Toward Cost-Effective Agricultural Censuses: Cross-Country Insights from Latin America

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Abstract[1]

Agricultural censuses are widely recognized as the cornerstone of national agricultural statistical systems, providing detailed structural information every 5 to 10 years and serving as the basis for constructing sampling frames for probabilistic surveys. Yet, during the 2020 census round, only nine countries in Latin America managed to conduct an agricultural census, primarily due to the high cost of these operations. To date, there has been no systematic, cross-country analysis of agricultural census budgets in the region. This paper addresses that gap by drawing on a novel, detailed database of census budget data from four Latin American countries. Beyond estimating average costs, it identifies methods, tools, and operational innovations that can reduce expenditure without compromising data quality. The relevance of this research lies in its potential to strengthen the planning and budgeting of future agricultural censuses in the region. Its findings will provide governments with a practical reference for producing more accurate budget estimates and will support more effective resource mobilization efforts by both national authorities and international partners.

Keywords: Agriculture, Census, Costs, Budgets.

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Introduction

The Agricultural Census (AC) is widely acknowledged as the cornerstone of national agricultural statistical systems [1]. This operation is particularly vital in many developing countries where it often represents the only source of structural data for the agricultural sector. Furthermore, its unique ability to generate statistics on farms at the lowest administrative or geographical level makes it an essential tool for effective government and decision-making. Accordingly, the AC is typically the only statistical operation which can produce three main outputs: 1. structural data at the level of agricultural holding, 2. primary source to benchmark agricultural statistics produced by other means, and 3. sampling frames for inter census surveys.

The Food and Agriculture Organization (FAO) is mandated to produce international guidelines and provide technical assistance to countries to carry out ACs and recommends conducting an AC at least once every ten years. To ensure inclusion of emerging topics and incorporation of new best practices, FAO updates the World Census of Agriculture (WCA) in 10-year cycles. Accordingly, ACs undertaken during 2016-25 fall under the guidelines of the WCA 2020, and ACs undertaken during 2026-2035 will fall under WCA 2030 guidelines to be published during the first quarter of 2026.

Despite the importance of the AC, most countries cannot carry one out every 10 years in Latin America and the Caribbean. In fact, only 14 of the 32 member countries in the region participated in the WCA 2020 round, in other words, less than half of the countries in the region have adequate structural data for the agricultural sector. There are many reasons why planning and executing an AC is difficult, and participation is low. However, the financial costs are consistently cited as the primary impediment. Despite the census being an "indispensable source of information" for granular data and sampling frames, its implementation is becoming "increasingly less common" driven specifically by the "high costs of full enumeration." [2]. This aligns with the FAO's observation that governments face growing pressure to curtail statistical expenditures, often lacking the specific manpower or capital required to sustain such technically demanding operations [3].

Compounding this challenge is the unfortunate reality that standardized cost metrics are lacking, and detailed budgetary information for these operations is rarely made publicly available for external analysis. Accordingly, no systematic study has been undertaken during the 2020 census round which analyzes detailed census cost making it difficult to identify practices which minimize cost.

This paper aims to address this critical information gap by conducting a detailed cost analysis across five countries in the Latin American region. The primary goal is to systematically identify the major components and drivers of census expenditures. By collecting detailed expenditure data by major cost categories, the paper analyzes differences across countries to identify cost minimization strategies. The second purpose of the findings of this paper is intended to serve as a practical reference guide for countries currently planning ACs. By processing these cost data and making them internationally comparable, countries can use the results to inform their own budget planning and show how their estimates compare to recent ACs in other countries.

The first section of the paper describes methodology and data sources. The following sections provide a detailed summary of costs for each country, and the final section consolidates the results, and derives conclusions.

Methodology and Data Sources

Due to the lack of publicly available expenditure data on ACs, the authors distributed a survey designed in excel to the 5 countries which agreed to participate: Brazil, Chile, Mexico, Paraguay, and Uruguay. The excel forms were distributed to the management teams of the previous agricultural census, Table 1 below describes the country, institution, and year of the agricultural census. It is worth noting that expenditure data were requested, not what was budgeted.

Table 1: Description of ACs included

Country	Institution	Year of data collection
Brazil	Brazilian institute of Geography and Statistics (IBGE)	2017/2018
Chile	National Institute of Statistics (INE)	2020
Mexico	National Institute of Statistics and Geography (INEGI)	2022
Paraguay	Ministry of Agriculture and Livestock (MAG)	2022
Uruguay	National Institute of Statistic (INE) and Ministry of Livestock, Agriculture, and Fisheries (MAGyP)	2022 & 2024

The excel form was designed to ensure comparability by collecting data in current local currency units and included a break down by cost category. The cost categories were determined using the AC budget templates proposed by Vol 2 of the WCA 2020 [4]. The aim was to collect information disaggregated enough to facilitate the analysis of differences but not be overly burdensome for the informants.

To facilitate cross country comparison, yearly expenditure data were collected in local currency units. Then the data from all countries were converted to international dollars using Purchasing Power Parity (PPP) rates and adjusted by the GDP deflator. For this calculation, 2015 was established as the base year, with PPP rates and deflators sourced from World Bank databases [5, 6].

For deriving conclusions, standard indicators including cost per hectare, and cost per holding were calculated combining the collected expenditure data with the official census results.

Country Results

Brazil

The total cost of the agricultural census in Brazil was 295,222,759 (2015 PPP US dollars). The entire agricultural censuses operation was designed and implemented between 2016 and 2019, inclusive with data collection taking place between October 2017 and February 2018.

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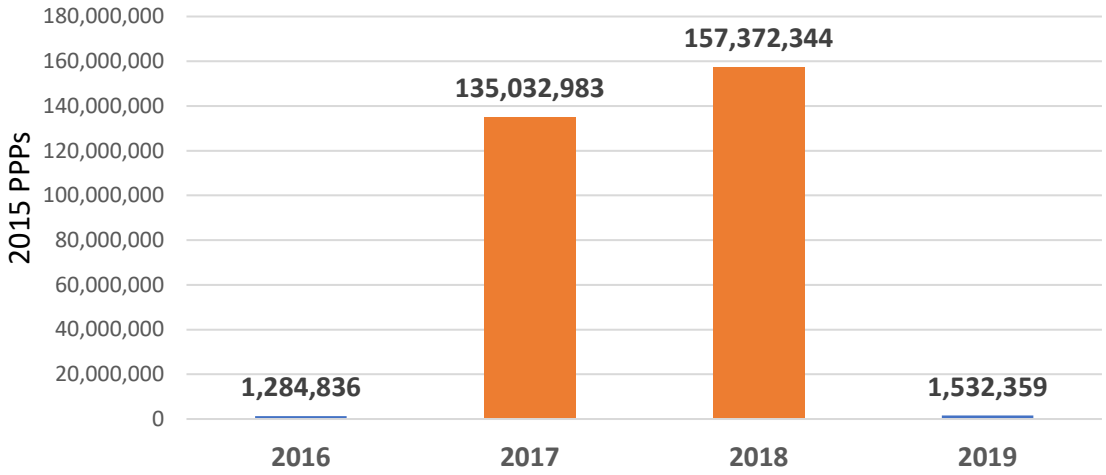
The census was a classical census based on full enumeration, using face-to-face CAPI interviews, the CAWI method was applied on a voluntary basis to 1,000 large holdings, and extended questionnaire was applied to large holdings meeting certain thresholds.

Figure 1: Total cost of agricultural census in Brazil, by year (2015 PPPs US Dollars)



Note: Years of data collection in orange.

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Table 2. Cost categories for Brazilian Agricultural Census by year (2015 PPPs US Dollars)

Cost category	2016	2017	2018	2019
Materials	19,262	1,633,524	391,824	4,085
Equipment	13,191	12,366,294	11,458,122	162,065
Communications and publicity	22,608	1,654,083	81,165	25,896
Training and capacity development	94,533	5,328,206	37,282	0
Data collection	784,981	82,521,787	117,623,184	307,667
Data processing and Analysis	318,857	31,083,887	26,593,089	959,556
Publication and dissemination	0	414	244,376	0
Management and general costs	2,634	104,456	25,161	0
Other costs	28,771	340,333	918,139	73,090
Total	**1,284,836**	**135,032,983**	**157,372,344**	**1,532,359**

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Chile

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Mexico

The total cost of the Agricultural and Forestry Census in Mexico amounted to 245,042,237 (2015 PPP US dollars). However, several considerations are necessary to interpret this figure accurately.

First, a major operational component of the census was carried out in 2016, and the associated costs were not included in the budget reported here. Specifically, a large-scale listing operation was conducted to construct the census frame. This exercise involved the identification, enumeration, and georeferencing of all agricultural holdings, as well as rural households and establishments without agricultural production. The resulting frame constituted a critical input for the 2022 Agricultural Census.

Second, the reported budget covers both agricultural and forestry activities. The inclusion of forestry operations, beyond crop and livestock holdings, necessarily increased total expenditures relative to what would have been required for a census limited solely to agricultural production units.

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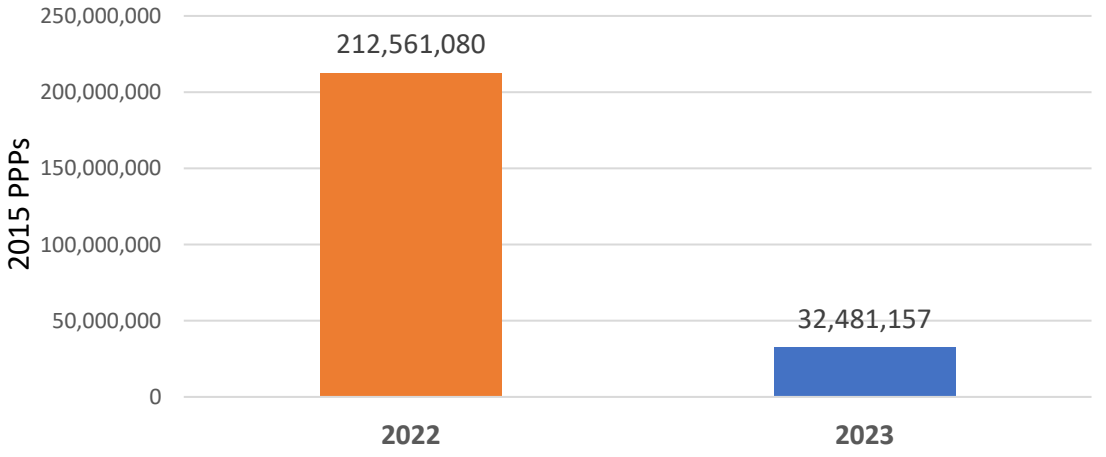
The census followed a traditional full-enumeration design. Data collection was conducted primarily through CAPI. However, PAPI was employed in areas with security constraints, and CAWI was piloted for large-scale producers, although this modality yielded a very low response rate. Data collection took place between September and November 2022, and final results were published in November 2023.

Three distinct questionnaires were administered: a short-form instrument for small- and medium-scale producers; an extended questionnaire for large-scale producers; and a specialized questionnaire for holdings exclusively engaged in forestry activities.

Figure 2: Total cost of Agricultural Census in Mexico by year (2015 PPPs US Dollars)



Note: Years of data collection in orange.

Table 3. Cost categories for Mexico Agricultural and Forestry Census by year (2015 PPPs US Dollars)

Cost category	2022	2023
Materials	2,332,109	0
Equipment	16,790,202	0
Communications and publicity	6,096,872	0
Training and capacity development	14,229,017	0
Data collection	118,932,528	17,356,279
Data processing and Analysis	5,857,800	5,301,416
Publication and dissemination	0	0
Management and general costs	47,533,840	9,772,606
Other costs	788,711	50,856
Total	**212,561,080**	**32,481,157**

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Paraguay

The total cost of the agricultural census in Paraguay was 12,774,589 (2015 PPP US dollars). The entire agricultural censuses operation was designed and implemented between 2020 and 2025, inclusive with data collection taking place between August and November 2022. Notably Paraguay was the only country to carry out a post enumeration survey, and did so during [Check]

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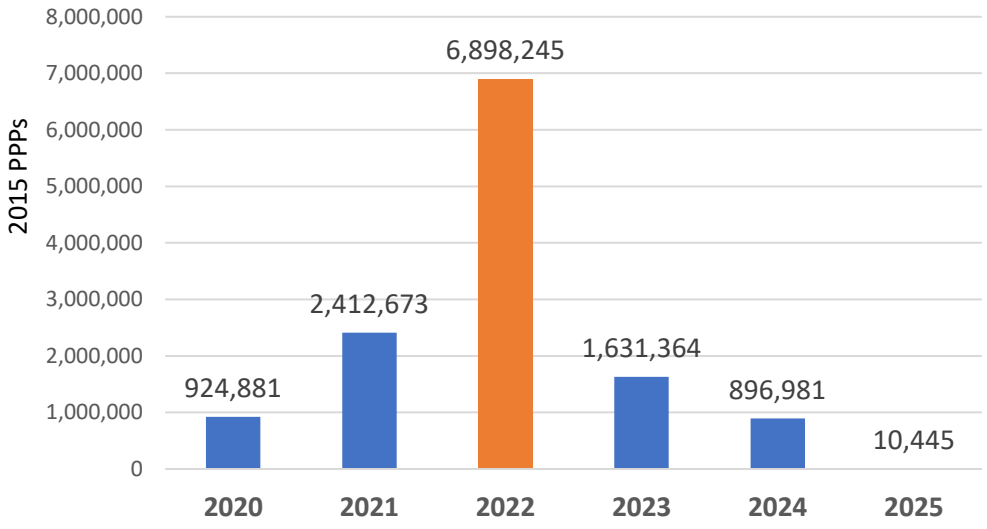
Figure 3: Total cost of Agricultural Census in Paraguay by year (2015 PPPs US Dollars)



Note: Years of data collection in orange.

Table 4. Cost categories for Paraguay Agricultural Census by year (2015 PPPs US Dollars)

Cost category	2020	2021	2022	2023	2024	2025
Materials	0	115,173	154,864	0	0	0
Equipment	0	160,575	1,038,522	0	0	10,445
Communications and publicity	0	0	249,227	0	0	0
Training and capacity development	0	0	173,272	0	0	0
Data collection	13,129	797,040	3,317,966	362,473	39,248	0
Data processing and Analysis	11,097	407,982	134,844	32,714	50,625	0
Publication and dissemination	0	0	55,290	23,269	15,253	0
Management and general costs	900,655	931,903	1,718,925	1,114,230	791,855	0
Other costs	0	0	55,334	98,678	0	0
Total	**924,881**	**2,412,673**	**6,898,245**	**1,631,364**	**896,981**	**10,445**

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Uruguay

The total cost of the agricultural census in Uruguay was 3,078,460 (2015 PPP US dollars). The entire agricultural censuses operation was designed and implemented between 2021 and 2025 in several phases. It began with a survey of large enterprises (holdings over 10,000 ha), conducted by phone and online in August 2022. The main fieldwork phase then ran from November 2022 to March 2023, using in-person interviews and covering just over 14,000 census units, of which 11,000 were agricultural holdings, for a total of 5.7 million hectares. Throughout 2023, several proposals were developed to complete the census, which were put into practice from March 2024 onward. The first phase ran from March to June 2024 combining in-person, phone, and online interviews, followed by a second phase from September 2024 to the present using phone and online interviews only [Check].

Figure 4: Total cost of Agricultural Census in Uruguay by year (2015 PPPs US Dollars)

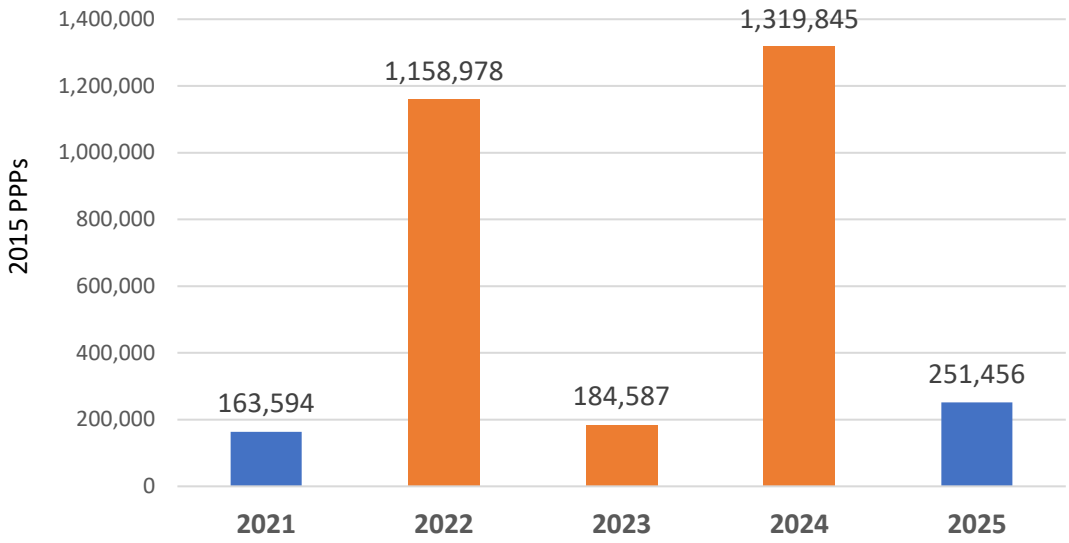

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Table 5. Cost categories for Uruguay Agricultural Census by year (2015 PPPs US Dollars)

Cost category	2021	2022	2023	2024	2025
Materials	24,912	28,320	25,259	0	0
Equipment	0	0	0	0	0
Comms and publicity	0	14,872	4,794	178,694	0
Training and capacity development	0	0	0	836	0
Data collection	81,772	1,058,957	96,833	645,043	152,568
Data processing and Analysis	52,853	52,779	53,589	311,623	75,020
Publication and dissemination	0	0	0	0	0
Management and general costs	0	0	0	99,144	23,868
Other costs	4,056	4,051	4,113	84,507	0
Total	**163,594**	**1,158,978**	**184,587**	**1,319,845**	**251,456**

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Comparisons across countries

There was significant heterogeneity across countries in areas such as thematic domains included in the questionnaire, use of long and short form depending on farm characteristics, thresholds, and mixed modalities including CAWI and CATI (Table 6).

Table 6: Key Agricultural Census Characteristics for 5 countries

Country/year	Fisheries or aquaculture	Forestry	Modality	Questionnaires	Total staff	Thresholds	PES
Brazil 2017	Yes	Yes	CAPI (smartphones – primary) CAWI (large holdings, <1,000 voluntary)	1 electronic questionnaire (with expanded sections for holdings above thresholds: ≥50 cattle, ≥50 pigs, ≥200 poultry, or ≥50 permanent crop trees)	~29,240	No cut-off thresholds. Covers urban areas with agricultural holdings. Excludes household gardens and leisure farms.	No
Chile 2021	No	Yes	CAWI (voluntary, open to all producers) CAPI (tablets, for remaining producers)	2 questionnaires: • Long form for lare holdings (282 questions, 16 sections) • Short form for small farms (20 questions, 4 sections — holdings <2 ha, no sales, CAPI only)	~2,325	Holdings <2 ha without sales → short questionnaire. Excludes recreational areas, zoos, gardens. National parks and forest reserves included (unlike 2007).	No
Mexico 2022	No	Yes	CAPI (primary) PAPI (high-risk areas) CAWI (large units; 0.14% used)	3 questionnaires: • Basic (small/medium agricultural units) • Expanded (large agricultural units) • Forestry production units	26,083	No cut-off thresholds. Excludes backyard/self-consumption/recreational holdings.	No
Paraguay 2022	No	Yes	CAPI (tablets)	2 questionnaires: • Full questionnaire (civil & juridical persons) • Short questionnaire (indigenous communities)	3,715	Min. thresholds apply (e.g. ≥0.1 ha crops, ≥3 adult bovines, ≥100 poultry). Excludes national parks, urban/suburban areas.	Yes
Uruguay 2022/24	No	No	CAPI, CAWI, and CATI	Various depending on characteristics	772	> 1 hectare	No

Note: Information compiled from Metadata Reviews available from FAO except Uruguay which was based on a reports shared by the Ministry of Agriculture.
Note: Uruguay figures to be updated.

For example, 4 of the 5 countries used, or attempted to incorporate CAWI into census operations. All the countries used longer form questionnaires only for large holdings and used abbreviated questionnaires for small holdings. Brazil and Mexico are the only countries which did not have explicit thresholds related to farm size, and Paraguay is the only country which used only 1 modality of interview: CAPI.

Table 7: Cost per holdings and area covered by agricultural census for 5 countries

Country	Holdings	Area (ha)	Total Cost	Cost per holding	Cost per hectare
Brazil	5,073,324	351,289,816	$295,222,759	$58.19	$0.84
Chile	175,556	45,774,419	*$37,475,876*	*$213.47*	*$0.82*
Mexico	5,194,342	102,155,122	$245,042,237	$47.17	$2.40
Paraguay	291,497	30,401,660	$12,774,589	$43.82	$0.42
Uruguay	57,074	17,000,000	$3,078,460	$53.94	$0.18

Note: Chile figures to be updated.

To facilitate comparison of cost, it is useful to compute the cost per holding and cost per hectare. The case of Chile is an outlier in terms of cost driven by the COVID19 which occurred at the height of census planning. However, on a per hectare basis, the Chilean

Main Findings

Conclusions

References

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