00
Wangfinga	1.00

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4.6 Methodological Note on Weight Assignment

The weights in the table above were assigned based on the final stratification strategy. For the districts of Marowijne and Brokopondo, all villages were grouped into a single, collapsed stratum, and therefore all selected villages within each of those districts receive a single, unified weight.

For the district of Sipaliwini, the weight for each village was determined by its original stratum, which was programmatically assigned based on the number of inhabitants listed in the sampling frame: Stratum 1 (>1,000 inhabitants), Stratum 2 (500-1,000 inhabitants), or Stratum 3 (<500 inhabitants).

5. Fieldwork Planning and Implementation

5.1 Recruitment and training of enumerators/supervisors

The successful implementation of the census relied on the recruitment and training of a dedicated field workforce composed of enumerators and supervisors. Supervisory functions were primarily performed by members of the Census Working Group (CWG) and the Ressort officers, ensuring strong technical oversight and consistency in field operations.

Enumerator training was a critical component of the fieldwork preparation process. Training activities combined both conceptual and practical elements and were designed to ensure a standardized understanding of the census methodology, questionnaire content, and data collection procedures. Training covered:

- census objectives, concepts, and definitions;
- enumeration procedures and roles and responsibilities;
- detailed review of the questionnaire;
- use of the CAPI system (Survey Solutions);
- interpretation of validation messages and skip patterns;
- reference day concepts and reporting rules;
- interview techniques and respondent engagement.

Training sessions included hands-on exercises using tablets, live demonstrations, and mock interviews to simulate real field conditions. Enumerators practiced completing questionnaires independently under supervision, allowing trainers to identify and address potential issues before deployment.

Given Suriname's linguistic diversity, enumerators were prepared to conduct interviews in Dutch, Sranan Tongo, and other local languages where necessary, ensuring effective communication with respondents.

5.2 Field logistics

Field logistics were carefully planned to support efficient and complete coverage of all assigned enumeration areas. The operational design reflected the geographic diversity of Suriname, including the coastal districts, district Paramaribo, and the Interior.

Enumeration staff was organized into teams of enumerators, supervisors, coordinators and Deputy-Directors (Martosatiman 2025). Each supervisor was responsible for specific enumeration areas and supervised a group of usually 5-6 enumerators.

Transportation arrangements were made to facilitate access to both accessible and remote locations, including the use of vehicles provided by the Ministry and other logistical arrangements as required.

The use of the **Survey Solutions platform** enabled structured assignment management, allowing headquarters to distribute workloads, monitor progress, and adjust field deployment in real time. Enumerators conducted interviews using tablets and synchronized completed questionnaires to the central server when connectivity was available.

Daily debriefings between supervisors and enumerators were conducted to review progress, address challenges encountered in the field, and ensure data quality standards were maintained. This continuous feedback loop contributed to improving field performance throughout the data collection period.

5.3 Timing of fieldwork

Field data collection for the Sixth Census of Agriculture was conducted during the period of **January till March 2025**, following the approval and publication of the Sixth Agricultural Census 2025 legislation by the end of December 2024.

The fieldwork period was scheduled based on operational considerations and climatic conditions, which are generally less severe during this time of the year. This ensured that most areas were accessible and that respondents could be reached to provide accurate information. The **reference day of the census (13 January 2025)** served as the benchmark for reporting stock variables, including land area and livestock numbers.

Fieldwork was scheduled to allow sufficient time for complete coverage of all enumeration areas, including those sampled in remote Interior regions. Flexibility was incorporated into field operations to account for weather conditions, accessibility constraints, and respondent availability.

5.4 Quality control procedures

A multi-layered quality control system was implemented to ensure the accuracy, completeness, and consistency of the data collected during fieldwork. Quality assurance began at the point of data collection and continued throughout the data transmission and supervisory review process.

The use of **CAPI (Survey Solutions)** introduced automated validation mechanisms, including:

- range and consistency checks;
- skip logic enforcement;

- real-time error messages;
- mandatory field controls.

These features significantly reduced data entry errors and improved internal consistency of responses.

Supervisors played a key role in quality control by reviewing submitted questionnaires, verifying completeness, and resolving inconsistencies. They had the ability to reject interviews requiring correction and reassign them to enumerators for follow-up. Headquarters staff monitored data quality trends, field progress, and validation error patterns to identify systemic issues requiring corrective action.

In addition, the CWG maintained continuous communication with field teams, providing technical guidance and ensuring adherence to standardized procedures.

5.5 IT infrastructure and Technical Support

The implementation of the census relied on a dedicated IT infrastructure to support the deployment and operation of the **Survey Solutions CAPI system**. A specialized IT consultant was engaged to ensure the proper configuration, stability, and security of the system throughout the census.

The IT consultant was responsible for the installation and configuration of the Survey Solutions platform on the server environment, including database setup, system connectivity, and secure access. This involved configuring database connections, establishing domain bindings where applicable, and ensuring that the system could reliably transmit and receive data between field devices and the server.

A key component of the IT consultant's role was to **ensure data integrity and system reliability**. This included supporting the recovery and restoration of the database in the event of technical issues, as well as implementing a **robust data backup strategy**. Regular backups were established to safeguard census data and reduce the risk of data loss during field operations.

The IT consultant also provided **ongoing technical monitoring and support**, including tracking system performance, identifying potential issues, and ensuring timely resolution of technical problems. Particular attention was given to ensuring that data exports accurately reflected the information stored on the server, thereby supporting subsequent data processing and analysis.

Prior to full deployment, the system was tested through trial surveys and data entry exercises to confirm proper functionality of the application, database, and synchronization processes. In addition, documentation was prepared to guide system administrators and users in maintaining and operating the platform in line with best practices.

Overall, the technical support provided contributed significantly to the successful implementation of the CAPI-based data collection system and strengthened the Ministry's capacity to manage digital data collection operations for future statistical activities.

5.6 Challenges encountered and mitigation strategies

The implementation of the census faced several operational challenges, reflecting both the scale of the exercise and the geographic and institutional context.

One major challenge was the **delayed start of field operations**, due to the late approval of the Sixth Agricultural Census 2025 legislation. This required rapid re-adjustments to the fieldwork schedule.

Logistical challenges were particularly evident in **remote Interior regions**, where access to villages is limited and transportation is more complex. These challenges were addressed through careful planning, flexible deployment strategies, and the use of local knowledge to facilitate access.

The introduction of **CAPI technology** also presented an initial learning curve for both enumerators and supervisors, as this was the first time the Ministry implemented a fully digital data collection system. This challenge was mitigated through extensive training, hands-on practice, and ongoing technical support provided by the FAO and the CWG.

An important operational challenge encountered during fieldwork was a temporary disruption of the **Survey Solutions server infrastructure**, which affected the synchronization and management of data collected through the CAPI system. Given the risk of potential data loss, immediate mitigation measures were implemented. Fieldwork was temporarily paused to prevent further data collection under unstable system conditions. The CWG and IT consultants promptly intervened to restore the server by rebooting the virtual machine hosting the application, in coordination with specialized technical support.

Once system functionality was re-established, priority was given to securing the data already collected by exporting the core survey datasets from the server. After confirming system stability and data integrity, field operations were gradually resumed. This incident highlighted the importance of robust IT infrastructure, contingency planning, and rapid-response protocols when implementing large-scale digital data collection systems.

Additional operational challenges included variability in respondent availability and the need to ensure consistent interpretation of questionnaire items. These were addressed through supervisor oversight, daily debriefings, and continuous clarification of concepts during fieldwork.

Despite these challenges, the census was successfully implemented, achieving broad national coverage and generating a high-quality dataset. The experience gained during this

operation provides valuable lessons for future censuses and the development of regular agricultural survey program.

6. Post-Enumeration Survey - PES

6.1 Purpose and Objectives

A **Post-Enumeration Survey (PES)** was carried out as an independent evaluation of the coverage and content accuracy of the 2025 Census of Agriculture. The PES followed the FAO WCA 2020 recommendations for census quality assessment and aimed to quantify key types of errors, including undercoverage, overcoverage, misclassification of holdings, and errors in selected core census variables (FAO 2018). The PES provided an empirical basis for assessing the reliability of census results and documenting strengths and limitations.

6.2 Methodological Approach

The PES was conducted independently from the main census field operation to avoid bias. The approach relied on:

- **a sample of enumeration areas (PES EB/Villages)** selected from the national frame;
- **door-to-door visits** within the sample enumeration areas (PES EB/Villages);
- **reconciliation of PES results** with census results;
- classification of discrepancies into standardized error categories.

The PES focused on structural variables essential for census quality measurement, such as land use, livestock ownership, and holding identification.

6.3 Sample Design of the PES

A stratified sample of EBs/Villages was selected to ensure representation across (Martosatiman 2025c):

- Coastal Area;
- District Paramaribo;
- Interior with dispersed villages.

Within each PES EB/Village, the PES team conducted a fresh listing of all agricultural holdings, irrespective of their census classification. This enabled measurement of major coverage errors, including:

- **omissions** (households and holdings missed during the census),

- **duplicate counts** (households and holdings that were recorded more than once during the census),
- **erroneous inclusions** (non-holdings included in the census),
- **location or linkage errors**,
- **misclassification of holding type**.

6.4 PES Questionnaire and Field Operations

The PES used a short, carefully designed questionnaire focusing on variables necessary for matching and verification:

- holder identification and demographic details;
- confirmation of agricultural activity based on the national threshold;
- land-use characteristics;
- livestock ownership and key production activities.

Fieldwork followed strict protocols:

1. **listing and identifying holdings independently of the census**;
2. **conducting PES interviews** with holders or representatives;
3. **matching** each PES holding to the census list;
4. **reconciliation** when matches could not be found or discrepancies emerged.

This systematic approach upheld the independence and rigor of the PES.

6.5 Matching, Reconciliation, and Error Classification

Matching was conducted using multiple criteria, including name, location, household composition, land use, and livestock type. When discrepancies were detected, reconciliation procedures determined whether the difference represented:

- a census omission,
- a PES error,
- an erroneous census inclusion, or

- a data mismatch (e.g., location or unit misalignment).

All discrepancies were categorized using standard FAO PES classifications, allowing quantitative estimation of coverage and content error rates.

6.6 Key Performance Indicators - KPIs

The PES implementation followed the KPI framework outlined in the PES manual, covering:

- percent of holdings correctly matched;
- rate of census omissions;
- rate of erroneous inclusions;
- accuracy in reporting of core structural variables;
- interviewer and supervisor performance indicators.

KPIs supported systematic evaluation of census data quality and operational performance.

6.7 Summary of PES Results

PES results indicated that the census achieved **generally good coverage**, with specific areas identified for improvement. Common sources of error included:

- small numbers of omissions in rapidly changing peri-urban zones;
- misclassification of marginal or mixed-use holdings;
- occasional listing discrepancies in dispersed Interior communities.

These findings are typical for agricultural censuses and were within acceptable ranges relative to international experience.

6.8 Implications for Census Quality and Future Surveys

The PES provided valuable evidence on the strengths and weaknesses of the census. Its results will guide:

- interpretation of published indicators;
- improvements to the national list frame;

- enhancements to training, listing, and supervision procedures;
- the design of the annual agricultural survey programme being established by MAAHF with FAO support.

6.9 Overall Assessment

The PES confirmed the overall reliability of the census and demonstrated the Ministry's strong capacity to conduct independent quality evaluation exercises. Integration of PES findings into future statistical activities will contribute to continuous improvement and reinforce the credibility of agricultural statistics in Suriname.

7. Data Processing and Quality Assurance

7.1 Overview of Data Management Workflow

Data processing for the census followed a structured workflow designed to ensure secure management, systematic quality control, and full traceability of records from the moment of data capture to final cleaning. All data were collected on tablets using the **Survey Solutions Interviewer App** and synchronized to the **Survey Solutions Headquarters Server** hosted by MAAHF. The system ensured encrypted transmission, role-based access controls, and real-time monitoring of enumeration progress. The CWG at headquarters oversaw the entire data management cycle.

7.2 CAPI Validation and Built-in Quality Controls

Survey Solutions enabled the implementation of rigorous validation controls directly at the point of data capture. The digital questionnaire incorporated:

- **hard validation checks**, preventing entry of impossible values;
- **soft validation checks**, prompting enumerators to confirm outlier values;
- **consistency checks** across related variables (e.g., crop area vs. total parcel area);
- **range and format checks** for numeric and categorical inputs;
- **GPS recording** (where feasible) and paradata such as interview time and keystrokes.

These built-in controls significantly reduced interviewer error, ensured logical coherence across records, and minimized downstream editing requirements.

7.3 Supervisory Review and Error Resolution

Upon synchronization, all completed interviews passed through a structured supervisory workflow. The responsibilities of the supervisors included the following:

- verified completeness of each interview;
- reviewed and resolved validation warnings;
- checked GPS coordinates for positional accuracy;
- rejected questionnaires requiring correction or follow-up;
- ensured that all holdings within assigned EAs (EBs/Villages) were visited.

The CWG carried out higher-level verification by analyzing patterns in validation errors, reviewing outlying values, and identifying inconsistencies that required further investigation. Questionnaires that could not be resolved at the census office were returned to the enumerators through the supervisors for re-contact with the respondent or for data correction.

7.4 Data Cleaning, Editing, and Final Validation

After fieldwork, a multi-stage data cleaning process was implemented. Automated routines were applied to detect:

- **duplicate records** arising from field updates or newly identified holdings;
- **inconsistent area values** (e.g., parcels exceeding total holding area);
- **incorrect livestock counts** or missing structural information;
- **cases failing critical logical relationships** (e.g., livestock ownership without appropriate facilities or grazing types).

Problematic cases were reviewed manually by the CWG. When necessary and feasible, revisits or phone calls were conducted. Minor item non-response was addressed through imputation or logical deduction in accordance with the FAO WCA 2020 guidelines (FAO 2018). All edits were documented in a standard editing log to ensure transparency.

7.5 Confidentiality and Data Security

All data management procedures complied with national and international statistical confidentiality standards. Access to the Survey Solutions server was restricted to authorized personnel within MAAHF. Data transfers were encrypted, and regular backups were maintained to safeguard data integrity. No personal identifiers will be disclosed in published outputs. The final cleaned dataset constitutes the official basis for further analysis, the preparation of future thematic reports, the Final Report of the Sixth Agricultural Census 2025, and the monitoring of the SDG indicators.

8. Lessons Learned and Recommendations for Future Rounds

The implementation of the census represents a transformative shift from the manual, paper-based methods of the 2008 cycle to a fully modernized digital system. This transition has provided critical insights into the methodological, operational, and cultural requirements for maintaining a robust agricultural statistical system in Suriname. This chapter documents the key lessons learned during implementation and provides recommendations to inform the next Census of Agriculture and the development of annual agricultural surveys.

8.1 Methodological lessons

8.1.1 Sampling Design for Interior Districts

The stratified village sampling approach employed in districts Sipaliwini, Brokopondo, and the interior portion of Marowijne proved operationally sound, but the initial three-stratum design required adjustment during implementation. For Marowijne and Brokopondo, the upper population strata (villages with more than 500 inhabitants) contained too few villages to support independent inference, necessitating the collapse of all strata into a single sampling domain.

Lesson: Village stratification by population size alone does not adequately capture the heterogeneity of agricultural systems in Suriname's interior. Population is correlated with ethnicity and tribe, which in turn influence agricultural practices, land use patterns, and livelihood strategies. Future census rounds should explicitly incorporate ethnicity and tribal affiliation into the sampling frame design to improve representativeness and reduce estimation variance.

Recommendation for the Next Census: Redesign the village sampling frame to stratify by ethnicity (Amerindian and Maroon) and tribe, in addition to or instead of population size. This approach would better reflect the diversity of agricultural systems and improve the statistical efficiency of the sample. The stratification should be developed in consultation with Ministry officials, tribal authorities, and local representatives to ensure culturally appropriate boundaries and accurate village classifications.

8.1.2 Sampling Method for District Paramaribo

The one-stage cluster sampling design employed in Paramaribo, with a 10% sample of Enumeration Blocks (EBs), performed adequately given the low to medium agricultural intensity in the capital district.

Recommendation for the Next Census: Maintain the one-stage cluster design for Paramaribo, but consider applying proportional allocation with a fixed sampling rate at the EB level to reduce variation in sampling fractions across Ressorts.

8.1.3 Geographic Scope of Village Enumeration

A critical **lesson** from the census is that villages are not confined to the three interior districts. Villages with distinct settlement patterns and cultural characteristics also exist in districts Para, Saramacca, and Nickerie. However, the current census design did not account for these villages in the coastal enumeration strategy, potentially leading to incomplete coverage or misclassification of holdings in village communities located outside the designated interior sampling domain.

Recommendation for the Next Census: Conduct a comprehensive national village mapping exercise to identify all villages across Suriname, regardless of district. Develop a unified village enumeration protocol that applies consistently to all districts, ensuring that village-based agricultural systems are appropriately captured whether they occur in the interior or coastal zones. This protocol should include consultation with village chiefs and community leaders as a standard component of enumeration planning.

8.1.4 Complete Enumeration in Coastal Districts

The decision to conduct complete enumeration in the coastal districts proved highly effective, as these areas contain the vast majority of Suriname's agricultural holdings and nearly all medium- and large-scale holdings. This approach ensured comprehensive coverage and eliminated sampling error for the most agriculturally significant regions of the country.

Recommendation for the Next Census: Continue complete enumeration in coastal districts unless resource constraints or operational considerations necessitate sampling. The coastal enumeration provides a high-quality census benchmark and supports the development of a robust national list frame for future surveys.

8.2 Operational lessons

8.2.1 Digital Data Collection and CAPI Performance

The adoption of **Survey Solutions** and tablet-based data collection represented the first fully digital census operation conducted by MAAHF. The CAPI system performed well overall, significantly improving data quality through real-time validation, reducing data entry errors, and enabling immediate supervisory review. Built-in checks allowed enumerators to resolve inconsistencies during field visits, saving substantial time during post-enumeration data cleaning.

Lesson: CAPI validation checks and skip logic are highly effective tools for improving data quality and reducing the burden of post-processing. However, the successful deployment of CAPI requires comprehensive enumerator training, robust IT infrastructure, and technical support capacity.

Recommendation for the Next Census: Continue and expand the use of CAPI for all future agricultural censuses and surveys. Invest in ongoing capacity building for MAAHF staff in questionnaire programming, CAPI system administration, and troubleshooting. Establish a permanent IT support function within the Ministry to maintain the Survey Solutions infrastructure and provide technical assistance during field operations.

8.2.2 GPS Data Collection

Approximately 40% of GPS recordings were missing in the final dataset, representing a significant gap given the high demand for geospatial data to support agricultural planning, land use mapping, and climate resilience initiatives. The primary cause was the use of tablets with weak GPS receivers, which struggled to acquire accurate location data in forested areas, under tree cover, or in dense settlements.

Lesson: Standard tablets are not sufficient for reliable GPS data collection in Suriname's diverse environmental conditions. Accurate geolocation data require devices with stronger GPS receivers or supplemental GPS hardware.

Recommendation for the Next Census: Procure tablets equipped with high-sensitivity GPS receivers specifically designed for field data collection in challenging environments. Alternatively, consider providing enumerators with external GPS units that can be paired with tablets to improve location accuracy. Ensure that GPS functionality is tested during pre-enumeration training and pilot operations.

8.2.3 Phased Fieldwork Timing

The phased enumeration strategy—completing coastal enumeration first, followed by Paramaribo and village sampling—proved highly beneficial. Coastal enumeration was completed efficiently, allowing experienced enumerators and supervisors to be redeployed to support training and supervision in Paramaribo and interior districts. This approach maximized the use of trained personnel and improved overall field operation efficiency.

Recommendation for the Next Census: Maintain the phased enumeration approach, with coastal districts enumerated first, followed by Paramaribo and interior village sampling. This strategy enables the reuse of trained staff as trainers and supervisors for subsequent phases, improving quality and reducing training costs.

8.2.4 Village Enumeration and Community Engagement

Enumeration in interior villages required advance preparation not necessary in coastal areas. Successful census operations in the villages depended on prior consultations with village leaders (captains or granman), securing permission from traditional authorities, and collaboration with representatives of relevant ministries. Failure to conduct these consultations in advance can lead to delays, logistical complications, and, in some cases, reluctance from community members to participate.

Lesson: Village enumeration is not simply a technical exercise; it requires respectful engagement with traditional governance structures and cultural protocols. Advance preparation and community consultation are essential components of successful field operations in the villages.

Recommendation for the Next Census: Formalize community engagement as a mandatory pre-enumeration activity for all village-based enumeration. Develop a standardized protocol that includes advance meetings with village chiefs, traditional authorities, and representatives of several relevant Ministries to explain the purpose of the census, secure permission, and address community concerns. Budget sufficient time and resources for this preparatory phase, recognizing that it is integral to achieving high-quality coverage in the villages.

8.2.5 Accessibility and Logistics in Remote Areas

Enumeration in remote villages, particularly in districts Saramacca, Nickerie, and the interior portions of other districts, presented significant logistical challenges due to limited road access, long travel times, and high transportation costs.

Lesson: Complete coverage of all villages is operationally and financially challenging given Suriname's geography and infrastructure. Prioritization and resource allocation must balance statistical representativeness with operational feasibility.

Recommendation for the Next Census: Conduct a comprehensive accessibility assessment during the planning phase to identify villages that require special logistical arrangements (e.g., boat transport, extended field stays, or advance supply delivery). Allocate additional budget and time for remote village enumeration, and consider alternative enumeration strategies (e.g., community-based data collection or administrative data integration) for the most inaccessible locations.

Server Infrastructure and Data Security A temporary disruption of the Survey Solutions server during fieldwork highlighted the critical importance of robust IT infrastructure for digital census operations. The server failure required immediate intervention, fieldwork suspension, and system recovery measures to prevent data loss. While the issue was resolved without significant data loss, it underscored the vulnerability of digital systems to technical failures.

Lesson: Digital census operations depend on stable, secure, and well-maintained IT infrastructure. Server disruptions can jeopardize data integrity and delay field operations.

Recommendation for the Next Census: Invest in redundant server infrastructure, implement automated daily backups, and establish a formal IT contingency plan that includes rapid-response protocols for system failures. Ensure that technical support staff are trained in server recovery procedures and that backup systems are tested prior to fieldwork. Consider cloud-based hosting options with guaranteed uptime and professional technical support.

8.3 General Recommendations for the next Agricultural Census

8.3.1 Timing and Legal Framework

The delayed approval of the Sixth Agricultural Census 2025 legislation (passed on 30 December 2024, just days before the planned start of fieldwork) created significant operational challenges and compressed the timeline for final preparations. Future census operations would benefit from earlier legislative approval and a more extended preparation period.

Recommendation: Initiate the legislative approval process at least 12 months in advance of the planned census reference day. This buffer period allows for timely printing of materials, final system testing, enumerator recruitment, and logistical arrangements without undue time pressure.

8.3.2 Questionnaire Design and Cognitive Testing

The questionnaire development process benefited from multiple rounds of pre-testing, stakeholder consultations, and a full pilot census. In formal cognitive testing, respondents are interviewed to assess their understanding of specific questions. Such testing helps identify unclear formulations, ambiguous concepts, and respondent interpretation issues that may not be detected during pretesting.

Recommendation: Incorporate formal cognitive testing into the questionnaire development process for the next census. This testing should focus on complex or newly introduced questions, particularly those related to land tenure, production purpose, and agricultural practices. Cognitive testing should be conducted with a small sample of farmers representing different production systems, education levels, and linguistic backgrounds.

8.3.3 Post-Enumeration Survey - PES Timing

The PES was conducted after the conclusion of main fieldwork, as recommended by international best practices. However, the timing of the PES could be optimized to provide real-time feedback during enumeration, allowing for mid-fieldwork corrections if major issues are identified.

Recommendation: Consider conducting a rapid PES in a small subsample of enumeration areas during the early stages of main fieldwork. This approach would allow for the identification and correction of systematic listing errors, training deficiencies, or procedural issues before they affect the entire census. A second, more comprehensive PES could still be conducted after fieldwork to evaluate final coverage and content accuracy.

8.3.4 Integration with Administrative Data Systems

The census was conducted independently of administrative data systems maintained by Ressort officers and other Ministry divisions. While this independence ensures

methodological rigor, it also represents a missed opportunity for validation, cross-checking, and data integration.

Recommendation: Explore opportunities to integrate census data with administrative records during the planning and data processing phases. Administrative data can be used to validate census coverage, cross-check reported production levels, and identify potential omissions. Conversely, census data can be used to improve the quality and completeness of administrative registers, creating a mutually reinforcing data ecosystem.

8.4 Overall

The lessons learned and recommendations documented in this chapter should provide a roadmap for continuous improvement in Suriname's agricultural statistics system. The Sixth Agricultural Census has established a solid foundation; the next steps are to maintain that foundation, build on the successes achieved, and address the challenges identified. By doing so, Suriname will be well-positioned to conduct an agriculture census in the coming round of World Census of Agriculture 2030 (WCA 2030), (FAO 2026), and to operate a robust, sustainable program of annual agricultural surveys that supports evidence-based policymaking and agricultural development.

9. Conclusion

The **Sixth Agricultural Census 2025** represents a major milestone in the country's agricultural statistical system. Conducted after a gap of more than seventeen years, the census provides a comprehensive and updated structural baseline of the agricultural sector, while also establishing the foundation for a modern and sustainable agricultural data system.

From a methodological perspective, the census was implemented in line with international standards, particularly the **FAO WCA 2020**. The adoption of clearly defined national thresholds, harmonized classifications, and a combination of reference periods ensured the consistency, relevance, and comparability of the data. The mixed enumeration approach—combining complete enumeration in high-intensity agricultural areas with probability sampling in urban and Interior regions—allowed for efficient resource use while maintaining national representativeness.

Operationally, the census marked a significant transition toward **digital data collection**, with the full deployment of Computer-Assisted Personal Interviewing (CAPI) using the Survey Solutions platform. This shift improved data quality through built-in validation controls and strengthened supervision through real-time monitoring. At the same time, the experience highlighted the importance of robust IT infrastructure, data backup systems, and contingency planning to mitigate risks associated with digital operations.

The census also contributed to **institutional capacity development** within the MAAHF. Through training, hands-on implementation, and technical support, national staff gained practical experience in modern census methodologies, digital data collection, and data management systems. These gains are critical for the sustainability of future statistical activities.

Importantly, the census provides both **a sampling frame and a structural foundation** for the implementation of regular agricultural surveys, particularly the annual crop and livestock production surveys. The first of these surveys was conducted by the MAAHF in April 2026. In this regard, the census is not a standalone exercise but a key component of a broader effort to strengthen the agricultural statistical system in Suriname.

The results of the census are being disseminated through a structured reporting approach, including this **Methodology and Implementation Report**, **a Preliminary Report with Key Findings**, forthcoming thematic reports, and a **Final Report of the Sixth Agriculture Census 2025**. This phased dissemination strategy ensures timely access to results while allowing for more in-depth analysis over time.

In conclusion, despite operational challenges—including delays in implementation and technical issues encountered during fieldwork—the census was successfully completed and has generated a high-quality dataset. The experience provides valuable lessons for future censuses and surveys, particularly in areas such as fieldwork planning, IT systems management, and quality assurance. Building on these lessons, Suriname is well positioned

to further strengthen its agricultural statistics system and support evidence-based policymaking for the agricultural sector.

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