Liberia Institute of Statistics and Geo-Information Services

LIBERIA 2024 ANNUAL AGRICULTURE SURVEY

FINAL REPORT

October 2025

Ministry of Agriculture – Liberia – Integrity – Service – Inclusion

50x2030 Data-Smart Agriculture

Food and Agriculture Organization of the United Nations

The World Bank – IBRD • IDA

DATA SOURCES AND AVAILABILITY

LAAS-2024 Final Report is available online at: https://lisgis.gov.lr/census.php

Additional information from the LAAS-2024 can be obtained from the Liberia Open Data Portal via: https://liberia.opendataforafrica.org/data#topic=Agriculture

In addition, information not available in the LAAS-2024 Final Report and on the Open Data Portal may be obtained from the LISGIS Head Quarters.

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RELATED LINK

The LAAS-2024 microdata can be obtained from:

https://microdata.lisgislr.org/index.php/catalog/?page=1&ps=15

CITATION REQUIREMENT AND FORMAT GUIDANCE

Liberia Institute of Statistics and Geo-Information Services (LISGIS), Liberia Annual Agriculture Survey 2024 Final Report, November 2025.

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LIST OF ABBREVIATIONS AND ACRONYMS

ARREST	Agriculture, Roads, Rule of Law, Education, Sanitation and Tourism
AAID	ARREST Agenda for Inclusive Development
CAADP	Comprehensive Africa Agriculture Development Programme
CDA	Cooperative Development Agency
CARI	Central Agriculture Research Institute
FDA	Forestry Development Authority
FAO	Food and Agriculture Organization of the United Nations
GPS	Global Positioning System
HHs	Households
HISWAP	Harmonizing and Improving Statistics in West Africa Project
IFAD	International Fund for Agriculture Development
LAC	Liberia Agriculture Census
LAAPS	Liberia Annual Agriculture Production Survey
LISGIS	Liberia Institute of Statistics and Geo-Information Services
LRD	Liberian Dollar
MACs	Ministries, Agencies and Commissions
MoA	Ministry of Agriculture

EXECUTIVE SUMMARY

The Liberia 2024 Annual Agriculture Survey (LAAS-2024) was conducted by the Liberia Institute of Statistics and Geo-Information Services (LISGIS), in collaboration with the Ministry of Agriculture (MoA). The survey provides up-to-date national and regional estimates on crop and livestock production, input use, and rural livelihoods to inform agricultural policy and planning. It follows a stratified two-stage sampling design and covers all six agricultural regions of Liberia.

The findings confirm that agriculture remains the backbone of rural livelihoods, engaging the vast majority of households. Crop production is dominated by smallholder farming, with rice, cassava, maize, and vegetables as the main crops. The North Central region accounted for the largest cultivated area, representing nearly two-thirds of total national farmland. Average plot size stood at 1.7 ha, and most holdings operated only one or two plots. Traditional tillage was the prevailing land-preparation method (79 percent), while mechanized practices accounted for less than 1 percent.

Input use remains modest. Over 70 percent of farmers used uncertified seed, and only 7 percent applied inorganic fertilizer. Organic manure was the primary soil amendment, used by 17 percent of plots. Irrigation covered merely 1.6 percent of parcels, mostly watered manually from rivers and wells, highlighting the reliance on rain-fed agriculture. Pesticide application was limited and concentrated among vegetable growers, while greenhouse or high-shelter structures were reported on only 6 percent of parcels.

In livestock production, most households raised small ruminants or pigs. Goats were the most common species, followed by pigs and sheep. Feed purchases were limited, and disease treatment costs remained modest. Poultry production was more widespread compare to livestock, with indigenous chickens dominating household flocks.

Forestry and charcoal activities formed an important income source, especially in the North Western and South-Central regions, which together accounted for over half of national charcoal output. Palm wine, honey, and Xylopia were the most frequently sold forest products, demonstrating a growing commercial interest in non-timber forest goods.

Labor patterns reveal a strong dependence on family members. Women led planting and weeding, while men dominated land preparation and fencing. Hired labor was mainly used during land clearing and harvesting. Children contributed significantly to planting and weeding, especially in large households. Daily wage rates averaged LRD 379 for men and LRD 327 for women, with the highest wages observed in Montserrado.

Access to external support remains low. Only 1.8 percent of holdings received cash subsidies, 11.5 percent obtained loans, and 4.7 percent benefited from transfers for agricultural purposes. These results underscore the limited outreach of financial and technical assistance to smallholders.

In summary, the 2024 survey highlights a predominantly traditional agricultural sector, labor-intensive, low-input, and largely rain-fed, but also demonstrates the potential for productivity gains through improved input access, mechanization, and financial support.

1. Introduction

1.1. Background

Agriculture is the cornerstone of Liberia's economy and society, employing a large share of the population (0ver 68% in 2024) and serving as the primary source of livelihood for most rural households. The sector contributes significantly to the country's gross domestic product (GDP), supports food security, and provides raw materials for agro-industries. For example, the Central Bank of Liberia's sectoral analysis of real GDP for 2024 shows that agriculture and fisheries contributed 28.5 percent of total output, making it the second largest sector after services, which accounted for the highest share at 38.7 percent (Central Bank of Liberia Annual Report, 2024). Yet, despite its centrality, agriculture in Liberia continues to face a complex set of challenges. Productivity remains low, largely due to limited access to modern inputs, weak extension services, inadequate infrastructure, and the predominance of smallholder subsistence farming systems. These structural constraints are further compounded by vulnerability to climate variability, pests, diseases, and fluctuating market conditions. In fact, the 2024 Liberia Agriculture Census results show that Crop disease and animal damage are the two most challenges faced by farmers in agricultural communities. About 53.9 per cent of agricultural communities reported that crop disease is a major challenge for farmers while 46.2 per cent of them reported animal damage as a major challenge ((LISGIS), 2024).

Another pressing challenge, however, has been the absence of timely, reliable, and comprehensive agricultural data. For decades, data gaps have hampered evidence-based policymaking, effective program design, and accurate reporting on national, regional, and international commitments. The last agricultural census before 2024 was conducted in 1972, leaving a fifty-year gap in comprehensive sectoral statistics. During this period, Liberia experienced significant political, social, and economic transformations that profoundly altered the agricultural landscape. Policymakers and planners were forced to rely on fragmented data sources, often outdated and inconsistent, which limited the scope and effectiveness of agricultural interventions.

To address this long-standing deficit, Liberia conducted its second Agriculture Census in 2024, covering 2022/2023 farming activities. This exercise marked a historic step forward, offering for the first time in five decades a detailed structural overview of the sector. The census generated baseline statistics on the number, distribution, and characteristics of agricultural holdings, land use patterns, and the socio-demographic profiles of farming households. Equally important, the census established a sampling frame that now serves as the foundation for more frequent, modular agricultural surveys. This shift represents a deliberate move toward a modernized system of agricultural statistics capable of meeting both national planning requirements and international reporting standards.

In alignment with this vision, the Government of Liberia, through the Liberia Institute of Statistics and Geo-Information Services (LISGIS) and the Ministry of Agriculture, signed onto the 50x2030 Initiative to Close the Agricultural Data Gap. This global partnership, supported by the World Bank, FAO, IFAD, and other partners, aims to assist countries in generating high-quality, timely, and policy-relevant agricultural data by 2030. Under this framework, Liberia has committed to conducting one agricultural census and two annual agricultural surveys. This approach ensures a continuous flow of structural and current agricultural statistics, enabling the country to track agricultural performance, design targeted interventions, and monitor progress toward its development priorities.

The Liberia 2024 Annual Agriculture Survey (LAAS-2024) is the first of these regular agricultural surveys to follow the census. Unlike the census, which provides a structural snapshot, the LAAS-2024 delves into the dynamics of production, marketing, and household livelihoods. It generates data on crop areas, yields, and outputs, as well as on livestock, aquaculture, and forestry. It also captures socio-economic variables, including labor use, farm income, access to resources, and the adoption of agricultural practices. A unique feature of the LAAS-2024 is the integration of a Women Empowerment and Nutrition (WEN) module, designed to measure women's dietary diversity and assess their role in agricultural decision-making. This ensures that the survey contributes not only to economic analysis but also to gender-responsive policy and programming. At the national level, the results will directly inform the implementation of the ARREST Agenda for Inclusive Development (AAID), which identifies agriculture as a primary driver of economic transformation, job creation, and poverty reduction.

Beyond the national context, the survey plays a critical role in enabling Liberia to meet its regional and global obligations. Data generated will support reporting on the Sustainable Development Goals (SDGs), particularly those related to zero hunger (SDG 2) and gender equality (SDG 5), as well as on the Comprehensive Africa Agriculture Development Programme (CAADP) indicators.

In this way, the LAAS-2024 serves as both a continuation of the statistical modernization process initiated by the 2024 Census and a strategic tool for advancing Liberia's agricultural development. By bridging critical data gaps, it empowers policymakers, researchers, and development partners with the evidence required to design effective policies, target resources, and build resilience in the agricultural sector. The survey thus represents a vital milestone in the ongoing effort to transform Liberia's agriculture into a more productive, sustainable, and inclusive sector.

1.2. Objectives

The overarching objective of the LAAS-2024 is to produce reliable and nationally representative estimates of crop and livestock production, marketing, and related socio-economic characteristics at both national and regional levels. Specifically, the survey seeks to:

- Estimate total production quantities of major crops and livestock products, including harvested area and yields.
- Collect data on land use, farmland types, and input utilization to support yield estimation and productivity analysis.
- Gather socio-demographic and economic characteristics of agricultural households, including farm income, labor use, and ownership of assets and equipment.

1.3. Justification

The Government of Liberia has placed agriculture at the center of its national development agenda, the ARREST Agenda (Agriculture, Roads, Rule of Law, Education, Sanitation, and Tourism), recognizing its potential as a driver of economic growth and poverty reduction. For this vision to be realized, policymakers and stakeholders require accurate, comprehensive, and timely agricultural data. The LAAS-2024 responds directly to this need by generating evidence for policy formulation, program monitoring, resource allocation, and investment planning. In addition, the survey supports Liberia's obligations to report on regional and global commitments, including the SDGs and the CAADP. By bridging critical data gaps, the survey strengthens national planning and ensures that agriculture remains a catalyst for inclusive development and food security.

1.4. Report Structure

This report is organized into seven chapters. Following this introduction:

- Chapter 2 presents the characteristics of agricultural holdings and land, including their size, distribution, and tenure arrangements.
- Chapter 3 analyzes production activities in agriculture, livestock, aquaculture, fishing, and forestry, focusing on output levels, yields, and post-harvest outcomes.
- Chapter 4 examines agricultural practices and input use, highlighting land preparation, seed systems, fertilizer and pesticide application, irrigation, and other farm expenditures.

- Chapter 5 discusses the agricultural labor force, with attention to the type, gender distribution, and use of labor across different production domains.
- Chapter 6 reviews household access to subsidies, loans, and transfers.
- Chapter 7 concludes the report with key findings and recommendations.

The annexes provide methodological details, statistical tables, and a list of contributors.

1.5. Definition of Key Terms

To ensure clarity and consistency throughout the report, the following key terms are defined:

Agricultural holding: An economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes.

Household: arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living.

Enumeration Area (EA): The smallest geographical unit for data collection, defined during the 2022/23 Agriculture Census and used as the primary sampling unit for the survey.

Crop-cutting: A statistical method used to obtain objective measurements of crop yields by harvesting a specified plot within a farmer's field.

Land tenure: arrangements or rights under which the holder operates the land making up the holding.

Manure: fertilizer prepared from organic material.

Organic fertilizers: fertilizers prepared from processed plant or animal material and/or unprocessed mineral materials (such as lime, rock or phosphate) containing at least 5 percent combined plant nutrients.

Parcel: any piece of land of one land tenure type, entirely surrounded by other land, water, road, forest or other features not forming part of the holding or forming part of the holding under a different land tenure type.

Permanent crops: crops with a more than one-year growing cycle.

Plot: part or whole of a field on which a specific crop or crop mixture is cultivated

Production: actual quantity of produce, after drying and processing, ready for sale or consumption.

Tillage: any physical loosening of the soil carried out in a range of cultivation operations, either by hand or mechanized.

KEY FINDINGS

Characteristics of Agricultural Holdings and Land

In Liberia, agriculture is concentrated in the North Central region (51% of holdings). Most holdings are unregistered (86%), with limited land documentation (14%). Average parcel size is small, mostly inherited, and under customary tenure. Average plot size is 1.7 ha, mostly prepared by hand tools. Only 16% of the agricultural population have secure land rights, and women remain significantly disadvantaged in ownership.

Agricultural Labor

Family labor dominates agricultural work. Women lead planting and weeding, while men handle land preparation and fencing. Hired labor is mainly for clearing and harvesting, with daily wages averaging LRD 379 for men laborers and LRD 327 for women laborers. Children also contribute to agricultural holdings activities. During the 2023/2024 farming season, approximately 3.6 million and 2.4 million hirings of men and women, respectively were done for crop production activities. This show that agricultural holdings employ more men for crop cultivation activities than women and it is important for the rural workforce.

Production Activities

Crop production dominates agricultural holdings activities, with rice, cassava, maize, and vegetables as main crops. A total of 201,074 metric tons of rice was produced. The average yield of 2.0 metric tons of rice per hectare is the highest among staple crops, underscoring rice's central role in Liberia's food system. Despite this, harvested area represents only about 75 percent of planted area, suggesting losses due to flooding, pest damage, or incomplete harvesting.

Goats and pigs are the most common type of livestock raised; poultry (especially indigenous chickens) is commonly practice compare to livestock, but largely traditional.
Aquaculture and fishing are limited, with low commercialization.
Forestry and charcoal activities are key income sources, especially in North Western and South-Central regions. Nationally, charcoal holdings reported sales value of about LRD 5 billion with the average holding making LRD 76,517.00.

Agricultural Practices and Input Use

Farming in Liberia remains largely traditional and subsistence-oriented. About 79% of plots are cultivated using hand tools, with minimal mechanization (less than 1%).

Only 7% of farmers apply inorganic fertilizers and 17% use organic manure. Use of improved or certified seeds is rare, and most farmers rely on local or recycled varieties. Pesticide and herbicide use are mainly limited to vegetable growers. Irrigation coverage is extremely low (1.6%), leaving crop production highly dependent on rainfall patterns. Limited access to extension services and input markets continues to constrain productivity.

Access to Subsidies, Loans, and Transfers

Access to external support is very limited. Only 1.8% of holdings received subsidies, 11.5% accessed loans, and 4.7% benefited from cash or in-kind transfers. Farmers mostly rely on personal savings and informal borrowing.

2. Characteristics of Agricultural Holdings and Agricultural Land

Agricultural holdings form the foundation of Liberia's agriculture sector, shaping how land, labor, and inputs are combined to generate food, income, and livelihoods. Understanding the distribution, size, and characteristics of these holdings is therefore critical for assessing agricultural potential and identifying constraints to productivity. This chapter presents an overview of the structural features of agricultural holdings, including their spatial distribution, legal status, land use, and parcel characteristics. Through the analysis of these dimensions, the chapter provides insights into the organization of agriculture across Liberia's regions and highlights structural factors that influence production outcomes.

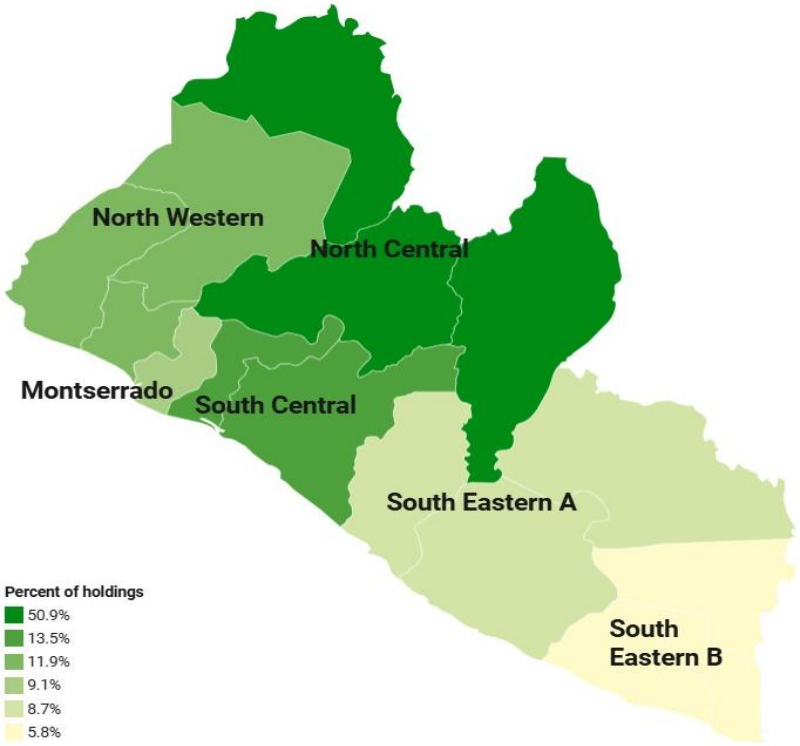
2.1 Size and Spatial Distribution of Agricultural Holdings

North Central region dominates agricultural activity, with half of all holdings.

Agricultural activity in Liberia is not evenly distributed across the country. Figure 1 shows the spatial distribution of agricultural holdings by region. The results reveal that the North Central region dominates agricultural activity, with just over half (50.9 percent) of all holdings. The North Central region is general known for its vast land area and heavy dependence on farming as a primary livelihood. The South-Central region ranks second, with 13.5 percent of holdings.

Montserrado (the region of the capital Monrovia), despite being the most urbanized and densely populated county, accounts for 9.1 percent of holdings, demonstrating the persistence of peri-urban farming in and around Monrovia. The Southeastern regions have smaller shares, with Southeastern A contributing 8.7 percent and Southeastern B just 5.8 percent of holdings. Collectively, these figures underline the centrality of the North Central region as the country's agricultural heartland.

FIGURE 1: SPATIAL DISTRIBUTION OF AGRICULTURAL HOLDINGS



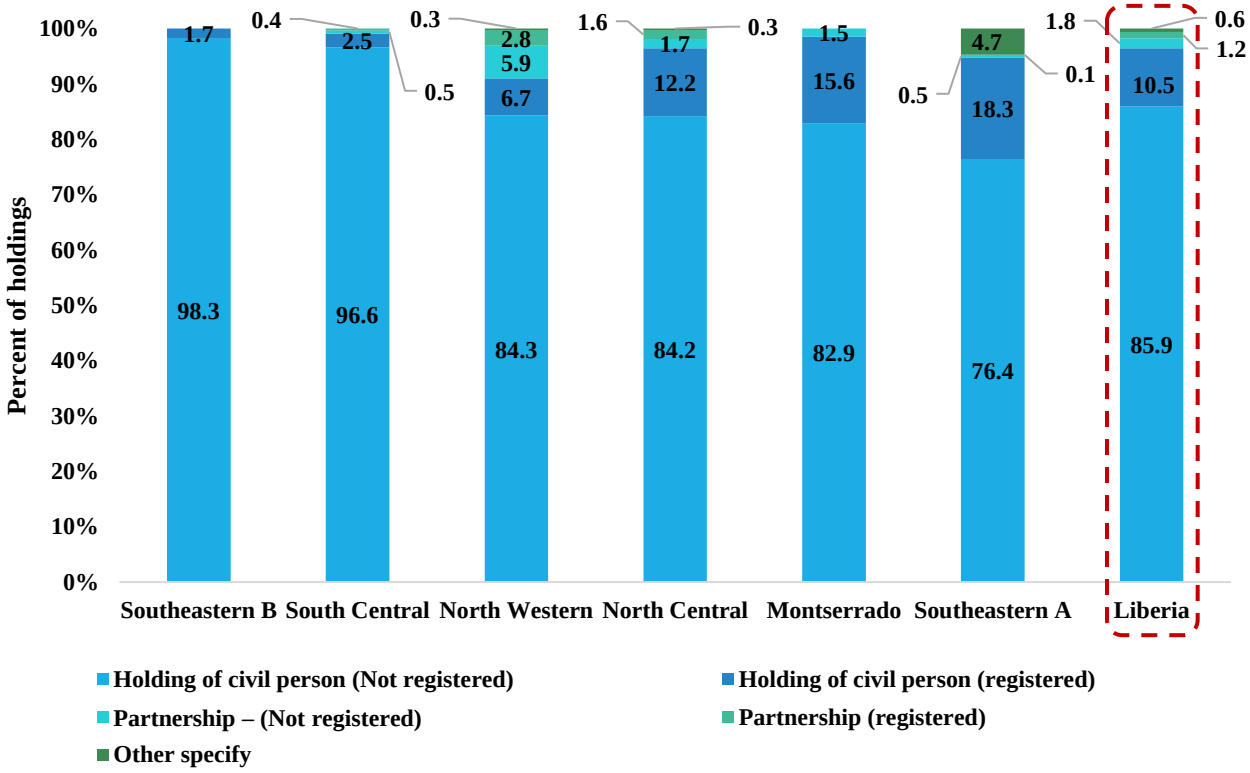
2.2 Legal Status of Agricultural Holdings

The majority of holdings are operated by civil persons without formal registration.

The legal framework under which holdings operate has significant implications for tenure security, investment, and productivity. **Figure 2** presents the distribution of agricultural households by the legal status of their holdings. The findings indicate that the majority of holdings are operated by civil persons without formal registration, accounting for 85.9 percent of all holdings nationwide. Only 10.5 percent of holdings are owned by registered civil persons, while partnerships (both registered and unregistered) constitute a marginal share of less than 3 percent.

The highest share of unregistered holdings is found in Southeastern B (98.3 percent), while Southeastern A and Montserrado record the largest proportions of registered holdings (18.3% and 15.6%, respectively). This distribution reflects both regional differences in access to land administration services and the influence of urbanization in Montserrado, where land transactions are more likely to be formalized.

FIGURE 2: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY LEGAL STATUS AND REGION



2.3 Agricultural Activities

Agricultural households are overwhelmingly crop-focused, with nearly all holdings nationwide engaged in crop cultivation.

Agricultural holdings often engage in multiple activities, ranging from crop cultivation to livestock and aquaculture. In the case of Liberia, agricultural holdings are overwhelmingly crop-focused, with nearly all holdings nationwide engaged in crop cultivation (97.9 percent). However, other agricultural activities are also practice across the country, even though less common. North Western stands out for its relatively high engagement in poultry production (24.9 percent), while Montserrado and Southeastern B record almost no livestock or aquaculture activity. These findings highlight the heavy dependence on crop-based farming systems across the country and the underdeveloped nature of livestock and aquaculture sectors.

TABLE 1: DISTRIBUTION OF HOLDINGS BY AGRICULTURAL ACTIVITIES PRACTICED AND REGION[1]

Region	Number of holdings	Crop (%)	Livestock (%)	Poultry (%)	Aquaculture (%)
Southeastern A	30,268	96.5	10.1	12.5	2.5
Southeastern B*	20,335	99.2	0.3	0.0	1.0
North Central	177,259	97.6	4.7	6.2	1.8
North Western	41,478	97.3	7.3	24.9	6.1
Montserrado*	31,673	98.9	0.0	0.0	1.6
South Central	46,988	99.1	0.6	1.0	0.8
Liberia	348,000	**97.9**	**4.3**	**7.3**	**2.2**

***** *The zeros in the table does not represent a true zero but rather smaller proportions relative to the total number of holdings in the respective regions.*

2.4 Agricultural area by use type and size.

Liberia's agriculture is predominantly smallholder-based, with holdings in the North Central region cultivating the largest amount of land.

The LAAS-2024 data provides details on the total and average size of holdings, agricultural land, and planted area by region. Liberia's agriculture is predominantly smallholder-based, with the national average holding size at 4.4 hectares. However, there is wide regional variation. The North Central region has the largest holdings on average (6.6 ha), reflecting both land availability and extensive farming practices. In contrast, the South Central and Southeastern B regions record much smaller average holding sizes of 1.1 and 1.5 hectares, respectively.

[1] Percentages may exceed 100% due to multiple activities being practiced by the same household.

Across the country, only a portion of agricultural land is planted: of the 1.49 million hectares of total holdings, 1.29 million hectares qualify as agricultural area, but just 896,393 hectares were planted in the reference year. This indicates that a significant share of arable land remains either fallow or underutilized, suggesting opportunities for expansion and intensification if supported by improved inputs and infrastructure.

TABLE 2: TOTAL AND AVERAGE SIZE OF HOLDINGS, AGRICULTURAL AREA AND PLANTED AREA BY REGION

Region	Land area (Ha)		Agricultural Area (Ha)		Planted Area (Ha)	
	Total	Average	Total	Average	Total	Average
Southeastern A	74,128	2.5	41,917	1.5	39,302	1.4
Southeastern B	29,791	1.5	21,374	1.1	21,104	1.1
North Central	1,138,761	6.6	997,457	5.9	627,394	3.7
North Western	136,172	3.4	130,459	3.3	121,955	3.1
Montserrado*	59,957	1.9	54,360	1.8	49,389	1.6
South Central	52,854	1.1	45,012	1.0	37,249	0.8
Liberia	**1,491,662**	**4.4**	**1,290,578**	**3.9**	**896,393**	**2.7**

*This region has *values with CV > 33% or SE > 17.5% and are therefore considered unreliable and should be interpreted with caution.*

2.5 Number and size of parcels.

Agricultural holdings at the household level have an average of two parcels, measuring two hectares on average.

Agricultural holdings at the household level reported over 730,000 parcels, averaging just over two parcels per holding during the reference agricultural season. The North Central region accounts for the largest parcel area, exceeding 1.1 million hectares, with parcels averaging 3.0 hectares each. In contrast, South Central has the smallest average area per parcel, averaging only 0.5 hectares.

TABLE 3: TOTAL AND AVERAGE NUMBER OF PARCELS AND PARCEL SIZE PER HOLDING BY REGION

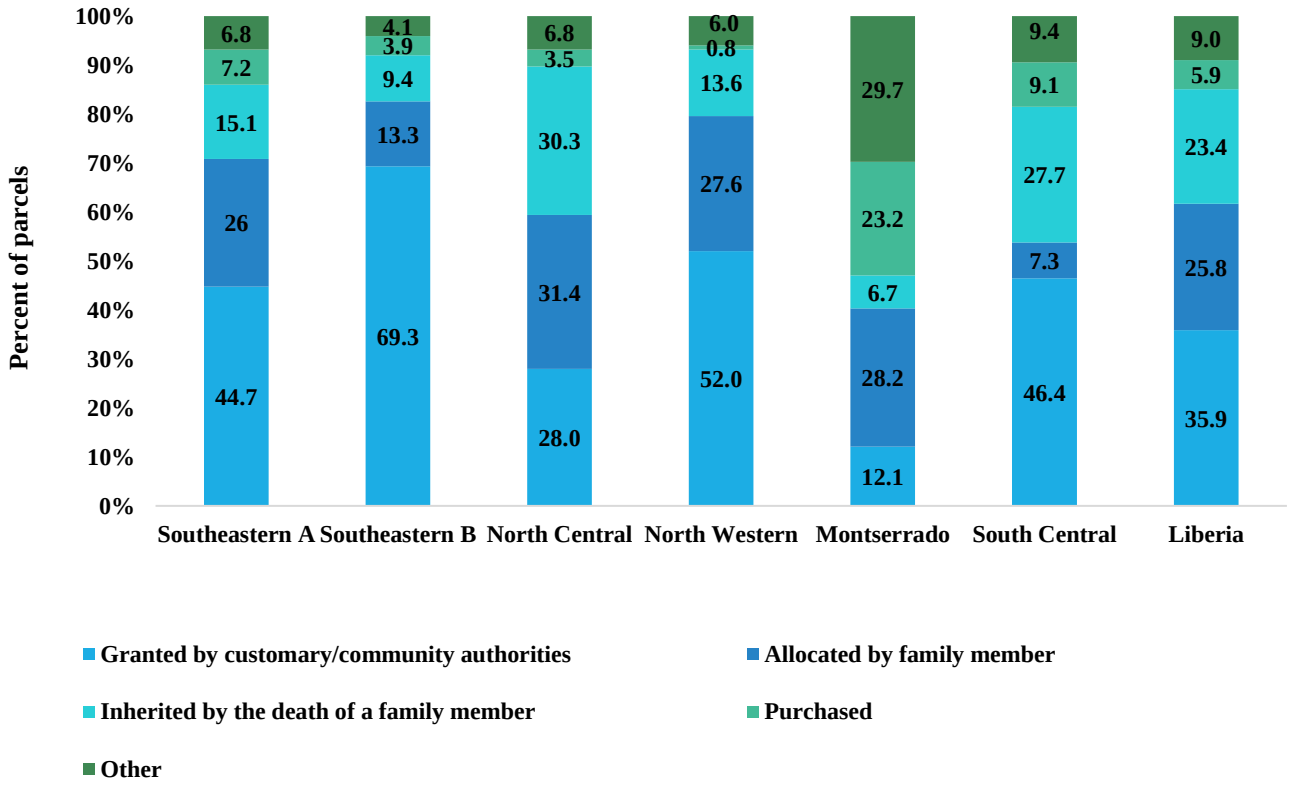
Region	Parcels		Parcel Area (Ha)	
	Number of parcels	Average per holdings	Total	Average per parcel
Southeastern A	60,054	2.1	74,128	1.2
Southeastern B	44,847	2.2	29,791	0.7
North Central	377,502	2.2	1,138,761	3.0
North Western	87,997	2.2	136,172	1.5
Montserrado	62,227	2.0	59,957	1.0
South Central	99,114	2.1	52,854	0.5
Liberia	**731,741**	**2.1**	**1,491,662**	**2.0**

2.6 Parcel acquisition method and tenure system.

Acquisition of parcels through customary means is more common in Liberia than other acquisition methods. However, most parcels are often operated under inherited arrangements.

This section analyzes how agricultural holdings at the household level acquired parcel and under which tenure system they operate the land making up their holding. The data presented in this subsection highlight the diversity of land acquisition and tenure arrangements across regions. The most common form of parcel acquisition nationwide is customary, followed by land allocated by family members and inheritance. However, there are striking regional differences: in Southeastern B, almost seven in ten parcels (69.3 percent) are acquired through customary allocation, the highest share nationally. On the other hand, acquiring parcels through purchase is most common in Montserrado (23.2 percent), reflecting the influence of urban land markets.

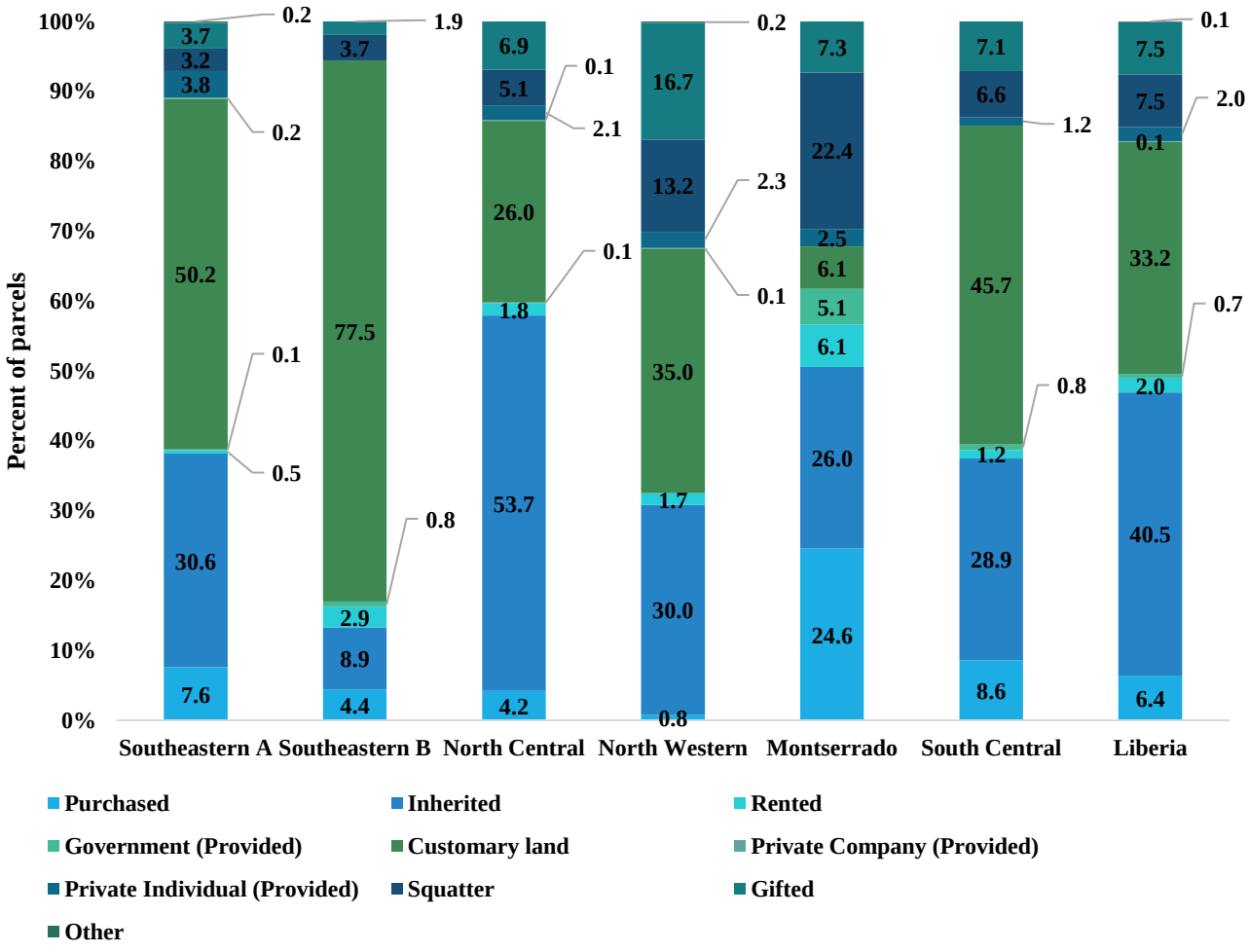
FIGURE 3: PERCENT DISTRIBUTION OF PARCELS BY ACQUISITION METHOD AND REGION



When examining tenure systems (**see Figure 4**), inherited arrangements dominate nationally (40.5 percent), with North Central region showing the highest reliance (53.7 percent). In contrast, Southeastern B has the largest share of customary land tenure (77.5 percent), while Montserrado record the highest percentage of parcels under purchase arrangements (24.6 percent). These results

highlight the duality of Liberia's land system, where inherited and customary arrangements coexist with growing urban land commercialization.

FIGURE 4: PERCENT DISTRIBUTION OF PARCELS BY TENURE SYSTEM AND REGION



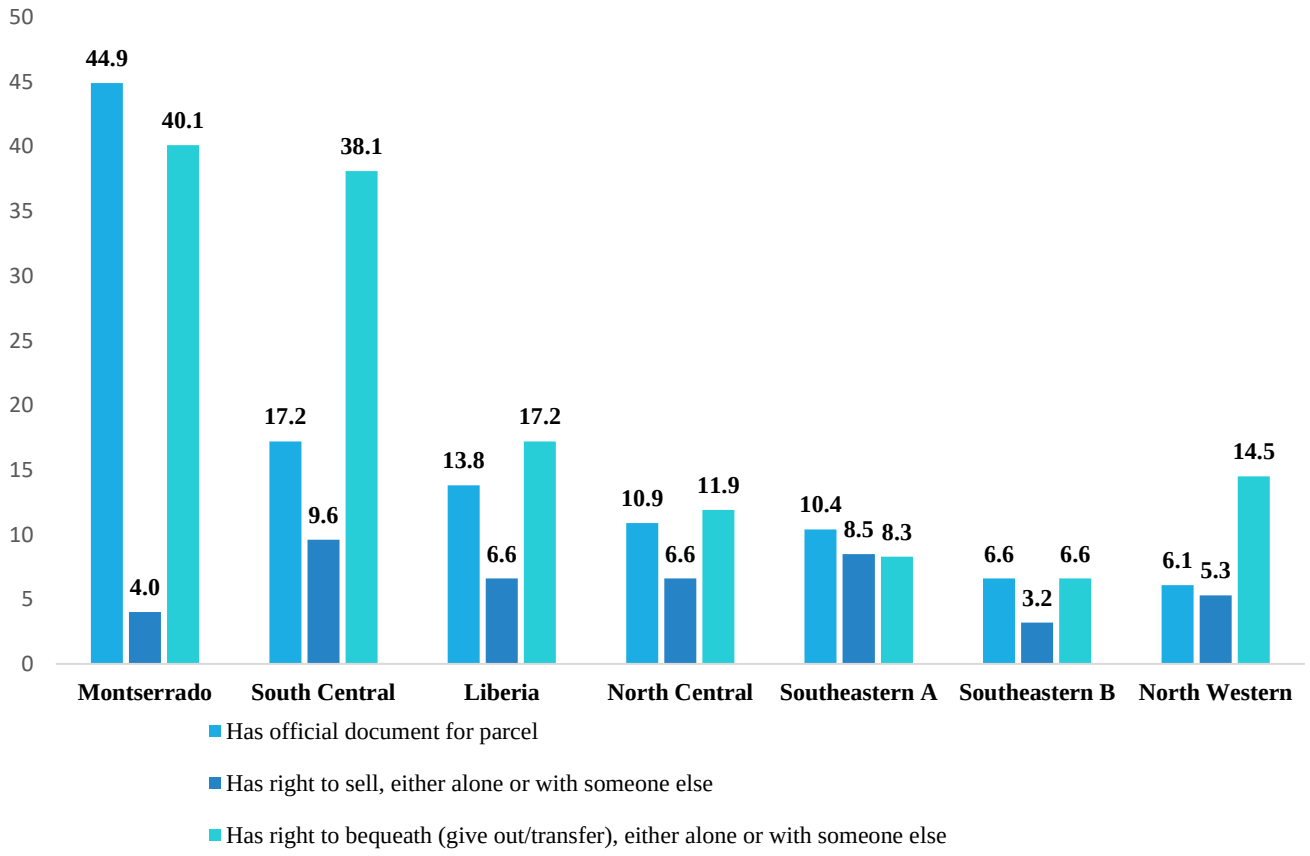
2.7 Official documentation and rights to sell/bequeath.

Land documentation among agricultural households in Liberia is limited, with documentation being more pronounced in Montserrado.

Land documentation among agricultural households in Liberia is limited. Nationally, only 13.8 percent of holdings have official documentation for their parcels. Montserrado stands out as the region with the highest level of documentation (44.9 percent), reflecting urban land pressures and formal transactions. By contrast, Southeastern B has the lowest share (6.6 percent), suggesting limited access to land formalization services in rural areas.

Interestingly, the right to bequeath land is somewhat more widespread than the right to sell, with 17.2 percent of holdings nationwide reporting such rights. This suggests that land is more often transferred through inheritance than through market-based sales.

FIGURE 5: PERCENTAGE OF HOLDINGS WITH OFFICIAL DOCUMENTATION AND RIGHTS TO SELL/BEQUEATH PARCELS



2.8 SDG 5.a.1 for Liberia

The Sustainable Development Goal (SDG) indicator 5.a.1 is a global benchmark for assessing ownership and control over agricultural land. It is designed to capture both the legal recognition of rights (through documentation) and the perceived security of those rights (through tenure and transferability). By aligning with this standard, Liberia is able to situate national progress on both men and women's property rights within an international framework, ensuring that efforts to advance gender equality are visible, comparable, and accountable at the global level.

The Indicator is divided into two sub-indicators:

(a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex.

(b) Share of women among owners or rights bearers of agricultural land, by type of tenure.

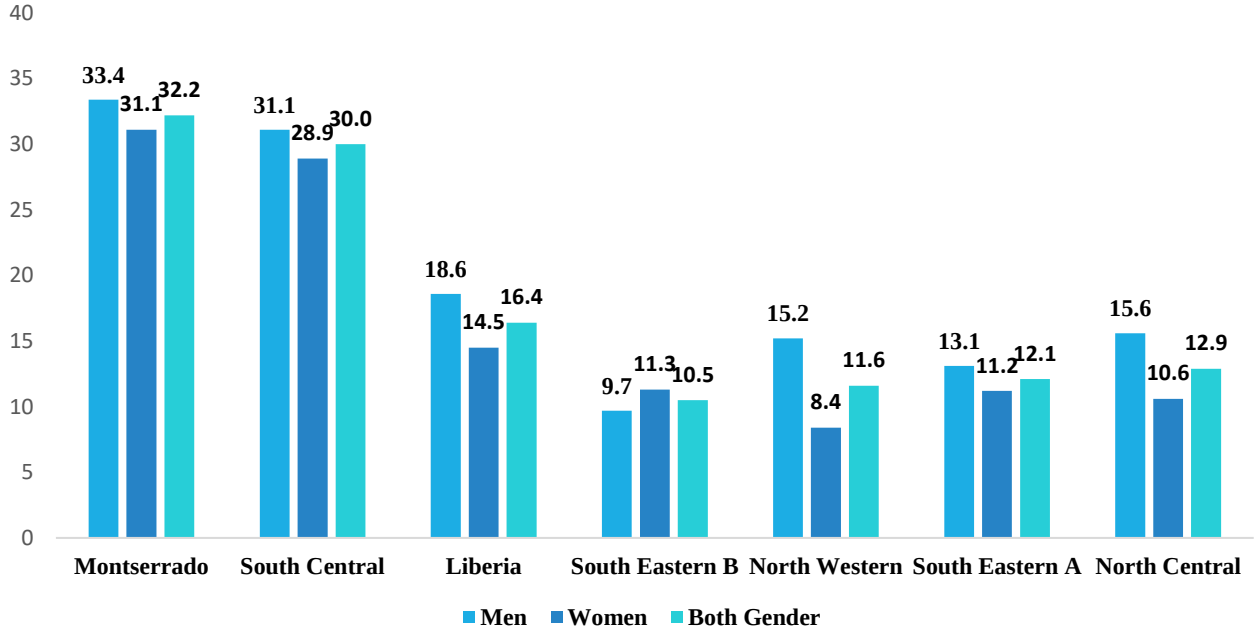
Sub-indicator (a) measures the prevalence of people in the agricultural population with ownership or tenure rights over agricultural land (disaggregated by sex) while sub-indicator (b) focuses on the gender parity, measuring the extent to which women are disadvantaged in ownership/tenure rights over agricultural land.

The findings in this section have significant implications for Liberia's progress toward SDG 5.

The proportion of the total agricultural population with ownership or secure rights over agricultural land is low in Liberia. Also, the vast majority of women in agriculture still lack either formal land ownership or assured tenure compare to men.

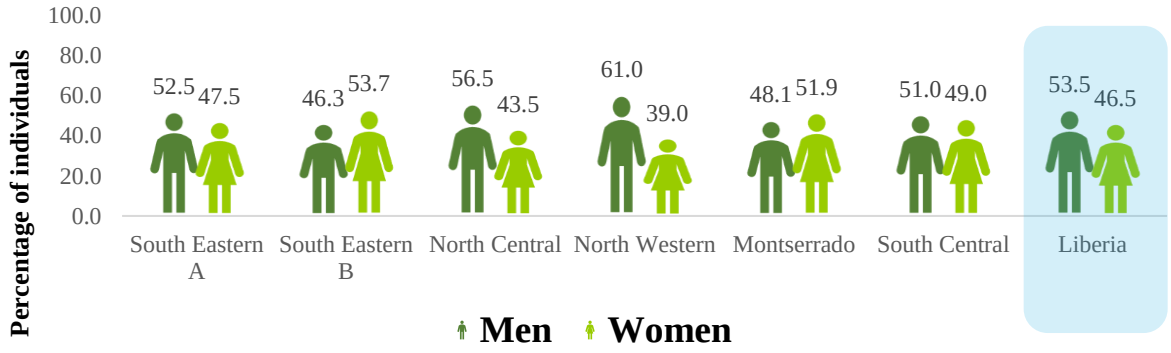
In general, the proportion of the total agricultural population with ownership or secure rights over agricultural land is low in Liberia. The LAAS-2024 data shows that only 16.4 percent of individuals, aged 15 years and above, living in agricultural households has ownership or secure rights to land. The highest prevalence of people in the agricultural population with ownership or tenure rights over agricultural land is observe in the Montserrado (32.2%) followed closely by the South-central region (30.0%), while the lowest prevalence is observed in Southeastern B (10.5%). When disaggregated by sex, the proportion of women in the total agricultural population with ownership or secure rights to land remains very low (14.5%), compared to about 19% for men. This indicates that the vast majority of women in agriculture still lack either formal land ownership or assured tenure, a critical gap to close for achieving equal land access.

FIGURE 6: PERCENTAGE OF INDIVIDUALS WITH OWNERSHIP OR TENURE RIGHTS OVER AGRICULTURAL LAND OUT OF TOTAL AGRICULTURAL POPULATION



Meanwhile, SDG 5.a.1(b) shows a moderate gender gap between rights bearers of agricultural lands: women make up about 47% of agricultural land owners nationally. In the North Western region, women's share is alarmingly low (39% of land owners are women compare to 61% for men). In Southeastern B and Montserrado, women constitute the majority of agricultural land owners (53.7% in South Eastern B and 51.9% in Montserrado).

FIGURE 7: SHARE OF MEN AND WOMEN AMONG INDIVIDUALS WITH OWNERSHIP OR TENURE RIGHTS OVER AGRICULTURAL LAND

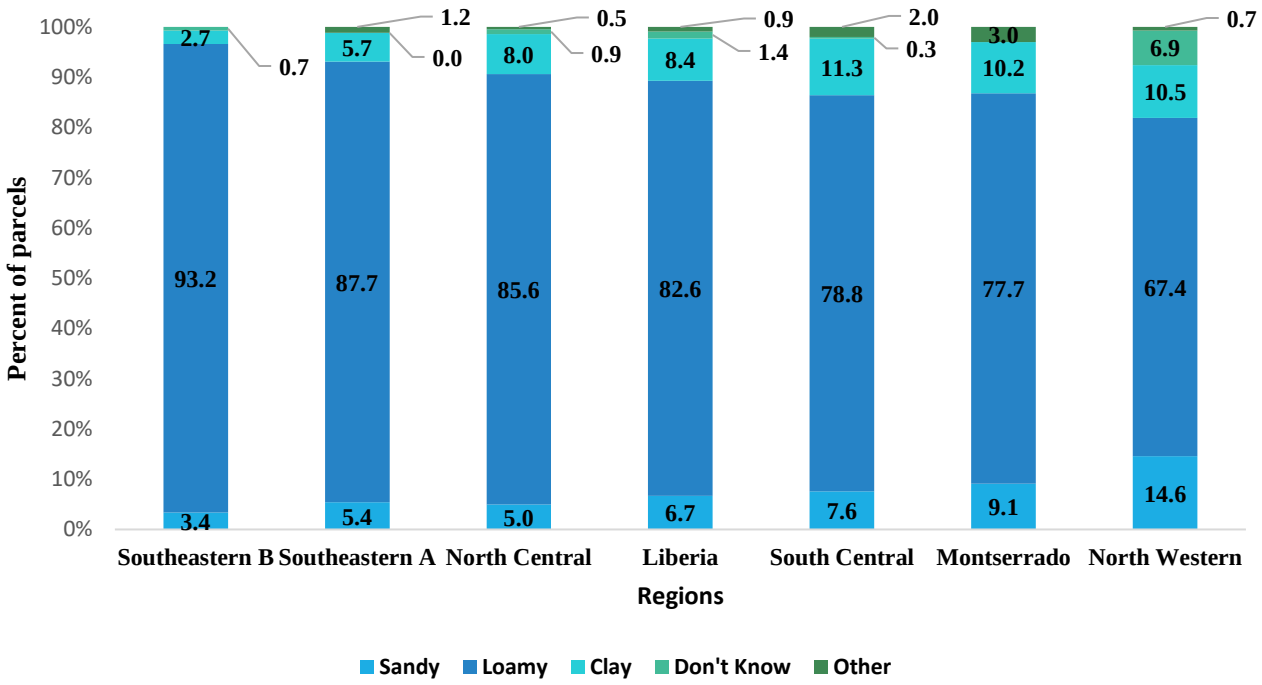


2.9 Characteristics of Parcels: soil type and erosion control

The vast majority of agricultural parcels are composed of loamy soils. Erosion incidence was reported on about three out of ten parcels. Unfortunately, no erosion control was reported on the majority of affected parcels.

The results on parcel characteristics show important variations in natural resource conditions. Loamy soils dominate across Liberia (82.6 percent of parcels), which is favorable for crop production. However, the North Western region has the highest share of sandy soils (14.6 percent) and a noticeable share of clay soils (10.5%), which may pose fertility challenges. South Central reports the highest proportion of parcels composed of clay soils (11.3%). Montserrado also records a notable share of clay soils (10.2 percent).

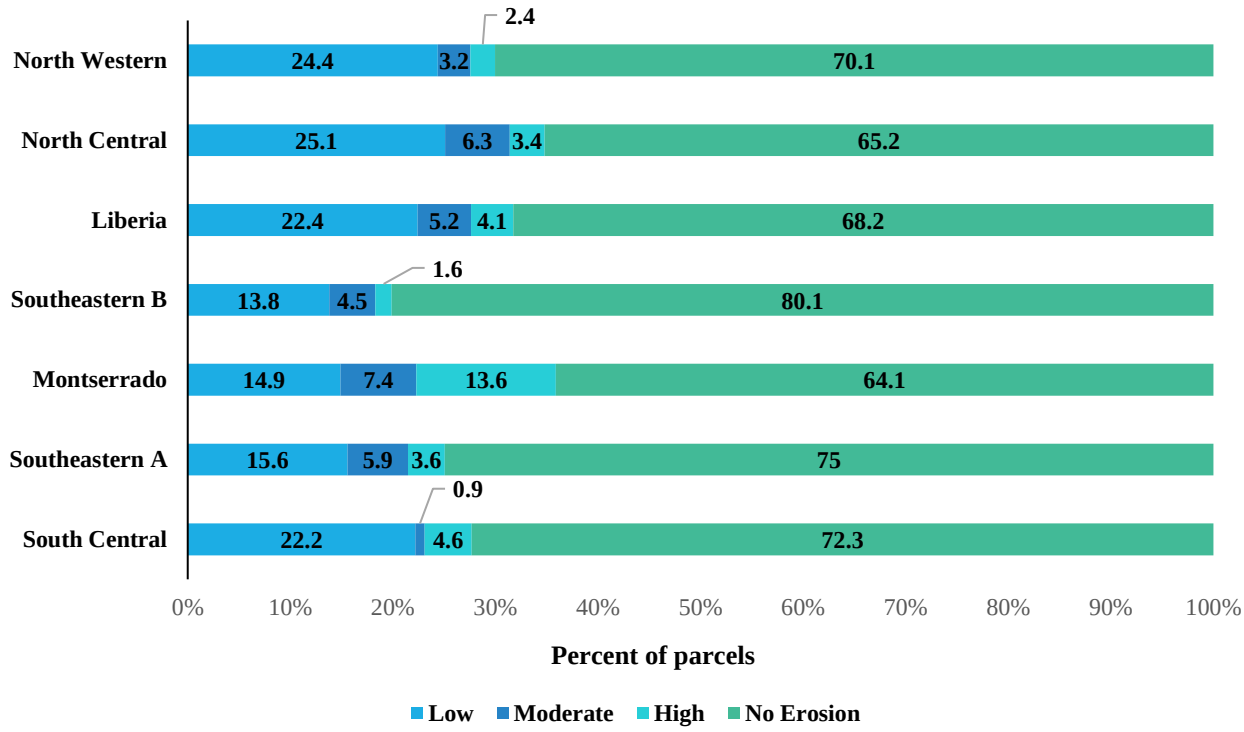
FIGURE 8: PERCENT DISTRIBUTION OF PARCELS BY SOIL TYPE



Erosion affected about 3 out of ten parcels. Its prevalence is most severe in Montserrado, where 13.6 percent of parcels report high erosion, more than triple the national average. Southeastern B records the lowest erosion, with 80.1 percent of parcels unaffected.

Control measures remain limited overall. Nationwide, 87.2 percent of parcels reported no erosion control, with Montserrado being the only region where more than 15 percent of parcels use drainage ditches as a protective measure. This suggests that erosion management is still underdeveloped, despite its importance for sustainable land use.

FIGURE 9: PREVALENCE OF EROSION ON PARCEL (IN %)



2.10 Number and size of plots

The average number of plots per holding is two, with each measuring 1.7 hectare.

A total of 537,076 plots were reported by agricultural holdings, with a total area of 896,393 hectares. On average, holdings have two plots, measuring 1.7 hectare each. As expected, the North Central region dominates, with more than 300,000 plots covering 627,394 hectares, far exceeding any other region. This also gives North Central the largest average plot size (2.1 hectares). At the other extreme, the South-Central region records the smallest average plot size (0.6 hectares), despite having a relatively large number of plots (almost 59,000). Southeastern B also shows small average plot sizes (0.7 hectares), indicating more fragmented landholdings.

Montserrado stands out with the lowest number of plots per holding (1.3 on average), consistent with its more urbanized setting where land for agricultural purpose is scarce. These results point to clear regional differences in agricultural land use: more holdings with larger plots in North Central versus smaller, more fragmented plots in coastal and urban regions.

TABLE 4: NUMBER OF PLOTS AND PLOT AREA BY REGION

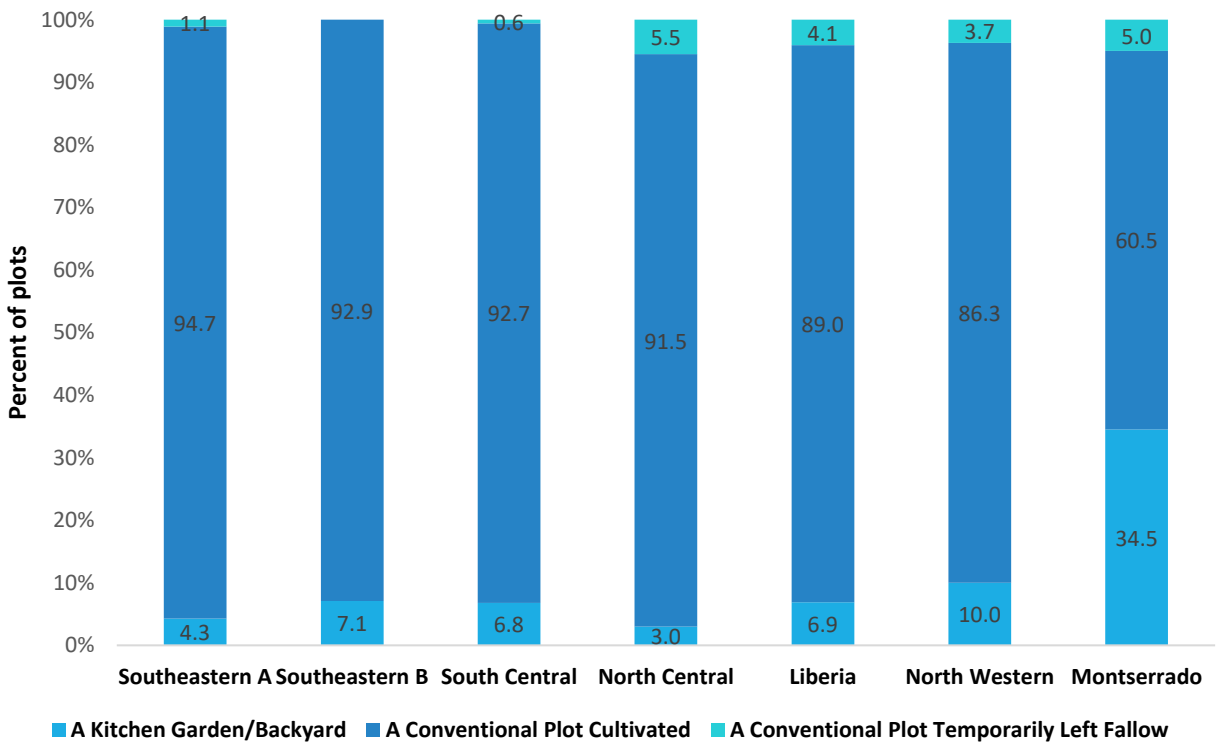
Region	Number of plots	Average plot per holdings	Total plot area (Ha)	Average area per plot (Ha)
Southeastern A	39,190	1.4	39,302	1.0
Southeastern B	30,142	1.5	21,104	0.7
North Central	304,677	1.8	627,394	2.1
North Western	63,686	1.6	121,955	1.9
Montserrado	40,501	1.3	49,389	1.2
South Central	58,881	1.3	37,249	0.6
Total	537,076	1.6	896,393	1.7

2.11 Type of plots

In Liberia, the majority of agricultural plots are conventional plots cultivated.

The majority of plots are conventional cultivated plots (89.0 percent). However, Montserrado stands out with the highest share of kitchen/backyard gardens (34.5 percent of plots), highlighting the prominence of peri-urban gardening for food and income. In contrast, Southeastern A and B have almost no backyard plots, with over 90 percent of plots being conventional cultivated fields.

FIGURE 10: PERCENT DISTRIBUTION OF PLOTS BY TYPE



3. Production Activities in Agriculture, Forestry, and Fishing

Agricultural production at the household level contributes greatly to Liberia's economy and the livelihood of many families. Beyond providing food security, it generates income, supports employment, and sustains the majority of rural households. This chapter presents the main findings on agricultural production activities, with emphasis on crop cultivation, livestock, aquaculture and fishing, and forestry. The analysis draws attention to the dominant crops and livestock products, production levels, and regional variations that shape the performance of the sector.

3.1.Crop Cultivation

As seen earlier from the data, crop production remains the dominant agricultural activity in Liberia, with nearly all holdings engaged in cultivating food or cash crops. However, the type and intensity of crop production vary across regions. This section presents the results on the crops commonly grown by agricultural households in Liberia during the 2023/2024 farming season.

3.1.1 HOLDINGS ENGAGED IN CROP PRODUCTION

North central leads in staple food cultivation while Montserrado shifts toward vegetable farming.

The vast majority of holdings grow cereals, tubers, and roots, making this food group the backbone of Liberia's food systems. The North Central region reports the highest number of holdings engaged in crop production (169,117 holdings), reflecting both its large population of farmers and its role as the country's main food basket. Southeastern B has the lowest number of holdings (19,700), underlining its smaller farming base.

Notably, Montserrado shows a very different pattern: while a large number of households report crop cultivation, less than 60 percent are engaged in cereals/tubers/roots production. Instead, vegetable cultivation plays a much larger role, consistent with the region's urban and peri-urban farming systems.

Vegetable cultivation shows broader adoption and higher intensity compare to the remaining crop categories. Nationally, 28.9 percent of holdings grow vegetables, with the highest prevalence in Montserrado (45.9 percent of holdings) and Southeastern B (35.9 percent). Vegetable farming is least common in Southeastern A (only 12.3 percent of holdings).

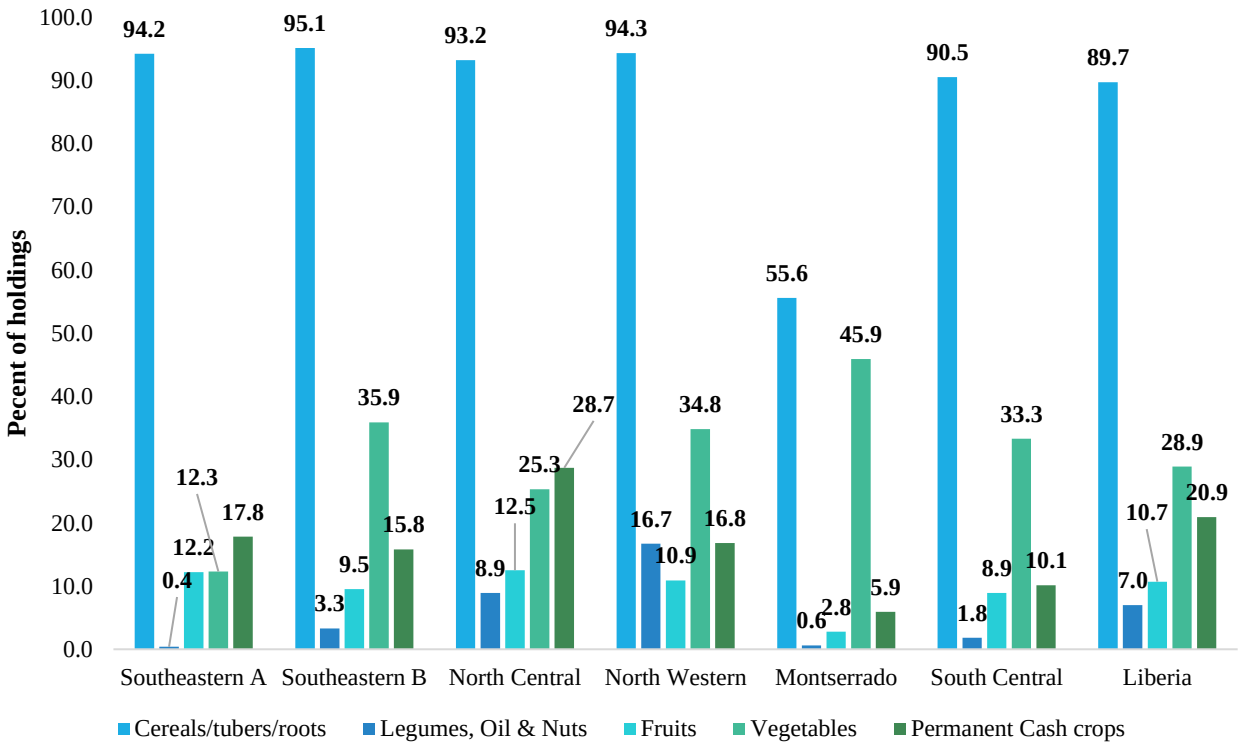
Permanent cash crops, such as oil palm, cocoa, and coffee, are grown by 20.9 percent of agricultural holdings. The North Central region leads (28.7 percent of its holdings), followed by

Southeastern A (17.8 percent of its holdings) and North Western (16.8 percent). The lowest participation is observed in Montserrado (5.9 percent).

Fruit crop cultivation is reported by 10.7 percent of holdings, showing moderate distribution across regions. The North Central (12.5 percent) and Southeastern A (12.2 percent) regions have the highest participation, while Montserrado (2.8 percent) records the lowest. Fruit farming in these regions is primarily for home consumption or small local sales.

Legumes, oil, and nut crops are far less common, cultivated by only 7.0 percent of holdings nationwide. Production of these crops is concentrated in the North Western region (16.7 percent) and North Central (8.9 percent), while all other regions record levels below 4 percent. This pattern shows that the cultivation of beans, sesame, and groundnuts remains localized and relatively small in scale.

FIGURE 11: PERCENT OF AGRICULTURAL HOLDINGS REPORTING CROP PRODUCTION BY CROP CATEGORY



- **Cereal, Root, and Tuber Crops Cultivation**

Rice and cassava dominate cereal, root and tuber crops across all regions, with minor contributions from maize, eddoes, sweet potatoes, and yams.

As seen above, cereals, roots, and tubers are the dominant crop category cultivated by the majority of agricultural holdings across all regions. The LAAS-2024 results

show that rice and cassava dominate this category of crop across all regions, with minor contributions from maize, eddoes, sweet potatoes, and yams.

Nationally, about 64.7 percent of holdings grow rice, and 50.4 percent cultivate cassava, confirming their roles as Liberia's key staple crops. The North Central region recorded the highest prevalence of rice cultivation, as 81.6 percent of its holdings reported cultivating rice during the reference period, followed closely by Southeastern B (79.4 percent of holdings), underscoring the concentration of rice farming in the interior of the country. By contrast, Montserrado reported the lowest rice cultivation rate (4.3 percent), reflecting urbanization and limited farmland availability.

Cassava cultivation shows a slightly different spatial pattern. The highest prevalence of cassava cultivation is found in Southeastern B (66.2 percent) and North Western (66.1 percent), followed by South Central (60.5 percent). Cassava's prominence in these regions reflects its adaptability to diverse soil types and its importance as a food-security crop, especially in coastal areas where rice production is limited.

Maize is cultivated by 7.3 percent of holdings nationwide, with relatively higher participation in Montserrado (13.7 percent) and North Western (8.4 percent).

Minor tuber crops such as eddoes, sweet potatoes, and yams are produced on a smaller scale, mainly for home use or local trade. Eddoes are grown by 5.5 percent of holdings, with the highest shares in Southeastern B (11.1 percent) and North Central (8.0 percent). Sweet potato production is reported by 1.8 percent of holdings, while yam cultivation remains marginal at 1.3 percent, concentrated in North Western (5.9 percent) where suitable upland soils prevail.

TABLE 5: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY TYPE OF CEREALS/TUBERS/ROOTS CROP CULTIVATED

Region	Number of holdings reporting	Rice/Paddy	Cassava	Corn/Maize	Eddoes	Sweet Potatoes	Yams
Southeastern A	26,640	64.3	55.5	2.4	1.6	0.5	0.8
Southeastern B	18,734	79.4	66.2	9.2	11.1	3.5	2.2
North Central	157,565	81.6	43.4	6.9	8.0	2.2	0.8
North Western	37,456	49.2	66.1	8.4	4.5	2.8	5.9
Montserrado*	17,039	4.3	39.3	13.7	0.4	1.4	0.0
South Central*	41,343	50.3	60.5	5.6	0.7	0.0	0.0
Liberia	**298,777**	**64.7**	**50.4**	**7.3**	**5.5**	**1.8**	**1.3**

* *The zeros in the table does not represent a true zero but rather smaller proportions relative to the total number of holdings in the respective regions.*

- **Legume, Oil, and Nut Cultivation**

The production of legume, oil, and nut crops in Liberia is limited compared to cereals and roots, reflecting their minor role in household farming systems. The results show that only a small proportion of agricultural holdings cultivate these crops, with notable regional variations.

Legume, oil and nuts cultivation are more pronounce in the North Western region, with beneseed or sesame being the dominant type of crop cultivated.

Nationally, beneseed or sesame is grown by 3.8 percent of agricultural holdings, while beans (2.7% of holdings), groundnuts (0.8% of holdings), and kola nuts (0.5% of holdings) are cultivated on an even smaller scale. The North Western region leads in overall legume and nut cultivation, with 6.4 percent of its holdings growing beans and 9.9 percent cultivating beneseed, the highest share recorded for any crop in this group. This indicates that North Western Liberia remains the primary hub for beneseed cultivation.

In the North Central region, about 5.2 percent of holdings grow beneseed and 3.0 percent cultivate beans, representing the second most active area for these crops. Groundnuts are also relatively common in this region (0.7 percent), mainly cultivated as intercrops on small plots.

In contrast, legume and nut production is minimal in the Southeastern and South-Central regions, where fewer than 2 percent of holdings engage in any of these activities. The Southeastern B region reports small but notable cultivation of beans (2.4 percent) and groundnuts (1.0 percent), while the Southeastern A and Montserrado regions record almost negligible cultivation across all categories.

TABLE 6: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY TYPE OF LEGUMES, OIL & NUTS CROPS PRODUCED*

Region	Number of holdings reporting	Beans	Beneseed (Sesame)	Groundnut	Kola Nut
Southeastern A	102	0.0	0.0	0.1	0.2
Southeastern B	656	2.4	0.0	1.0	0.0
North Central	15,111	3.0	5.2	0.7	0.5
North Western	6,619	6.4	9.9	2.1	2.0
Montserrado	189	0.0	0.0	0.6	0.0
South Central	807	1.8	0.0	0.5	0.0
Liberia	**23,484**	**2.7**	**3.8**	**0.8**	**0.5**

* *The zeros in the table does not represent a true zero but rather smaller proportions relative to the total number of holdings in the respective regions.*

- **Fruit Crop Cultivation**

Plantain is the dominant type of fruits cultivated in Liberia, with cultivation more common in Southeastern A and North Central regions.

Fruit production in Liberia is limited compared to staple and vegetable crops, but it provides important nutritional and income benefits for rural households. The survey results show that plantain dominates the fruit category, cultivated by 8.6 percent of agricultural holdings nationwide, while pineapple (1.6 percent), orange (0.8 percent), and watermelon (0.4 percent) are produced on a smaller scale.

Regional patterns reveal distinct production zones. Plantain cultivation is more common in Southeastern A (11.0 percent of holdings) and North Central (10.9 percent of holdings), followed closely by Southeastern B (8.1 percent). This reflects plantain's adaptability to Liberia's humid conditions and its importance as a staple substitute in local diets. In contrast, Montserrado records the lowest plantain production (1.4 percent) due to limited farmland and urban expansion.

Pineapple cultivation is highest in North Western (3.8 percent) and Montserrado (2.1 percent). Orange cultivation is also high in North Western (2.4 percent of holdings) compare to other regions.
Watermelon is cultivated by only 0.4 percent of holdings nationally, with slightly higher shares in South Central (0.9 percent) and North Western (0.8 percent).

TABLE 7: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY TYPE OF FRUITS CROPS PRODUCED

Region	Number of holdings reporting	Orange	Pineapple	Plantain	Water Melon
Southeastern A	3,451	1.0	1.2	11.0	0.0
Southeastern B	1,867	0.4	0.3	8.1	0.7
North Central	21,221	0.8	1.2	10.9	0.2
North Western	4,325	2.4	3.8	6.5	0.8
Montserrado	844	0.0	2.1	1.4	0.0
South Central	4,050	0.1	1.6	5.9	0.9
Liberia	**35,757**	**0.8**	**1.6**	**8.6**	**0.4**

- **Vegetable Crop Cultivation**

A wide range of vegetables are grown across the country, with pepper, bitterballs, and okra emerging as the most widely cultivated varieties.

As seen above, vegetable crops are cultivated by a significant proportion of agricultural households in Liberia. Results on the various types of crops cultivated show that a wide range of vegetables are grown across the country, with pepper, bitterballs, and okra emerging as the most widely cultivated varieties. Nationally, 17.0 percent of holdings produce pepper, 11.7 percent grow bitterballs, and 9.7 percent

cultivate okra. Other vegetables, such as pumpkin, potatoes greens, and cucumber, are produced on a smaller scale.

Regional variations are pronounced. The North Western region leads overall vegetable cultivation, with 26.3 percent of its holdings cultivating pepper and 24.1 percent cultivating bitterballs. It also records the highest cultivation of okra (18.5 percent) and eggplant (8.6 percent), reflecting strong regional specialization and favorable agro-climatic conditions for vegetable farming. Southeastern B also shows relatively high participation, with 20.7 percent of holdings growing pepper and 16.6 percent cultivating bitterballs, while a significant share also grows cucumbers (7.2%) and pumpkins (14.5%).

In contrast, Montserrado and South-Central show mixed patterns. While Montserrado reports the highest prevalence of okra (22.6 percent of holdings) and potatoes greens (17.7 percent of holdings) cultivation, it records limited cultivation of other vegetables, notably eggplant or pumpkin. Similarly, South Central has moderate pepper (21.3 percent of holdings) and bitterballs (13.3 percent) cultivation but little diversification into other vegetable crops.

Southeastern A and North Central are characterized by lower overall vegetable production, with pepper (7.9% and 16.7%, respectively) and bitterballs (5.6% and 10.2%, respectively) as the leading crops.

TABLE 8: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY TYPE OF VEGETABLE CROPS PRODUCED

Region	Number of holdings reporting	Bitterballs	Cucumber	Egg Plant	Okra	Pepper	Pumpkins	Water Greens	Potatoes greens
Southeastern A	3,481	5.6	0.8	0.5	3.7	7.9	1.4	0.2	0.0
Southeastern B	7,063	16.6	7.2	7.9	12.2	20.7	14.5	1.0	1.6
North Central	42,775	10.2	3.1	0.5	6.9	16.7	2.8	0.4	0.8
North Western	13,838	24.1	4.1	8.6	18.5	26.3	6.0	2.7	4.6
Montserrado	14,056	4.3	4.1	0.0	22.6	6.4	0.0	12.1	17.7
South Central	15,206	13.3	4.8	0.0	6.4	21.3	1.6	1.2	4.5
Liberia	**96,420**	**11.7**	**3.6**	**1.8**	**9.7**	**17.0**	**3.3**	**1.9**	**3.3**

- **Cash Crop Cultivation**

Nationally, cocoa is the most dominant cash crop cultivated by agricultural holdings.

Cash crop cultivation remains an important but less widespread component of Liberia's smallholder farming system. The data show that cocoa, oil palm, rubber, and sugarcane are the main cash crops grown, with cultivation concentrated in specific regions.

Nationally, cocoa is the most dominant cash crop, cultivated by 10.3 percent of agricultural holdings. It is followed by rubber (6.8 percent of holdings), oil palm (5.1 percent), and sugarcane (3.3 percent). These crops serve as key sources of household income, particularly in regions with strong trade linkages and processing opportunities.

Regionally, the cultivation of cash crops is more prevalent among agricultural households in the North Central region compare to other regions, as 14.6 percent of holdings in this region grow cocoa, 8.3 percent cultivate oil palm, 9.7 percent cultivate rubber, and 4.9 percent cultivate sugarcane. This reflects the region's relatively large land base and long-standing engagement in perennial crop farming. Southeastern A (16.3 percent) and Southeastern B (10.2 percent) also record strong cocoa cultivation.

Rubber cultivation is most notable in North Central (9.7 percent) and South Central (7.9 percent), both regions historically associated with plantation and out-grower schemes. Oil palm is most commonly cultivated in North Western (6.5 percent) and North Central (8.3 percent), reflecting its growing importance as a domestic cash and food crop. Sugarcane cultivation, though relatively low, is most widespread in North Central (4.9 percent) and Montserrado (3.3 percent).

It is worth noting that Montserrado and South-Central record the lowest overall cash crop cultivation.

TABLE 9: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY TYPE OF CASH CROPS PRODUCED*

Region	Number of holdings reporting	Cocoa	Oil Palm	Rubber	Sugar Cane
Southeastern A	5,027	16.3	0.0	0.7	0.0
Southeastern B	3,114	10.2	1.1	4.6	2.6
North Central	48,496	14.6	8.3	9.7	4.9
North Western	6,683	5.5	6.5	2.6	1.6
Montserrado	1,805	1.0	0.0	1.9	3.3
South Central	4,627	1.1	0.2	7.9	1.0
Liberia	**69,753**	**10.3**	**5.1**	**6.8**	**3.3**

* *The zeros in the table does not represent a true zero but rather smaller proportions relative to the total number of holdings in the respective regions.*

3.1.2 CULTIVATED AREA, YIELDS, AND TOTAL PRODUCTION.

Rice and cassava dominate cultivated area and total output, together accounting for the bulk of staple food production by holdings. However, the low yield of cassava highlights urgent need for agricultural improvement in Liberia.

The data on planted area, production, and yield provide an overview of Liberia's crop performance during the 2024 agricultural year. Results show that production continues to be dominated by rice and cassava, followed by a wide mix of vegetables, legumes, and cash crops. Yields vary considerably across crops, reflecting differences in crop management practices, input use, and agro-ecological conditions.

Rice remains the most widely cultivated crop, reported by 237,543 agricultural holdings, covering a planted area of 186,907 hectares and producing 201,074 metric tons. The average yield of 2.0 metric tons per hectare is the highest among staple crops, underscoring rice's central role in Liberia's food system. Despite this, harvested area represents only about 75 percent of planted area, suggesting losses due to flooding, pest damage, or incomplete harvesting.

Cassava ranks second in coverage, cultivated by 178,252 holdings across 87,430 hectares. However, with a total production of 14,591 metric tons and an average yield of 1.0 Mt/ha, cassava productivity remains low. This result may reflect small plot sizes, poor planting materials, and limited use of fertilizers.

Among other staples, maize is grown by 24,599 households on 4,635 hectares, yielding 2,937 metric tons at 1.5 Mt/ha, which is moderately higher than cassava and similar to palm oil. Eddoes and sweet potatoes contribute smaller shares, producing 243 Mt and 383 Mt respectively, with yields below 1 Mt/ha, reflecting their cultivation mainly on marginal plots for home consumption.

In the fruit and vegetable category, plantain shows strong productivity, with a yield of 2.1 Mt/ha from 29,989 holdings and 10,930 hectares cultivated. Among vegetables, cucumber (2.7 Mt/ha) and sugarcane (2.7 Mt/ha) register the highest yields, indicating their responsiveness to better management and input use. In contrast, pepper (0.4 Mt/ha), bitterballs (0.5 Mt/ha), and okra (0.6 Mt/ha) record lower productivity despite their widespread cultivation.

Cash crops account for a significant share of total cultivated area but relatively lower yields. Rubber occupies the largest planted area (91,125 hectares) and harvested area (62,306 hectares), producing 14,004 metric tons at an average yield of 0.6 Mt/ha. Cocoa, cultivated by 35,874 holdings, produced 2,013 metric tons at 0.1 Mt/ha, while palm oil recorded a better yield (1.5 Mt/ha) and output (8,017 Mt). Coffee, though grown by fewer farmers, also reported modest yields (0.2 Mt/ha).

TABLE 10: PLANTED AREA, PRODUCTION AND YIELD OF CROPS CULTIVATED BY AGRICULTURAL HOUSEHOLDS*

Crop	Number of holdings reporting Crop Production	Planted Area (HA)	Harvested Area (HA)	Harvested quantity (Mt)	Yield (Mt/ha)
Rice/paddy	237,543	186,907	139,707	201,074	2.0
Cassava	178,252	87,430	20,192	14,591	1.0
Corn/maize	24,599	4,635	3,438	2,937	1.5
Eddoes	18,564	4,321	614	243	0.8
Sweet potatoes	6,564	2,031	749	383	0.5
Beans	8,995	1,367	433	208	0.8
Plantain	29,989	10,930	3,145	3,388	2.1
Bitterballs	39,384	6,998	3,918	1,248	0.5
Cucumber	12,052	1,452	1,053	1,638	2.7
Egg plant	6,042	807	429	411	1.1
Okra	32,703	4,323	2,956	1,385	0.6
Pepper	57,418	19,660	5,104	1,731	0.4
Cocoa	35,874	76,171	33,457	2,013	0.1
Coffee	5,519	6,119	3,677	426	0.2
Palm oil	17,651	28,502	10,260	8,017	1.5
Rubber	23,223	91,125	62,306	14,004	0.6
Sugar cane	11,392	11,941	8,089	15,708	2.7

** The below statistics have values with CV > 33% or SE > 17.5%. They are therefore considered unreliable and should be interpreted with caution:*

- Area planted with pepper: CV=46.44%
- Area planted with rubber: CV=36.84%
- Area harvested with rubber: CV=52.68%
- Area harvested with sweet potatoes: CV=51.38%
- Production of sweet potatoes: CV=66.12%
- Area harvested with eggplant: CV=38.03%
- Production of eggplant: CV=36.54%
- Production of okra: CV=33.05%

3.1.3 HARVEST LOSSES

Rice records the highest absolute losses, with more than 2,506 metric tons lost at harvest and an additional 1,591 metric tons lost during post-harvest handling.

Losses during and after harvest remain a major challenge for Liberian farmers. Rice records the highest absolute losses, with more than 2,506 metric tons lost at harvest and an additional 1,591 metric tons lost during post-harvest handling. On the other hand, crops like sweet potatoes and eddoes show negligible recorded losses, partly because they are produced in smaller quantities and often consumed directly.

Cash crops such as cocoa and palm oil also experience significant losses during processing and storage, reflecting weaknesses in post-harvest infrastructure and storage capacity. These results emphasize the need for investments in drying, storage, and handling facilities to reduce food waste and improve marketable surpluses.

TABLE 11: QUANTITY OF CROP LOST DURING OR AFTER HARVESTING

Crop	During the harvest		During the post-harvesting activities		Lost during storage	
	Number of holdings	Total (Mt)	Number of holdings	Total (Mt)	Number of holdings	Total (Mt)
Rice/paddy	49,499	2,506	43,197	1,591	28,818	1,196
Cassava	2,826	763	1,185	311	822	49
Corn/maize	194	48.192	97	17.074	97	17.074
Eddoes	74	0.123	74	0.172	25	0.025
Sweet potatoes	34	0.034	34	0.034	34	0.034
Beans	63	6.322	63	12.644	0	0
Plantain	581	66.817	464	40.056	179	19.266
Bitterballs	661	24.938	342	17.735	276	17.664
Cucumber	371	14.822	0	0	0	0
Egg plant	65	0.261	65	0.522	0	0
Okra	414	22.046	455	3.955	167	2.086
Pepper	559	8	424	45	245	3
Cocoa	2,482	52	2,030	112	619	8
Coffee	686	54.038	576	4.135	255	1.072
Palm oil	1,431	322.014	969	321.959	709	140.562
Rubber	200	13.933	106	5.525	69	4.915
Sugar cane	407	73.094	371	16.596	202	7.52

3.1.4 PROCESSED CROP PRODUCTS

Crop processing is an important aspect of agricultural activities, providing households with additional food products, opportunities for income generation, and longer shelf life for perishable crops. The LAAS-2024 collected data on a wide range of processed crop products in Liberia, from rice flour and gari to palm oil and cassava-based foods such as fufu.

The table below presents data on the main processed products produced by agricultural holdings and the extent to which they rely on current or previous year's harvests.

Cassava-based products dominate processing, with fufu and gari being the most widely produced items.

The results show that cassava-based products dominate processing, with fufu (23.6 percent of holdings) and gari (15.0 percent of holdings) being the most widely produced items. Both products rely heavily on the current year's harvest (45.3% and 43.1%

of holdings, respectively), although a significant share of gari (20.4%) was also made from previous harvests, suggesting its importance as a storable and tradable food. Cassava dust (locally called dipper) was also processed, with 5.6 percent of households engaged, about two-thirds of which depend mainly on last year's stock.

Rice is another major contributor to processing activities. Products such as polished or parboiled rice (21.1 percent of holdings), country bread (18.0% of holdings), milled rice (9.6 percent), and rice flour (5.8 percent) demonstrate the extent to which rice undergoes transformation beyond direct consumption. Interestingly, the vast majority of polished/parboiled rice (85.9 percent of holdings) and country bread (83.1% of holdings) comes from the current year's production.

Among other products, palm oil processing involves 10.6 percent of holdings, with over 70 percent using the current year's harvest.

TABLE 12: PERCENT DISTRIBUTION OF HOLDINGS THAT PROCESSED CROP BY AGRICULTURAL YEAR PRODUCTION USED TO PROCESSED PRODUCT*.

Processed Product	Percent of holdings that produce processed product	**Agricultural year production used to produce processed product**			
		Only this year's production	Only previous year's production	Mainly this year's production	Mainly last year's production
Rice flour	5.8	33.4	1.1	65.4	0.0
Milled rice	9.6	54.8	18.1	21.8	5.3
Polished, parboiled or converted rice	21.1	85.9	9.8	2.3	1.9
Palm oil	10.6	72.3	14.1	9.8	3.7
Country Bread	18	83.1	4.0	12.3	0.6
Fufu	23.6	45.3	19.3	5.4	30.1
Gari	15.0	43.1	20.4	3.3	33.2
Dipper/cassava dust	5.6	13.1	17.3	5.7	63.9

3.1.5 SALES OF PROCESSED PRODUCTS

Cassava products dominate sales, with gari and fufu standing out as the most traded processed products.

The survey findings show that some processed products are not only consumed at the household level but also reach local and national markets. Among these, cassava products dominate sales, with gari and fufu standing out as the most traded items. Gari accounts for sales of about 2,336 metric tons with an impressive value exceeding 110 million Liberian dollars, making it the single most valuable processed product in rural markets

(see Table 13). Fufu follows closely, with about 2,046 metric tons sold, also representing a major source of household cash income (over 55 million Liberian dollars).

Palm oil is another major traded commodity, with nearly 875 metric tons sold by 71 percent of producing households, reinforcing its dual role as a subsistence and market crop. Comparatively, rice-based products, while widely processed, have more limited sales volumes. For example, only a small fraction of milled or polished rice enters the market compared to gari or palm oil **(see Figure 12).**

The findings above show that cassava and oil palm are the main crops of Liberia's rural processed product markets, while other items remain secondary, often produced for household use or specialize demand.

FIGURE 12: PERCENT DISTRIBUTION OF HOLDINGS THAT SOLD PROCESSED PRODUCTS

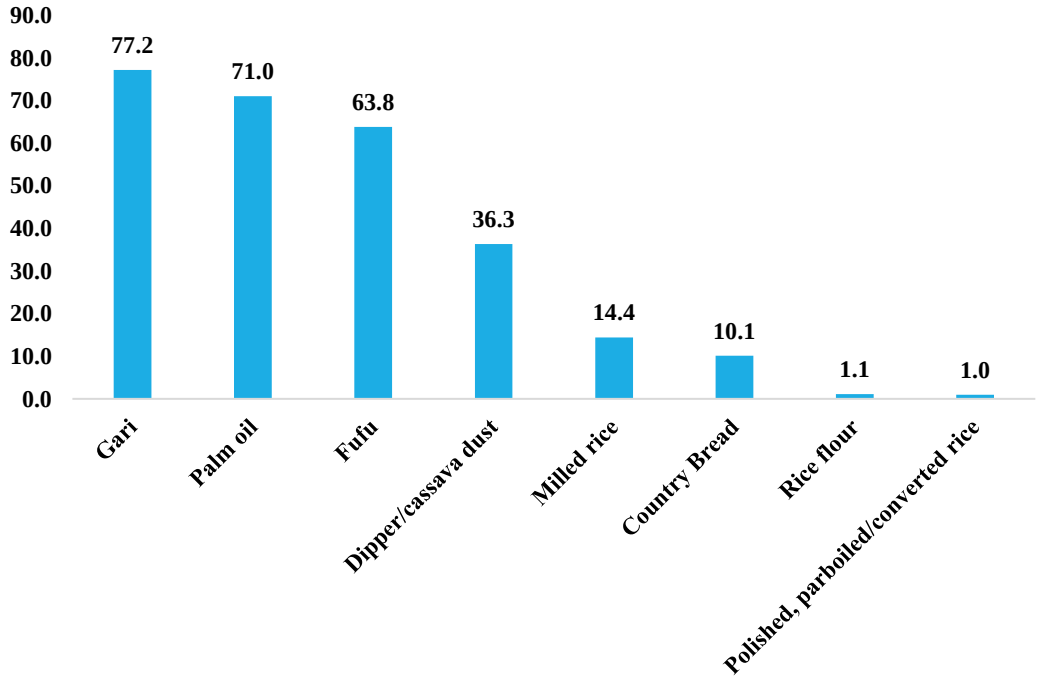


Table 13: Quantity and Value of Top Three Processed Product Sold

Processed Product	Quantity of processed product sold		Value of processed product sold (in LRD)	
	Total (Mt)	Average (Mt)	Total	Average
Gari	2,335.66	0.54	110,305,336.00	25,621.90
Palm oil	874.87	0.29	85,308,141.00	28,670.60
Fufu	2,045.73	0.39	55,917,564.00	10,635.00

3.2.Livestock and Poultry Production

As seen in section 2.3, about 4.3 percent of agricultural holdings raised at least one type of livestock while 7.3 percent raised at least one type of poultry during the reference agricultural season. While practice by few holdings, these activities are critical for food, income, and rural resilience. The following subsections present findings on livestock and poultry holdings, animal inventories, ownership arrangements, production purposes, herd/flock dynamics, health management, breeding, and input use.

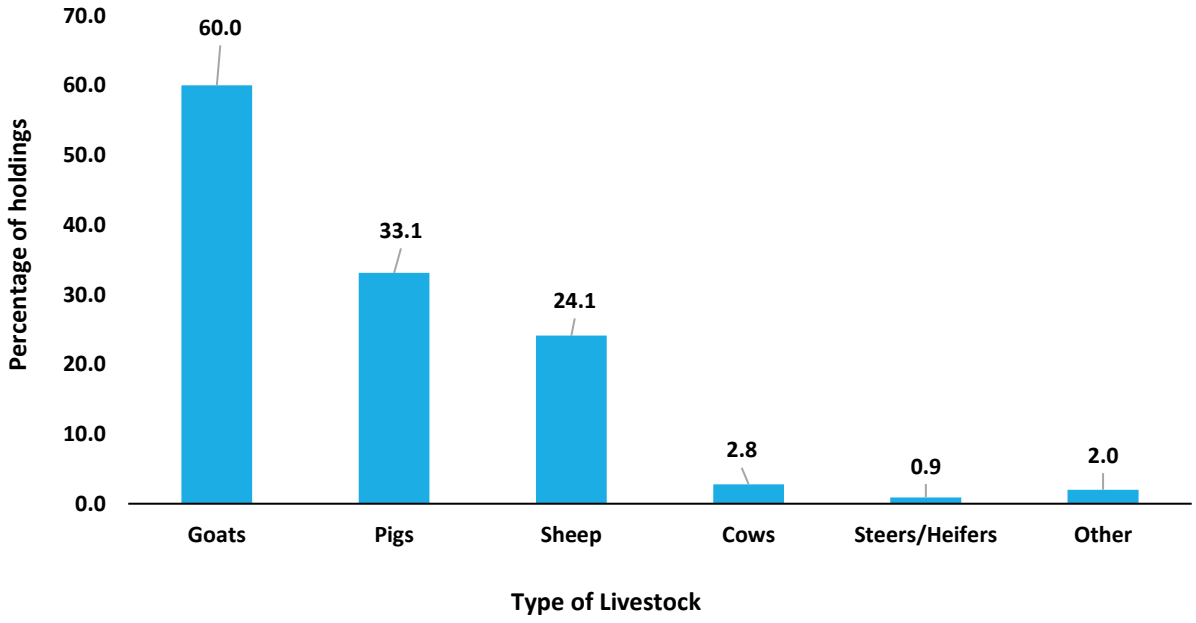
3.2.1. HOLDINGS RAISING LIVESTOCK AND POULTRY

Before assessing herd and flock sizes, production purposes, animal management and other aspects of livestock and poultry rearing, it is important to understand how many households are engaged in livestock and poultry keeping. The survey data show that although relatively few households raise livestock and poultry compared to crops, those who do often keep multiple species. This subsection shows the distribution of holdings engaged in raising different livestock and poultry types.

Goats and pigs are the most common livestock raised by livestock holdings, whereas almost all holdings that keep poultry rear indigenous chickens.

Among livestock holdings, goats dominate (raise by 60 percent of holdings), followed by pigs (33.1 percent of holdings) and sheep (24.1 percent). Cattle rearing is marginal, with only 2.8 percent of holdings raising cows while 0.9 percent of them raise steers/heifers.

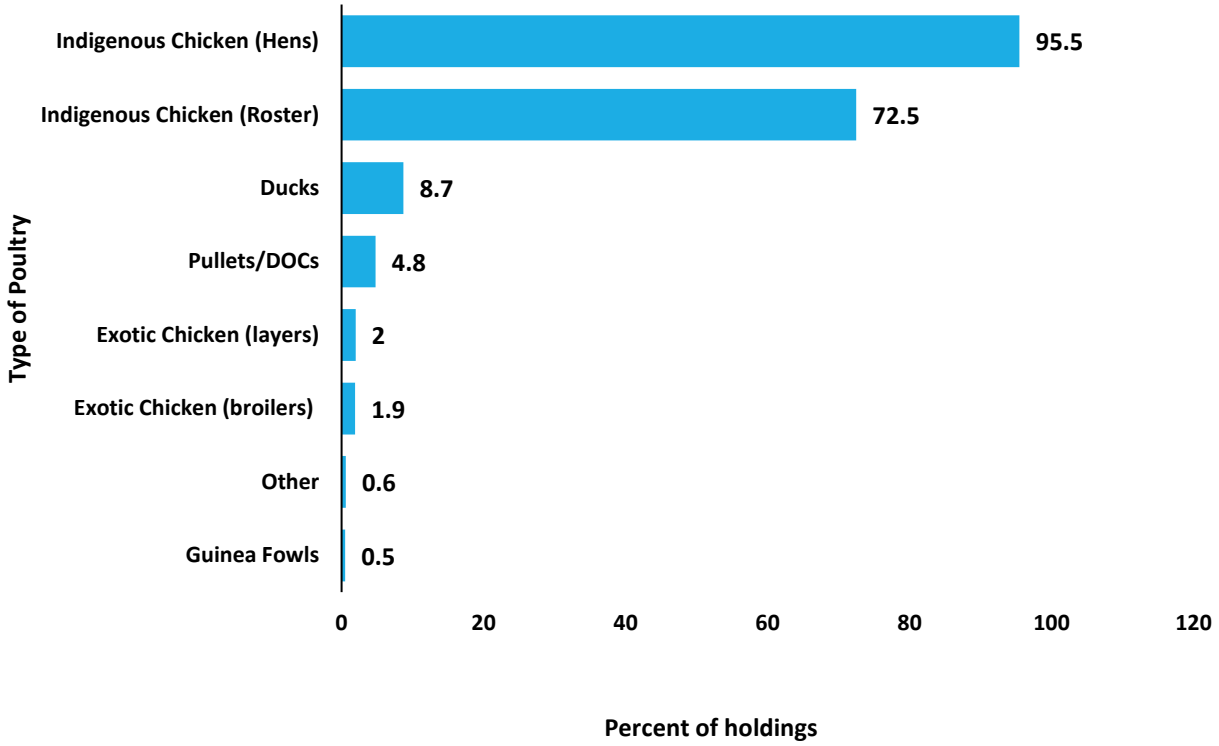
FIGURE 13: PERCENT DISTRIBUTION OF LIVESTOCK HOLDINGS BY TYPE OF LIVESTOCK RAISED



For poultry, almost all holdings that keep poultry rear indigenous chickens, with hens (raise by 95.5% of holdings) and roosters (72.5% of holdings) being most common. Exotic breeds, such as layers (2 percent) and broilers (1.9 percent), are rare, indicating limited penetration of commercial poultry systems. Ducks (8.7 percent) and guinea fowls (0.5 percent) are also kept, mainly for local consumption.

This distribution between traditional and commercial systems is important for understanding the structure of Liberia's poultry sub-sector.

FIGURE 14: PERCENT DISTRIBUTION OF POULTRY HOLDINGS BY TYPE OF POULTRY RAISED AND REGION



3.2.2. ANIMAL INVENTORY AND HERD/FLOCK SIZE

Livestock and poultry inventories provide insight into both the scale and structure of animal production. While some species such as goats and pigs are relatively widespread and numerous, others like cattle are more limited in number. The average herd or flock size also varies substantially across species, reflecting differences in production systems: small, scattered ownership for indigenous poultry versus larger, semi-commercial flocks for exotic breeds.

Table 15 presents the total number of animals and herd/flock sizes reported by livestock and poultry holdings during the 2023/2024 farming season.

Livestock and poultry farming in Liberia display a dual structure, with traditional subsistence systems coexisting alongside emerging commercial operations.

Among livestock, goats are the most numerous (62,595 animals, averaging 7 per holding), followed by pigs (44,572 animals, averaging 9 per holding). Sheep account for 19,186 animals, while cattle is relatively few (3,379 cows).

For poultry, indigenous chickens dominate, with over 180,000 hens and 90,000 roosters reported. On average, households keep 7 hens and 5 roosters.

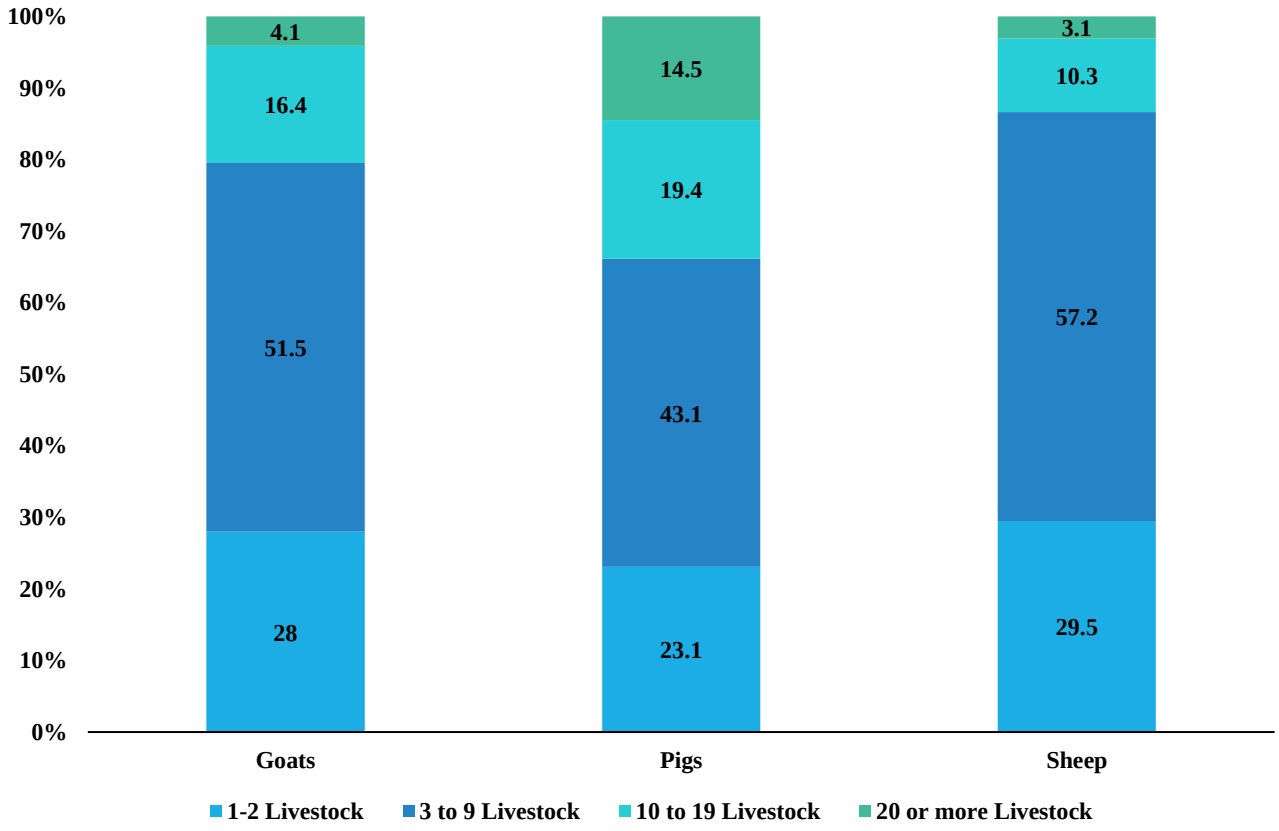
TABLE 14: TOTAL AND AVERAGE NUMBER OF LIVESTOCK AND POULTRY IN STOCK BY TYPE OF LIVESTOCK/POULTRY

Livestock/Poultry Type	Total Agricultural Holdings reporting	Total number of Animals	Average number of Animal per holding
Livestock			
Cows	415	-	-
Steers/Heifers	133	-	-
Goats	8,893	62,595	7.0
Sheep	3,572	19,186	5.4
Pigs	4,895	44,572	9.1
Other	302	-	-
Poultry			
Indigenous Chicken (Hens)	24,399	180,125	7.4
Indigenous Chicken (Roster)	18,505	90,541	4.9
Exotic Chicken (layers)	508	-	-
Exotic Chicken (broilers)	490	-	-
Pullets/DOCs	1,236	-	-
Ducks	2,225	-	8.0
Guinea Fowls	137	-	-
Other	145	-	-

- *Data withheld due to fewer than 30 unweighted cases.*

Figure 15 presents data on the percentage of holdings rearing the top three types of livestock by herd sizes. Herd and flock sizes vary: Across the top three categories of livestock, the majority of holdings reported having 3 to 9 herds on the reference day. Pigs are more likely to be kept in larger herds, with nearly one-third of pig holdings maintaining 10 or more pigs.

FIGURE 15: PERCENT DISTRIBUTION OF HOLDINGS REARING THE TOP THREE TYPES OF LIVESTOCK BY HERD SIZES



Poultry production is predominantly small-scale. Nearly all indigenous chickens are kept in flocks of fewer than 10 birds, reflecting their subsistence nature.

3.2.3. OWNERSHIP AND REASONS FOR KEEPING ANIMALS

A considerable proportion of livestock and poultry owners in Liberia keep their animals with relatives, neighbors, or herders, reflecting both space limitations and reliance on social networks for animal management. Livestock serve multiple roles, as goats and sheep are mostly rear for sale, pigs for both income and food, and poultry mainly for household consumption.

Analysis of livestock and poultry ownership in Liberia show that a significant number of holdings own animals that are not physically kept on their holdings, but instead are managed by relatives, neighbors, or herders. Several factors influence this kind of practice, including limited space, communal grazing systems, or customary arrangements with relatives or herders. In certain towns and villages in Liberia, it is forbidden to raise certain animals, including goats, pigs and sheep. In such settings, holdings usually raise their animal outside their holdings. The figures presented in this section highlight the extent of this practice.

The results of the survey show that 32 percent of cow-owning holdings do not physically keep them on the holding, instead entrusting them to relatives, neighbors or herders. Similar patterns exist for goats (21 percent of holdings) and sheep (22 percent of holdings). Similarly, a noticeable proportion of poultry holdings reported owning birds outside the household. About 19 percent of holdings raising ducks reported owning ducks that are not kept by them while 17.5 percent of those owning indigenous chicken (Hens) reported the same.

In terms of size, among livestock, goats are the most common species owned but not kept, with over 9,000 animals reported, averaging about five per household. Pigs follow with 4,920 animals (average of 6.4 per household), highlighting their importance as a household asset even when space or resources to raise them directly are lacking. Sheep also feature prominently, with 2,645 animals under such arrangements.

For poultry, the same pattern is observed. Indigenous chickens dominate, with more than 29,000 hens and roosters combined not kept by their owners. On average, each household owns about 5 indigenous birds under such arrangements.

TABLE 15: LIVESTOCK AND POULTRY OWNED BY HOUSEHOLDS BUT KEPT OUTSIDE THE HOLDINGS

Livestock/Poultry	Percent of Holdings reporting	Total number of Animals Owned Outside Holdings	Average number of Animals per holding
Livestock			
Cows	32.4	-	-
Goats	21.3	9,061	4.8
Sheep	22.3	2,645	3.3
Pigs	15.8	4,920	6.4
Other	40.1	1,401	11.6
Poultry			
Indigenous Chicken (Hens)	17.5	20,938	4.9
Indigenous Chicken (Roster)	9.2	8,075	4.7
Exotic Chicken (layers)	6.8	-	-
Exotic Chicken (broilers)	7.1	-	-
Pullets/DOCs	2.9	-	-
Ducks	19.3	-	-

- *Data withheld due to fewer than 30 unweighted cases.*

Reasons for keeping livestock vary by species. Goats and sheep are primarily kept for sale of live animals (76 and 87 percent of holdings, respectively), but also provide food for the household and other benefits. Pigs serve multiple purposes as well, including sales of live animal (75 percent of holdings), food (42 percent of holdings), sale of livestock products (26 percent), and savings (13.5 percent). This shows that several livestock species fulfill diversified economic and household roles rather than a single purpose.

TABLE 16: PERCENT DISTRIBUTION OF HOLDINGS BY MAIN REASONS FOR OWNING/KEEPING LIVESTOCK[2]

Livestock	Sale of live animals	Sale of Livestock products	Food for the family	Savings and insurance	Social status/prestige	Crop agriculture (manure, draught power)	Other
Goats	75.8	12.9	44.0	9.6	8.8	0.7	9.7
Sheep	87.3	14.7	40.1	9.2	14.6	1.3	10.7
Pigs	75.2	26.1	41.5	13.5	8.3	0.9	5.2

[2] The sum of the percentages may exceed 100% because holdings may have multiple reasons for owning or keeping livestock.

For poultry, indigenous chickens are overwhelmingly kept for household food (indicated by 90 percent of holdings), but also provide income for a significant proportion of holdings, as 54.6 percent of them engaged in live bird sales.

TABLE 17: PERCENT DISTRIBUTION OF HOLDINGS BY MAIN REASONS FOR OWNING/KEEPING POULTRY[3]

Poultry	Sale of live animals	Sale of Poultry products	Food for the family	Savings and insurance	Social status/prestige	Other (specify)
Indigenous Chicken (Hens)	54.6	6.0	90.0	11.4	14.9	10.0
Indigenous Chicken (Roster)	51.1	7.9	88.5	13.2	16.2	10.0
Exotic Chicken (layers)	-	-	-	-	-	-
Exotic Chicken (broilers)	-	-	-	-	-	-
Pullets/DOCs	-	-	-	-	-	-
Ducks	53.1	0.9	89.4	14.6	17.7	10.9
Guinea Fowls	-	-	-	-	-	-

- *Data withheld due to fewer than 30 unweighted cases.*

3.2.4. CHANGES IN HERD AND FLOCK SIZES DURING THE REFERENCE PERIOD

Livestock and poultry population changes are driven mainly by births as inflows and sales or disease-related deaths as outflows, with disease accounting for 59 percent of poultry losses, especially among indigenous chickens.

Tables 20 and 21 track livestock and poultry stock changes. Among livestock, most incoming animals are through births (81 percent), especially for pigs (90 percent) and goats (80 percent). Outflows are mainly due to sales (35 percent) and disease-related deaths (24 percent).

[3] The sum of the percentages may exceed 100% because holdings may have multiple reasons for owning or keeping poultry.

TABLE 18: CHANGE IN STOCK OF LIVESTOCK

Change in stock		Livestock type				
		Goats	Sheep	Pigs	Other	Total
Total Incoming animals		**30,770**	**12,774**	**32,682**	**3,234**	**79,460**
Source of Incoming animals	Births	80.30%	63.30%	90.40%	87.30%	81.20%
	Purchases	17.10%	35.10%	8.90%	12.70%	17.10%
	Other entries	2.60%	1.50%	0.70%	0.00%	1.70%
Total Outgoing animals		**28,959**	**9,847**	**25,229**	**1,711**	**65,746**
Destination of outgoing animals	Sales	30.90%	26.00%	47.80%	11.60%	35.30%
	Deaths due to disease	26.60%	30.40%	20.20%	23.00%	24.10%
	Deaths due to other causes	12.40%	18.40%	8.10%	33.80%	12.50%
	Lost	10.90%	6.80%	3.80%	5.00%	7.60%
	Given away	9.20%	7.60%	6.80%	6.70%	8.10%
	Slaughtered	10.00%	10.80%	13.30%	20.00%	12.50%

- *Data withheld due to fewer than 30 unweighted cases.*

For poultry, births also dominate inflows (90 percent). However, disease-related deaths are the largest cause of losses (59 percent), particularly for indigenous chickens. This underscores the vulnerability of traditional poultry systems to disease outbreaks. The high proportion of losses due to disease highlights the need for improved animal health management, especially for indigenous poultry.

TABLE 19: CHANGE IN STOCK OF POULTRY

Changes in Stock		Poultry Type					
		Indigenous Chicken (Hens)	Indigenous Chicken (Roster)	Exotic Chicken (layers)	Exotic Chicken (broilers)	Pullets/DOCs	Ducks
Total Incoming animals		**223,127**	**74,193**	-	-	-	**21,626**
Source of Incoming poultry	Births	91.6%	91.6%	-	-	-	95.5%
	Purchases	5.3%	4.2%	-	-	-	2.9%
	Other entries	3.1%	4.2%	-	-	-	1.6%
Total Outgoing poultry		**610,109**	**82,389**	-	-	-	-
Destination of Outgoing Poultry	Sales	5.9%	19.6%	-	-	-	9.9%
	Deaths due to disease	66.8%	14.3%	-	-	-	25.1%
	Deaths due to other causes	9.3%	18.7%	-	-	-	21.0%
	Lost	7.1%	14.2%	-	-	-	23.2%
	Given away	3.0%	10.2%	15.3%	11.5%	0.0%	5.2%
	Slaughtered	7.9%	23.0%	16.1%	48.9%	0.0%	15.6%

3.2.5. ANIMAL HEALTH AND TREATMENT COSTS

Animal diseases pose a major threat to Liberia's livestock and poultry productivity, with low vaccination coverage and uneven veterinary access leaving herds and flocks vulnerable to preventable losses. Small ruminants and indigenous poultry remain largely untreated.

Animal diseases remain a major challenge in Liberia's livestock and poultry sub-sectors, with significant implications for productivity and household resilience. Common animal diseases reduce herd sizes, limit market opportunities, and increase household expenditures. Veterinary coverage is limited, and vaccination uptake remains low, leaving herds and flocks highly vulnerable to preventable losses. Examining animal health conditions and treatment expenditures provides critical insights into the constraints faced by livestock and poultry keepers.

This subsection provides data on animal diseases and expenditures incurred on treatment of these diseases. Among livestock, foot and mouth disease affects about 19 percent of holdings with sheep. Pigs are vulnerable to multiple conditions, including Foot and Mouth Disease (affecting 12.3% of holdings), anthrax (7% of holdings) and brucellosis (6.5% of holdings).

TABLE 20: PERCENTAGE OF LIVESTOCK HOLDINGS EXPERIENCING ANIMAL DISEASES BY TYPE OF DISEASE AND LIVESTOCK TYPE

Livestock type	Type of diseases						
	PPR	Brucellosis	Anthrax	FMD	New Castle Disease	Fowl Pox	Foot and Mouth Disease
Goats	7.0	2.6	1.3	1.9	2.3	0.0	9.5
Sheep	6.6	3.3	0.0	3.0	3.6	5.4	18.9
Pigs	4.7	6.5	7.0	2.4	2.9	0.0	12.3

The data show that vaccination and treatment practices are uneven across livestock types, reflecting both differences in disease prevalence and holdings' access to veterinary services.

Among small ruminants, goats and sheep show much lower vaccination rates. Only 7.1 percent of goat holdings and 8.5 percent of sheep holdings reported vaccinating their animals. Treatments against internal and external parasites were also limited, generally below 6 percent.

Curative treatment practices follow similar trends. Pigs' holdings (21%) reported the highest proportion of curative interventions among small ruminants, while Sheep (11.5%) and goats (4.2%) holdings show moderate engagement.

TABLE 21: PERCENT DISTRIBUTION OF LIVESTOCK HOLDINGS BY VACCINATION, TREATMENT PRACTICES AND LIVESTOCK TYPE

Livestock	Vaccinated livestock	Treated livestock against internal parasites	Treated livestock against external parasites	Livestock received curative treatment
	%	%	%	%
Goats	7.1	5.8	6.1	4.2
Sheep	8.5	6.0	4.2	11.5
Pigs	23.6	28.3	23.6	21.0

Newcastle disease is the most common ailment that poultry species experience, affecting 11.6 percent of holdings with indigenous hens.

TABLE 22: PERCENTAGE OF POULTRY HOLDINGS EXPERIENCING ANIMAL DISEASES BY TYPE OF DISEASE AND POULTRY TYPE

Poultry type	**Type of disease**						
	PPR	Brucellosis	Anthrax	New Castle Disease	Fowl Pox	Foot and Mouth Disease	Other
Indigenous Chicken (Hens)	1.0	0.7	0.6	11.6	9.6	5.4	0.2
Indigenous Chicken (Roster)	1.4	0.4	0.0	6.9	15.3	4.7	0.0
Exotic Chicken (layers)	-	-	-	-	-	-	-
Exotic Chicken (broilers)	-	-	-	-	-	-	-
Pullets/DOCs	-	-	-	-	-	-	-
Ducks	0.0	0.0	0.0	0.0	2.9	2.1	7.6

- *Data withheld due to fewer than 30 unweighted cases.*

Vaccination is extremely limited among poultry holdings, with less than 1 percent of holdings reporting vaccination of indigenous chickens.

3.2.6. BREEDING PRACTICES

Controlled breeding is limited to a small share of holdings and is most common among pig holdings.

Breeding practices determine the quality and productivity of livestock and poultry over time. In Liberia, breeding is still predominantly natural and uncontrolled, especially among traditional smallholder systems. Controlled breeding is limited to a small share of holdings and is most common among cow, pig and exotic poultry producers. Understanding breeding practices is key for assessing productivity gaps and opportunities for genetic improvement in the livestock and poultry subsectors.

As indicated above, controlled breeding is rare among livestock holdings, with pig holdings the most likely to practice it (21% of pig holdings). A significant proportion of holdings that practice breeding reported incurring cost related to breeding (41% and 35.8% of goats and pigs holdings, respectively).

For poultry, about 8 percent of holdings rearing indigenous hens and 7 percent of those rearing indigenous roster practice-controlled mating.

TABLE 23: DISTRIBUTION OF LIVESTOCK AND POULTRY HOLDINGS BY BREEDING PRACTICES AND RELATED EXPENDITURES

Livestock/Poultry	Number of holdings reporting	% of holdings that practiced controlled mating or other breeding strategy	% of holdings that incurred cost related to breeding
Goats	8,893	5.0	41.0
Sheep	3,572	4.7	0.0
Pigs	4,895	20.9	35.8
Indigenous Chicken (Hens)	24,399	7.9	33.4
Indigenous Chicken (Roster)	18,505	7.4	39.4
Ducks	2,225	5.4	0.0

3.2.7. WATER SOURCES AND FEED USE AND EXPENDITURE

- **Water Sources**

Livestock and poultry holdings depend largely on wells, rivers, and streams for watering animals, reflecting limited watering infrastructure and strong seasonal variation. As rainfall declines, farmers increasingly rely on wells and boreholes, while small ruminants continue to depend on open water sources.

Access to adequate water and feed is fundamental for livestock and poultry productivity. In Liberia, many households rely on natural sources such as wells, rivers, and rainwater, reflecting the traditional nature of production systems. Feed purchase

remains rare for most livestock and poultry species, with pigs being the exceptions due to its higher nutritional requirements. Examining water and feed use highlights both the resource constraints faced by farmers and the opportunities to intensify production through better input access.

The distribution of livestock holdings by main source of water used for watering livestock show consistencies across both the first and second seasons, though minor shifts are observed as rainfall conditions change.

During the first season, when rainfall is typically higher, wells are the predominant source of water for most livestock species 49.4 percent of pig owners, and 30.0 percent of sheep holders. Rivers, springs, and streams serve as the second most common source, used by 39.1 percent of goat holdings and about 31 percent of sheep and pig holdings. This reliance on surface water and hand-dug wells underscores the limited infrastructure for livestock watering in rural communities.

Use of rainwater harvesting systems is modest, reported by 8.7 percent of goat owners and 13.2 percent of sheep owners, reflecting the seasonal abundance of rainfall during this period. Boreholes are rarely used.

As the second season progresses and rainfall declines, a noticeable shift occurs toward more reliable, year-round water sources. The share of holdings using boreholes increases, particularly sheep (24%), and pigs (12%). Similarly, the use of wells remains high, serving 52 percent of pig holdings, and 32 percent of sheep holdings. These figures show that wells and boreholes become increasingly important as seasonal rivers and rain-fed ponds begin to dry up.

Conversely, reliance on rivers and streams rises slightly for goat holdings (41.8 percent) and sheep holdings (34.4 percent) during the dry months, suggesting that some farmers still depend on open water sources even when supply becomes more uncertain.

TABLE 24: PERCENT DISTRIBUTION OF LIVESTOCK HOLDINGS BY MAIN SOURCE OF WATER FOR LIVESTOCK AND TYPE OF LIVESTOCK

Main source of water for livestock in the past 12 months	Livestock type			
	Goats	Sheep	Pigs	Other
1st Season				
Borehole	19.0	20.0	9.0	24.0
Dam	1.5	0.0	0.6	0.0
Well	23.2	30.0	49.4	57.8
River/spring/stream	39.1	30.1	30.9	6.8
Rainwater harvesting	8.7	13.2	6.0	0.0
Other	8.4	6.2	4.6	11.8
2nd Season				
Borehole	20.0	24.0	12.0	24.0
Dam	2.0	0.0	0.6	11.8
Well	25.8	32.2	52.1	57.8
River/spring/stream	41.8	34.4	33.1	6.8
Rainwater harvesting	0.4	1.9	0.0	0.0
Other	9.9	7.7	2.6	0.0

As with livestock holdings, most poultry keepers in Liberia rely on traditional water sources, such as wells and rainwater harvesting systems, with only limited access to improved infrastructure like boreholes. The use of water sources varies across poultry types and between seasons, reflecting differences in management systems and environmental conditions.

During the first season, the most common water source for poultry overall is the well. Wells are especially important for indigenous chickens (31.8% of hens and 30.3 percent of roosters holdings), as well as for ducks' holdings (31.4%), which are often raised near household compounds. Rainwater harvesting is the second most reported source, particularly for indigenous chickens (around 30% of holdings) and duck holdings (36.2%).

During the second season, as rainfall decreases, poultry producers increasingly depend on wells and boreholes. The share of holdings using boreholes rises across all types of poultry holdings. Similarly, well use increases, remaining the dominant water source for most indigenous species. Meanwhile, reliance on rainwater harvesting declines sharply across all types of poultry holdings, consistent with the drier seasonal conditions.

TABLE 25: PERCENT DISTRIBUTION OF POULTRY HOLDINGS BY MAIN SOURCE OF WATER FOR POULTRY AND TYPE OF POULTRY

Main source of water for poultry in the past 12 months	Poultry type							
	Indigenous Chicken (Hens)	Indigenous Chicken (Roster)	Exotic Chicken (layers)	Exotic Chicken (broilers)	Pullets/DOCs	Ducks	Guinea Fowls	Other
1st Season								
Borehole	17.0	13.0	-	-	-	20.0	-	45.0
Dam	0.7	0.6	-	-	-	0.0	-	0.0
Well	31.8	30.3	-	-	-	31.4	-	0.0
River/spring/stream	17.3	18.7	-	-	-	3.3	-	55.4
Rainwater harvesting	28.4	31.8	-	-	-	36.2	-	0.0
Other	5.3	5.8	-	-	-	8.8	-	0.0
2nd Season								
Borehole	23.0	20.0	-	-	-	29.0	-	45.0
Dam	0.7	0.9	-	-	-	0.0	-	0.0
Well	39.4	40.3	-	-	-	41.6	-	55.4
River/spring/stream	19.4	20.5	-	-	-	6.5	-	0.0
Rainwater harvesting	3.3	3.4	-	-	-	7.6	-	0.0
Other	13.9	14.7	-	-	-	14.9	-	0.0

- *Data withheld due to fewer than 30 unweighted cases.*

Feed Purchase

Feed purchasing in Liberia is limited overall but concentrated among pig holdings, reflecting their higher nutritional needs and semi-commercial production systems.

Feed supplementation is an important aspect of livestock production, especially during the dry season when natural grazing and forage availability decline. The data reveal that feed purchasing among livestock holders in Liberia is relatively limited overall but varies sharply by species and production scale.

Pigs account for the majority of feed purchases, while goats and sheep rely predominantly on natural grazing. During the first season, 39.0 percent of pig holdings purchased feed, compared with only 2.0 percent of goat owners and 4.8 percent of sheep holders. The pattern remains largely consistent in the second season, although the share of pig holdings purchasing feed declines slightly to 37.6 percent.

TABLE 26: PERCENTAGE OF LIVESTOCK HOLDINGS PURCHASING FEED BY SEASON AND LIVESTOCK TYPE

Feed purchase/expenditure	% of livestock holdings purchasing feed	
	1st Season	2nd Season
Goats	2.0	1.5
Sheep	4.8	4.8
Pigs	39	37.6

Regarding poultry, the data shows that feed purchase among poultry holdings in Liberia is also limited, reflecting the small-scale and subsistence nature of most operations.

During both the first and second seasons, feed purchasing patterns remained virtually unchanged, indicating stable feeding practices throughout the year. Nationally, only 1.3 percent of poultry holdings reported purchasing feed for indigenous chickens.

3.3.Aquaculture and Fishing Activities

Aquaculture and fishing remain small but growing components of Liberia's agricultural sector, contributing to household nutrition and rural income diversification. This section of the LAAS-2024 report details the primary findings derived from the analysis of aquaculture and fishing practices within Liberian agricultural households, offering an overview of the type of species cultivated and captured. The data shows both the number of holdings engaged in fish farming and capture and the specific aquatic species cultivated. It also presents data on the proportion of aquaculture and fishing households that reported selling their harvest or catch.

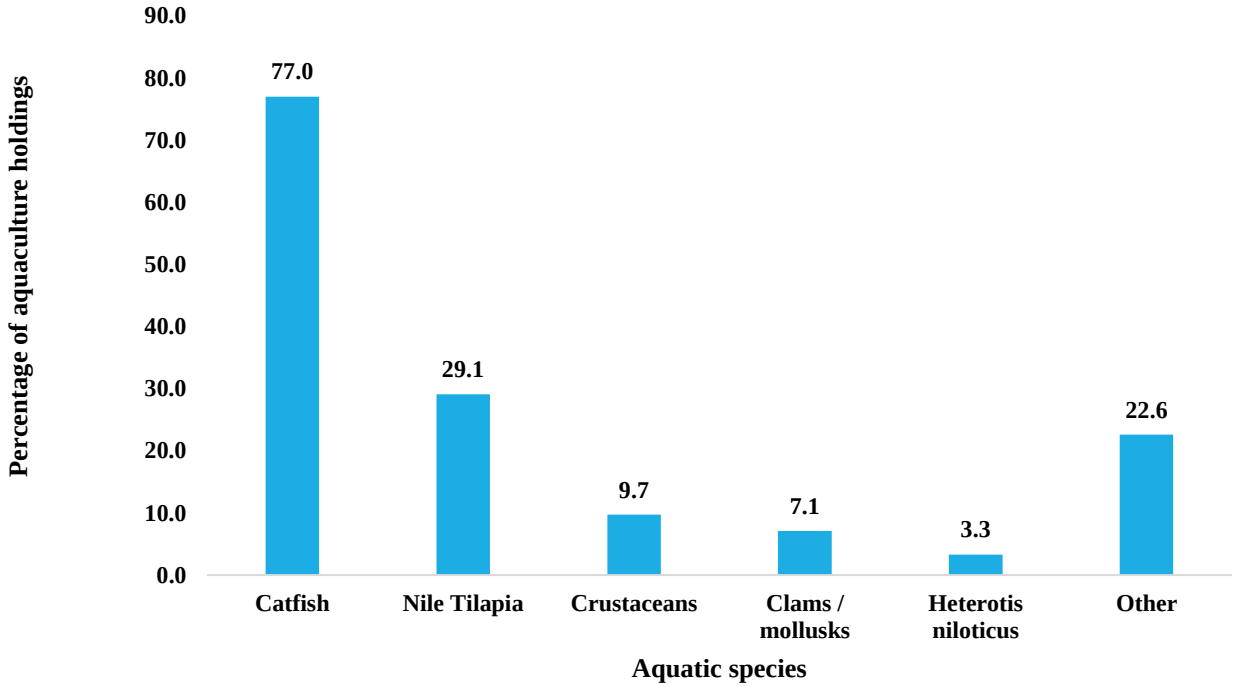
3.3.1. Holdings engaged in aquaculture

Aquaculture in Liberia is limited, and is dominated by catfish farming. A moderate share of producers raises Nile tilapia while few raises crustaceans and mollusks, indicating that diversification beyond pond-based catfish production is still at an early stage.

Figure 16 below presents the distribution of agricultural holdings involved in aquaculture by type of species raised. It highlights the dominant species cultivated across Liberia.

As seen in the figure, only 7,566 holdings (2.2 percent) reported any aquaculture activity at the household level. Among these, catfish dominates (with 77.0 percent holdings engaged) aquaculture farms, followed by Nile tilapia (29.1 percent of holdings). Holdings cultivating crustaceans such as crab or lobster represent 17.0 percent, while clams/mollusks account for 9.7 percent. This distribution indicates that pond-based catfish farming remains the principal form of aquaculture in Liberia, while diversification into crustaceans and mollusks is still limited.

FIGURE 16: PERCENT DISTRIBUTION OF AQUACULTURE HOLDINGS BY SPECIES



Note: *Percentages exceed 100% as some holdings raise more than one aquatic species*.

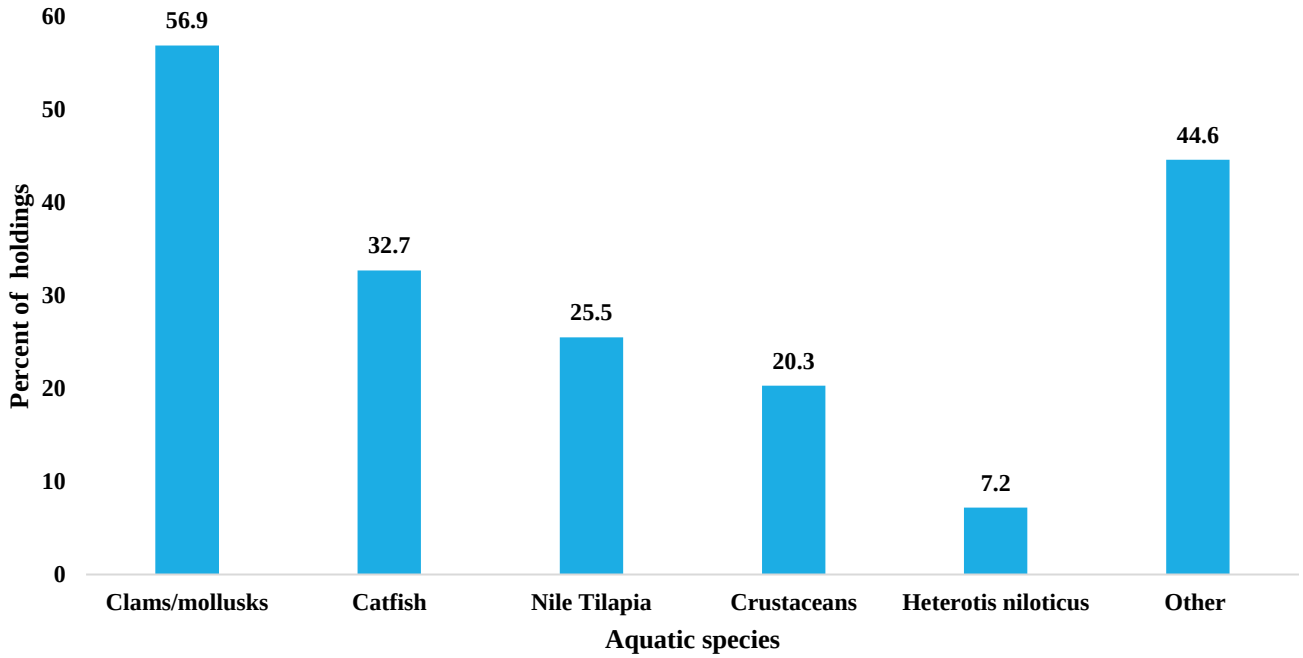
3.3.2. Aquaculture products Sales

This sub-section shows the proportion of aquaculture holdings that sell their produce by species type, providing insight into the commercialization of fish farming across Liberia.

Although cultivated by fewer holdings, clams/mollusks are the most frequently known species that are marketed, followed by Catfish and tilapia.

According to the survey result, the proportion of holdings selling aquaculture harvests varies by species. Clams/mollusks, sold by 56.9 percent of holdings, are the most frequently known species that are marketed, followed by Catfish (32.7% of holdings) and tilapia (25.5% of holdings). Sales are minimal for Heterotis niloticus (7.2 percent of holdings). Interestingly, other unspecified species, although cultivated by few holdings (6.5%) show the highest commercialization rates among aquaculture holdings.

FIGURE 17: PERCENTAGE OF AQUACULTURE HOLDINGS WHO REPORTED SELLING HARVEST BY TYPE OF SPECIES

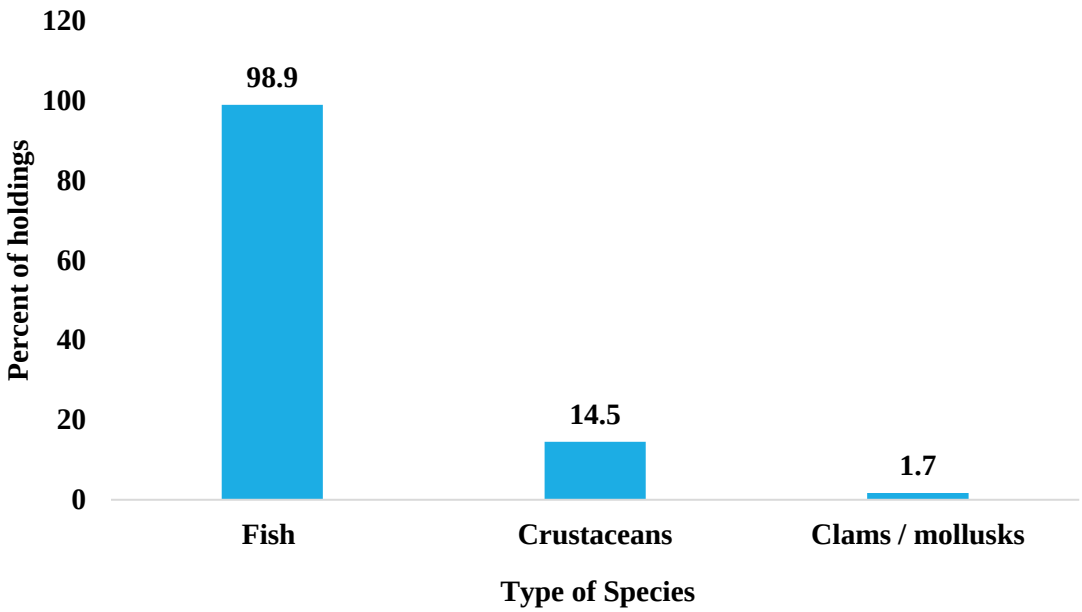


3.3.3. Holdings engaged in capture fishing

Fishing, especially artisanal fishing is an important activity of a significant proportion of agriculture households in Liberia. The data presented in this subsection highlights the importance of capture fisheries to rural livelihoods, particularly along Liberia's rivers and coastal areas.

Fishing is practiced by 92,372 holdings, constituting 26.5 percent of all agricultural households. Nearly all fishing holdings (98.9 percent) target fish, while 14.5 percent also collect crustaceans and 1.7 percent harvest clams or mollusks. These data show the dominance of artisanal fish capture along Liberia's coast and river systems.

FIGURE 18: DISTRIBUTION OF FISHING HOLDINGS BY SPECIES



3.3.4. Fishing products sales.

Very few fishing holdings sell their catch across all fish species.

Analyzing fishing product sales highlights the role of fishing in household income and food security. In Liberia, very few fishing holdings sell their catch across all species.

About 12.1 percent of fishing holdings sold fish, and 7.1 percent sold crustaceans. The percentage of holdings that reported selling clams or mollusks is negligible. Most catches are consumed locally. This illustrates the subsistence nature of fishing and the limited reach of fish markets.

3.4. Forestry products and charcoal production

Forestry-based activities are integral to rural livelihoods, providing energy, income, healing and food through the collection of firewood, charcoal, medicinal plants and non-timber products. The subsequent tables outline the types of forestry activities practiced, their prevalence across Liberia, and the economic value derived from forest products.

3.4.1. Holdings engaged in Forestry Activities

The LAAS-2024 results show that the majority of agricultural holdings practice some form of forestry activities during the 2023/2024 farming season. This section provides numerical evidence of the practice of forestry activities among agricultural holdings, by showing the proportion of them that engaged in forestry and the types of forest products collected. It provides an overview of the most common forestry-related activities among holdings, especially those in rural areas.

Forestry activities are widespread in Liberia, driven mainly by firewood and medicinal plants collection.

Out of all agricultural holdings, 227,003 (65.2 percent) were engaged in forestry activities. Firewood collection is nearly universal (95.1 percent of forestry holdings), followed by medicinal plants (17.3 percent), mushrooms (11.8 percent), and snails (8.7 percent). Honey (5.6 percent) and palm wine (4.6 percent) also represent notable livelihood sources. These figures show that forests serve as multipurpose resources for energy, food, health and income.

TABLE 27: DISTRIBUTION OF HOLDINGS THAT COLLECTED FORESTRY PRODUCTS BY TYPE OF PRODUCTS

Forestry product	Number of holdings	Percent of holdings
Firewood	215,837	95.1
Other woods	5,621	2.5
Coconuts	2,296	1.0
Mushrooms	26,869	11.8
Honey	12,750	5.6
Palm wine	10,541	4.6
Medicinal plants	39,305	17.3
Tea leaves	2,034	0.9
Snails	19,736	8.7
Baboon Worm	16,022	7.1
Chewing Sticks	2,992	1.3
Melequeta Pepper	2,278	1.0
Baboon and Ratten	5,359	2.4
Monkey Apple	2,083	0.9
Xylopia	1,373	0.6
Wild birds (bats, quail, etc)	584	0.3
Wild pigs	913	0.4
Sand	1,121	0.5
Rocks, stone, mud	530	0.2
Other	530	0.2

3.4.2. Forestry products Sales

Forestry products play a vital role in sustaining rural livelihoods, serving as both household resources and supplementary sources of income. **Table 28** presents the percentage of agricultural holdings that reported selling various forestry products. The data provided sheds light on the extent of commercialization within this sub-sector.

Palm wine is the most commercialized forest product, underscoring its strong cultural and economic value.

The results show that palm wine is the most commercialized forest product, sold by 73.4 percent of holdings engaged in its collection. This underscores its strong cultural and economic value, as palm wine production is widespread across rural Liberia and often provides steady cash income for smallholders. Similarly, honey (54.8 percent) and Xylopia or "country spice" (52.3 percent) also record high sales rates among holdings, reflecting their importance in both local markets and traditional trade networks.

Other notable products with moderate commercialization include melequeta pepper (46.7 percent) and snails (28.0 percent). These items are often harvested seasonally and sold in local markets, contributing to household income and dietary diversity.

By contrast, several widely used forest products show very limited or no sales. These include firewood (1.3 percent) and medicinal plants (3.2 percent), which are typically used for domestic consumption or traditional healing rather than for sale.

TABLE 28: PERCENTAGE OF HOLDINGS WHO REPORTED SELLING FORESTRY PRODUCTS BY TYPE OF PRODUCTS

Forestry product	Percentage of holdings
Firewood	1.3
Other woods	3.4
Coconuts	28.6
Mushrooms	5.4
Honey	54.8
Palm wine	73.4
Medicinal plants	3.2
Tea leaves	7.9
Snails	28.0
Baboon Worm	8.0
Chewing Sticks	0.0
Melequeta Pepper	46.7
Baboon and Ratten	0.0
Monkey Apple	6.6
Xylopia	52.3

3.4.3. Holdings engaged in charcoal production

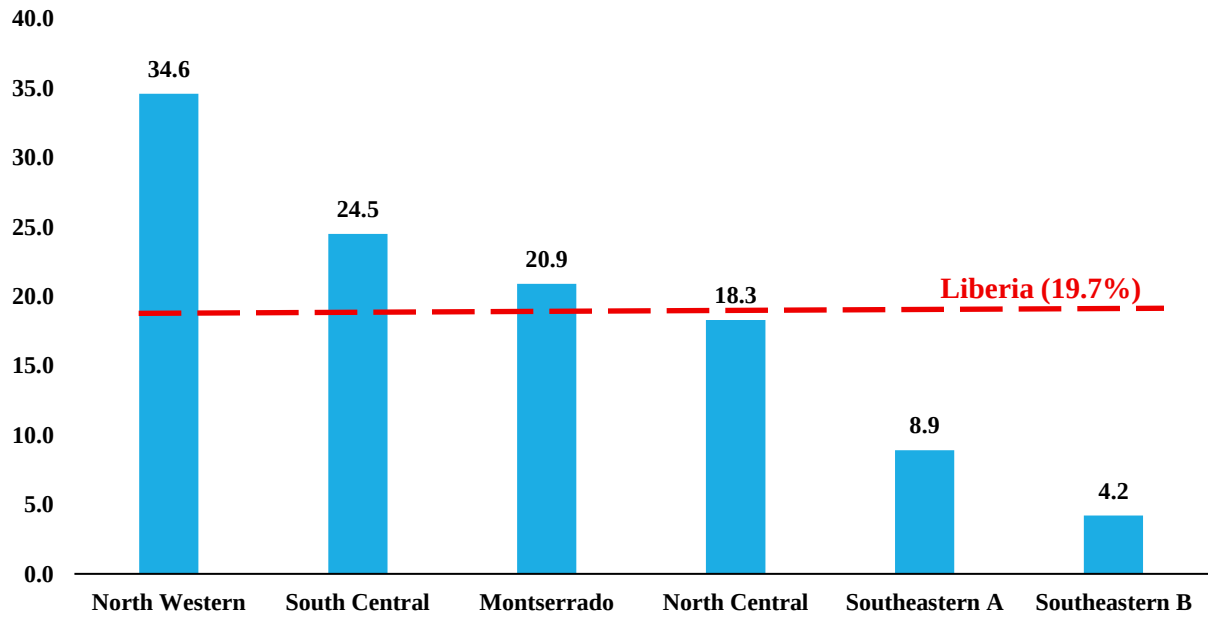
Another very important contributor to Liberian agricultural holdings income is charcoal, derive from forestry products (specifically wood). Charcoal is use in most Liberian households, especially in urban areas, as a source of energy for cooking and heating. In this subsection, the distribution of agricultural holdings engaged in charcoal production is provided. The next subsection presents estimates of the total and average value of charcoal production in term of kilograms. It also provides data on the total and average quantity consumed and sold by households. The results are presented by region to highlight the regional differences that exist in charcoal production.

About one in five holdings in Liberia engaged in charcoal production. The North Western region records the highest share of holdings producing charcoal.

According to the results, a total of 68,577 (constituting 19.7%) of agricultural holdings reported producing charcoal. North Western region records the highest share of holdings producing charcoal (34.6 percent), followed by South Central (24.5 percent) and Montserrado (20.9 percent). It is important to note that these three regions have one thing in common, close proximity to the capital, Monrovia, where urban markets demand for charcoal are high. This factor encourages large-scale charcoal production for both household use and urban sale.

On the other hand, Southeastern B has the lowest participation (4.2 percent), while Southeastern A (8.9 percent) also reports relatively limited engagement. This suggests lower charcoal commercialization in the southeastern counties, likely due to smaller market demand and longer transport distances to major urban centers.

FIGURE 19: PERCENTAGE OF HOLDINGS PRODUCING CHARCOAL BY REGION



3.4.4. Charcoal Production, Consumption and Sales

As mentioned above, this subsection presents information on the total quantity of charcoal produced, consumed, sold, and the corresponding sales value across regions. The results reveal wide regional disparities in both production volume and market value.

Nearly all charcoal produced nationally is sold, with only a small share retained for household use. The North Western region not only leads all others in number of charcoal producers, but also produces the largest total quantity of charcoal.

In general, nearly all charcoal produced nationally (96 percent) is sold, with only a small share retained for household use. This underscores charcoal's significance as a predominantly commercial product and a key source of cash income for rural households.

The North Western region not only leads all others in number of charcoal producers, but also produces the largest total quantity of charcoal (153.6 million kg), accounting for roughly half of national production. It also records the highest total sales value (LRD 2.35 billion) and the highest average value per holding (LRD 168,560).

The North Central region, despite having fewer charcoal producing households compare to other regions, ranks second in terms of production, with 84.4 million kg produced and sales totaling LRD 1.39 billion. This region performance is likely due to its accessibility to large forest land and urban markets in counties like Nimba and Bong.

The South-Central region follows closely, producing 44.6 million kg of charcoal and earning LRD 745.5 million from sales. This region's performance is likely driven by its accessibility to urban buyers and strong linkages to Monrovia's energy market.

In contrast, Southeastern B records the lowest production (875,000 kg) and the lowest total sales value (LRD 22.6 million), consistent with its low participation in charcoal production activities. Southeastern A shows modest production levels (6.3 million kg) but slightly higher average sales per holding (LRD 51,571), suggesting smaller-scale but relatively valuable operations.

TABLE 29: TOTAL CHARCOAL PRODUCED, CONSUMED, SOLD AND SALES VALUE BY REGION

Region	Quantity Produced		Quantity consumed		Quantity Sold		Monetary Value of Sales	
	Total quantity (kg)	Average Quantity (kg)	Total quantity (kg)	Average Quantity (kg)	Total quantity (kg)	Average Quantity (kg)	Total Value (LRD	Average Value (LRD)
Southeastern A	6,271,843	2,322.5	-	-	5,637,081	2,266.5	128,265,405	51,571.3
Southeastern B	-	-	-	-	-	-	-	-
North Central	84,372,257	2,599.1	6,225,110	322.9	78,262,435	2,608.6	1,390,035,655	46,332.2
North Western	153,606,118	10,691.5	3,137,333	359.3	150,389,520	10,780.3	2,351,481,636	168,559.6
Montserrado	18,389,686	2,777.8	-	-	17,892,500	2,702.7	328,472,660	49,617.2
South Central	44,564,171	3,866.0	1,409,492	310.9	43,154,679	3,924.1	745,507,802	67,789.7
Total	308,079,062	4,495.8	11,661,916	305.7	296,190,627	4,563.4	4,966,361,239	76,517.0

- Data withheld due to fewer than 30 unweighted cases.

4. Agricultural Practices and Input Use

This chapter examine key agricultural practices and the use of inputs among agricultural holdings, with a focus on how farmers manage production and utilize resources. The analysis covers land preparation, seed sourcing, fertilizer and pesticide application, irrigation, and farm expenditures. Combine, these aspects provide insights into production strategies and resource allocation in the agricultural sector.

4.1.Land Preparation Practices

Land preparation is a critical step in crop production, influencing soil fertility, moisture retention, and overall yield performance. In Liberia, farming remains predominantly traditional, with most plots prepared manually using hand tools (LAC, 2024). The LAAS-2024 investigated land preparation practices among agricultural holdings in Liberia, by asking how each holding prepare their plot for planting during the reference agricultural season. The results from across the six regions are presented below. These results confirm the findings of the LAC-2024 regarding the rudimentary nature of Liberia agriculture at the household level.

The majority of holdings use traditional tillage method to prepare their farmland.

The data shows that traditional tillage is by far the dominant land preparation method, used on 78.7 percent of plots nationwide. This approach is almost universal in South Central (used on 98.6 percent of plots) and Montserrado (used on 93.3 percent of plots).

The highest use of no-tillage systems is found in Southeastern B, where 69.1 percent of plots did not experience any tillage method and Southeastern A (55.8 percent of plots). Montserrado (0.6 percent) and South Central (0.2 percent) report the lowest no-tillage rates.

Mechanized land preparation remains rare, accounting for only 0.2 percent of plots nationwide, with slightly higher use in South Central (0.5 percent of plots under mechanized land preparation method). Reduced or minimum tillage practices are also negligible across regions.

These findings highlight the limited use of machinery, the persistence of labor-intensive farming practices, the presence of shifting cultivation as well as fallow-based systems, where new plots are cleared with minimal soil disturbance.

TABLE 30: DISTRIBUTION OF PLOTS BY LAND PREPARATION METHOD FOR PLANTING ON THE PLOT

Region	Percentage of holdings						
	No-Tillage	Traditional Tillage	Mulch Tillage	Strip or Zonal Tillage	Ridge Till (Including No-Till or Ridges)	Reduced or Minimum Tillage	Mechanized System
Southeastern A	55.8	42.3	1.4	0.0	0.5	0.0	0.0
Southeastern B	69.1	30.3	0.3	0.0	0.0	0.3	0.0
North Central	11.1	83.6	2.5	0.3	0.9	1.3	0.3
North Western	23.9	74.8	0.9	0.2	0.0	0.0	0.3
Montserrado	0.6	93.3	0.0	6.1	0.0	0.0	0.0
South Central	0.2	98.6	0.0	0.7	0.0	0.0	0.5
Liberia	**17.4**	**78.7**	**1.6**	**0.7**	**0.6**	**0.7**	**0.2**

4.2.Seed Use and Sources

Seed selection and input use are vital indicators of agricultural modernization and productivity. In Liberia, seed recycling and reliance on traditional inputs remain widespread, while fertilizer and pesticide use are still low and concentrated among vegetable growers. The following subsections present findings on the types of seeds used, seed recyclability, and the sources of seed purchased.

4.2.1. Seed Use

The majority of farmers in Liberia rely on uncertified or traditional seed varieties.

The majority of farmers in Liberia rely on uncertified or traditional seed varieties, with over 70 percent of holdings across most crops using uncertified seed. Thus, the lowest adoption of modern seed varieties is observed among traditional vegetables and local crops. The data shed lights on Liberia's dependence on farmer-saved seed, with only a few market-oriented crops using improved varieties.

TABLE 31: PERCENT DISTRIBUTION OF HOLDINGS BY TYPE OF SEED USED AND CROP[4]

Crop	Modern varieties, certified seed	Modern varieties, uncertified seed	Uncertified seed	No seeds used
Rice/paddy	9.7	19.6	71.9	1.2
Corn/maize	9.5	17.3	75.4	0.6
Bitterballs	7.2	17.3	75.7	1.0
Cucumber	7.3	21.7	71.0	0.0
Egg plant	6.4	26.5	69.5	0.0
Okra	6.9	15.8	74.9	2.8
Pepper	8.3	17.0	75.6	0.4

[4] The percentages for each crop do not necessarily sum to 100%, as holdings may use different types of seeds for the same crop.

Crop	Modern varieties, certified seed	Modern varieties, uncertified seed	Uncertified seed	No seeds used
Pumpkins	2.9	22.2	74.3	1.0

4.2.2. Seed Recyclability

The majority of holdings reported using recyclable seed varieties, particularly for vegetable crops.

The majority of holdings reported using recyclable seed varieties, particularly for pumpkin (83.3 percent of holdings). Conversely, Cucumber (8.9% of holdings) has the highest shares of holdings whose seeds cannot be reused, typical of hybrid crops. This distribution shows strong seed recycling traditions in Liberia, where farmers preserve part of their harvest for planting in the next season.

TABLE 32: DISTRIBUTION OF AGRICULTURAL HOLDINGS BY CROP TYPE AND SEED RECYCLABILITY

Crop Type	Number of Holdings	All seed varieties used are recyclable (in %)	Some seed varieties are recyclable (in %)	None are recyclable (in %)
Rice/paddy	69,069	69.5	25.8	4.7
Corn/maize	6,400	76.9	15.7	7.4
Water melon	425	-	-	-
Bitterballs	9,624	67.8	25.1	7.1
Cucumber	3,497	79.4	11.8	8.9
Egg plant	1,991	-	-	-
Kitilay	365	-	-	-
Okra	7,424	70.3	23.1	6.6
Pepper	14,250	71.3	21.4	7.3
Plato	95	-	-	-
Pumpkins	2,812	83.3	9.1	7.7
Tomatoes	206	-	-	-

-Data withheld due to fewer than 30 unweighted cases.

4.2.3. Seed Sources

Purchased seeds account for less than half of seeds used for most crops by farmers, while leftover or own seeds dominate.

The analysis of the sources of seed used by agricultural holdings during the 2023/2024 farming season show that purchased seeds account for less than half of seeds used for most crops by farmers, while leftover or own seeds dominate (reported by 50 - 60 percent of holdings, for most crop). Corn (55.7% of holdings) and okra (54.8% of holdings) also show relatively high purchase rates among holdings.

On the contrary, rice (63.9 percent of holdings) relies mostly on recycled seed. This highlights the persistence of self-sustaining seed systems across major food crops, while purchase is concentrated among high-value horticultural crops.

TABLE 33: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY CROP TYPE AND MAIN SOURCE OF SEED USED

Crop Type	Purchased	Left over (own seed)	Received for free
Rice/paddy	29.3	63.9	6.8
Corn/maize	55.7	40.8	3.5
Water melon	-	-	-
Bitterballs	36.5	50.3	13.3
Cucumber	46.5	41.6	11.9
Egg plant	44.8	38.2	17.0
Kitilay	-	-	-
Okra	54.8	35.1	10.1
Pepper	41.1	50.0	8.9
Plato	-	-	-
Pumpkins	22.4	55.8	21.8
Tomatoes	-	-	-

The survey also collected data on the sources of purchase seeds. Over 70% of purchased seeds come from local merchants and groceries, with minimal use of agro-input dealers or cooperatives (under 2%), showing farmers' reliance on informal seed markets (see **Annex 4**).

4.2.4. Fertilizer and Pesticide Use

Fertilizer adoption rates are highest among vegetable crops, especially cabbage but pesticides use is limited overall, concentrated among watermelon and potatoes greens holdings.

This section presents data on the proportion of plots using fertilizers and pesticides across various crops. Fertilizer adoption rates are highest among vegetable crops, especially water greens growers who show high fertilizer usage. In contrast, agricultural holdings rarely use fertilizer or pesticides on staple crops such as rice and cassava. Pesticides use is limited overall, concentrated among potatoes greens (21.2% of plots) plots.

TABLE 34: PERCENTAGE OF PLOTS USING PESTICIDES, ORGANIC AND INORGANIC FERTILIZER

Crops	Number of crop plots	Organic fertilizer	Inorganic fertilizer	Pesticides
Cereals/Tubers/Roots				
Rice/paddy	237,543	0.9	0.7	2.1
Cassava	178,252	0.4	0.7	0.9
Corn/maize	24,599	3.5	6.4	1.4
Eddoes	18,564	1.2	1.5	1.5
Sweet potatoes	6,564	2.6	4.7	5.0
LEGUMES, OIL & NUTS				
Beans	8,995	0.4	1.2	0.9
Sesame/beneseed	12,757	0.2	0.0	0.8
Groundnut	2,641	4.4	2.8	6.7
Kola nut	1,862	2.5	3.5	5.0
Fruits				
Plantain	29,989	0.6	0.4	1.2
Water melon	1,173	10.1	28.9	25.9
Vegetables				
Bitterballs	39,384	5.7	16.9	10.6
Cabbage	831	-	-	-
Collard greens	253	-	-	-
Cucumber	12,052	13.8	22.0	17.4
Egg plant	6,042	1.8	6.4	4.9
Okra	32,703	14.8	25.9	11.8
Pepper	57,418	5.2	11.8	7.9
Plato	344	-	-	-
Water greens	6,479	33.0	65.2	20.9
Potatoes greens	11,080	37.1	56.9	21.2
Palava sauce	9,000	30.7	58.7	5.3
Cash Crops				
Cocoa	35,874	1.6	4.0	4.3
Coffee	5,519	4.0	4.0	3.2
Oil Palm	17,651	1.1	5.9	4.4
Rubber	23,223	1.4	2.3	2.2
Sugar cane	11,392	1.9	1.3	1.7

-Data withheld due to fewer than 30 unweighted cases.

4.2.5. Types of fertilizers and pesticides use

Among plots using organic fertilizers, the solid manure is the most common type used. Inorganic fertilizer application is dominated by compound NPK while insecticides are by far the most common type of pesticides used.

Agricultural holdings that reported using fertilizers or pesticides also provided information on the specific type of fertilizers they used on their plots. As seen earlier, the use of fertilizers among agricultural holdings in Liberia is very low. The findings below present the types of fertilizers commonly used by holdings that apply fertilizers to their plots. Among plots using organic fertilizers, the solid manure is the most common type of fertilizer, used on more than 90 percent of maize and palm oil plots and 85 percent of cabbage plots. Composting and crop residue use are secondary methods, applied mainly on beans and eggplant plots. Use of more advanced organic inputs such as bio-stimulants or processed compost remains negligible.

Inorganic fertilizer application is dominated by compound NPK, which accounts for nearly 100 percent of use on maize, cabbage, collard greens, and watermelon plots. Rice and cassava show slightly more diverse use, with small shares of urea and superphosphate applied on rice plots (8.7% and 5.7% of plots, respectively). The absence of specialized fertilizers such as DAP or potassium chloride points to a narrow product range and limited advisory support on soil nutrient management in Liberia.

Among plots that utilize pesticides, insecticides are by far the most commonly used product, applied by over 90 percent of plots using pesticides on okra (98.3 percent), bitterballs (91.5 percent), and pepper (92.3 percent). Fungicides and liquid herbicides follow at much lower rates, with notable use on cabbage plots (70.8%) and sweet potato plots (49.1%).

Cereal, tuber and root crop plots that applied pesticide treatment rely mainly on insecticides, as rice (64.6 of plots) and cassava (73.6% of plots) use more of this chemical while coffee (86.4% of plots) and cocoa (64.5% of plots) show moderate chemical use among cash crops. The use of rodenticides, pheromones, and other pest control chemicals is negligible, emphasizing the low-input and subsistence-oriented nature of crop protection in Liberia. See the annex section for the detail results.

4.3. Irrigation and Greenhouse or High shelter Practices

Water provision and management as well as sunlight, heat or extreme cold is a vital aspect of agricultural productivity and resilience, especially in rain-fed systems like Liberia. The LAAS-2024 provides information on the extent of irrigation coverage, the methods and water sources used, and the adoption of greenhouse or high-shelter technologies. This information is provided in the subsections that follow.

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4.3.1. Irrigation structures and methods

The use of irrigation structures to support water provision and nourish crops is low across Liberia. Among irrigated parcels, manual watering is the most widespread method.

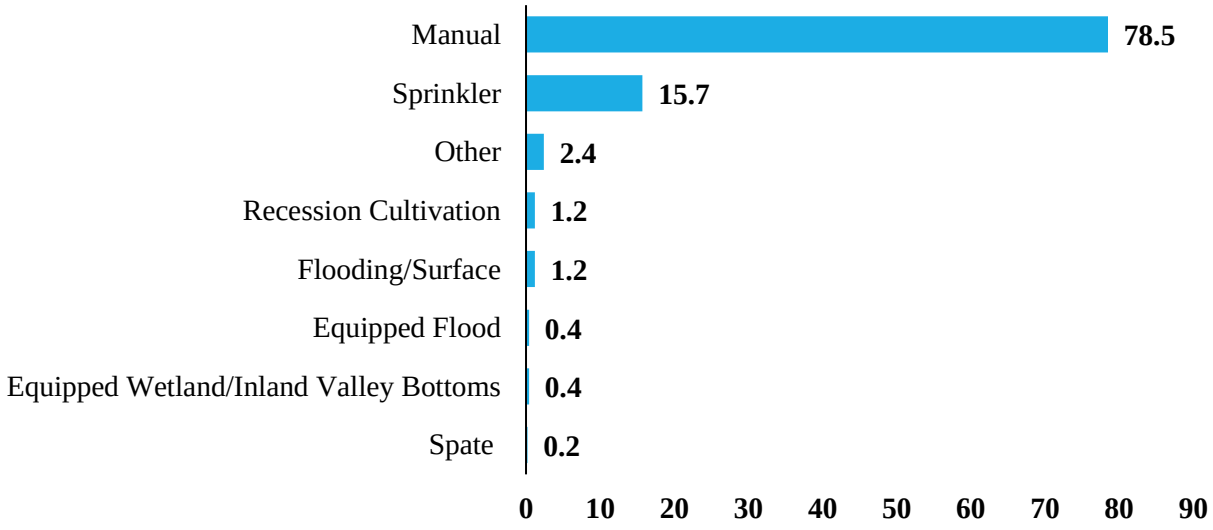
The use of irrigation structures to support water provision and nourish crops is low across Liberia.

About 7,345 agricultural parcels, representing 1.6 percent of all parcels in use nationwide had some form of irrigation facility during the 2023/2024 farming season. This extremely low level of irrigation confirms that Liberian agriculture is overwhelmingly dependent on rainfall. The limited presence of irrigation facilities may also suggest infrastructural and financial barriers to expanding controlled water use for crop production.

Among irrigated parcels, manual watering is the most widespread method, used on 78.5 percent of parcels. The dominance of manual watering irrigation method highlights labor-intensive practices such as watering cans and buckets used by Liberian farmers to water their crops in the absence of rainfall. Sprinkler systems, used on 15.7 percent of parcels, follow distantly as the second most common method.

Other systems such as flood or surface irrigation (1.2 percent) and equipped wetlands (0.4 percent) are used only on a small fraction of parcels. Spate and recession irrigation each account for about 1 percent. In general, mechanized or specialized irrigation remains almost nonexistent.

FIGURE 20: PERCENT DISTRIBUTION OF IRRIGATED PARCELS BY METHOD OF IRRIGATION

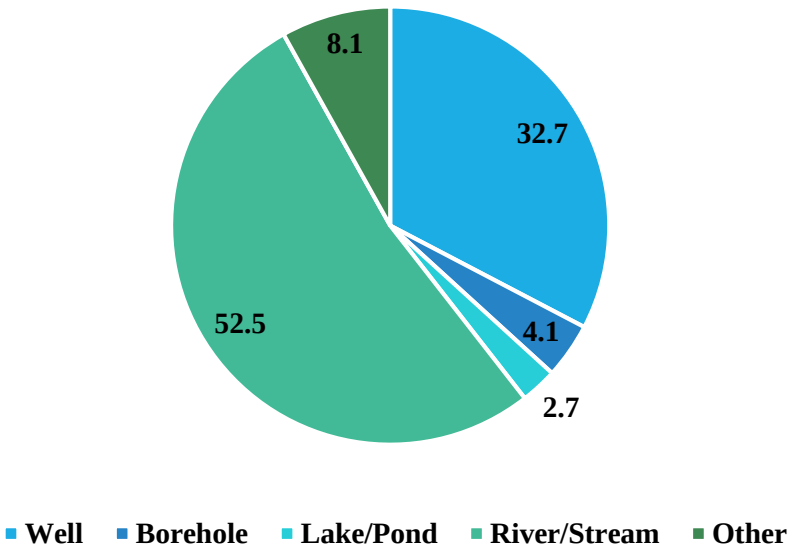


4.3.2. Sources of water for irrigation

Water for irrigation is drawn mainly from rivers and streams.

Water for irrigation is drawn mainly from rivers and streams. About 52.5 percent of irrigated parcels received water from rivers and streams. The second most common source of water for irrigation was well, serving about 32.7 percent of parcels. This distribution shows the relevance of groundwater in boasting crop productivity in Liberia. Lakes or ponds (2.7 percent) play a minor role in irrigation practice in Liberia. These findings underscore the reliance of Liberian farmers who practice irrigation on readily available surface water, which is inexpensive but highly seasonal and susceptible to climate variability.

FIGURE 21: PERCENT DISTRIBUTION OF IRRIGATED PARCELS BY MAIN SOURCE OF WATER FOR IRRIGATION

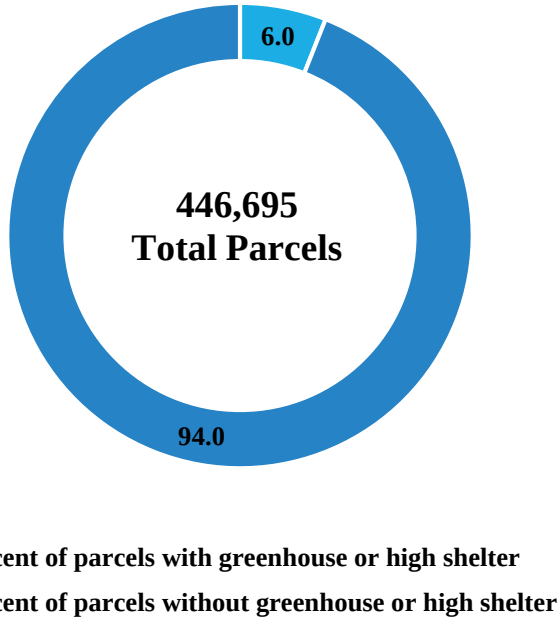


4.3.3. Greenhouse and High shelter Practices

In Liberia, the use of greenhouse and high-shelter systems is rare.

Greenhouse and high shelter structures are mainly use to extend the growing season and protect crops from excessive rainfall, sunshine or cold. This is particularly important for improving productivity and avoiding losses during cultivation. In Liberia, the use of greenhouse and high-shelter systems is rare, with only 26,770 parcels (6.0 percent) reporting their use. The low adoption rate may be due to high setup costs, limited technical expertise, or limited knowledge of farmers on their importance in agricultural practices. Nevertheless, the presence of such structures in Liberia marks an important step toward more intensive, climate-resilient farming practices.

FIGURE 22: DISTRIBUTION OF PARCELS BY GREENHOUSE OR HIGH-SHELTER USE



4.4. Other Production Costs

Besides seeds, fertilizers, and pesticides, farmers incur a range of additional expenses linked to labor, transport, equipment, and energy use. These costs reveal the hidden financial burden of agricultural operations and the relative importance of services that support smallholder production. The survey collected data on a wide range of other cost incurred by agricultural holdings during the 2023/2024 farming seasons. These costs, classified by various categories, summarize the expenses that farmers made on maintaining farm operations and accessing mechanized services.

Direction and Magnitude of Costs

Among all production-related expenditures, hired labor represents the most common and costly service.

Among all production-related expenditures, hired labor represents the most common and costly service, reported by 22.8 percent of households. On average, farmers pay LRD 455 per day for hired workers, typically for about 152 days per season. This result further confirms that crop production in Liberia remains labor-intensive and reliant on seasonal wage labor (LAC, 2024).

Transport services are the second most prevalent cost item, paid by 10.1 percent of households. Average transport expenditure stands at LRD 207 per day, used for about 137 days, highlighting the logistical challenges of moving inputs and produce to and from markets.

Contractual agricultural services, including specialized tasks such as land clearing or threshing, are paid by 2.6 percent of holdings, averaging LRD 162 per day over approximately 168 days. Thus, very few agricultural households made expenditure on long-term service engagement during the reference season.

Less Common and Specialized Expenses

Expenditures on mechanization, maintenance, and energy use were minimal. Less than 1% of households reported paying for animal traction rental, fuel and lubricants, machinery repairs, or electricity, and in most cases, data were withheld due to limited observations. This shows that only a very small share of farms uses modern equipment or infrastructure in their production processes. The low prevalence and minimal expenditure in these categories underscore the low level of mechanization and technological adoption in Liberian agriculture, where production continues to rely heavily on manual labor and traditional methods (See **Table 35**).

TABLE 35: OTHER AGRICULTURAL PRODUCTION COSTS INCURRED BY HOLDINGS: PERCENTAGE OF HOUSEHOLDS, AVERAGE DAILY PAYMENT, AND DURATION OF USE

Other costs	Percentage of households that pay for service	Average amount paid per day (LRD)	Average number of days paid for
Animal traction rental (e.g. to prepare land)	0.3	-	-
Post-harvest labor	1.7	243.6	99.3
Transport related to agricultural activities	10.1	206.7	136.5
Rentals or leasing of equipment, or vehicles	0.6	-	-
Repairs and maintenance of machinery and equipment	0.1	-	-
Fuel and lubricants for agricultural equipment, and vehicles	0.7	105.7	112.9
Repairs and maintenance of farm buildings and fences	0.3	-	-
Electricity use related to agricultural activities	0.1	61.3	156.0
Contractual services for agricultural activities	2.6	162.0	168.1
Hired workers for simple and routine tasks on the holding	22.8	454.7	152.2

- Data withheld due to fewer than 30 unweighted cases.

5. Agricultural Labor Force

Agriculture in Liberia remains highly labor-intensive, with most work performed manually by household members. The household remains the core labor unit, complemented by hired and exchange labor during peak periods such as land preparation and harvesting. The results presented in this section highlight the structure of the agricultural labor force, the gender and age composition of workers, and the duration and intensity of work across major agricultural production activities (crop, livestock, aquaculture and fisheries and forestry, including charcoal).

5.1.Labor in Crop Production

5.1.1. Type of Labor Used in Crop Production Activities

Agricultural labor is generally group into three distinct types; household labor, hired labor and free or exchange labor. These different types of labor have varying impacts on productivity and cost. Knowing the composition of labor helps policymakers and researchers to estimate the real cost of production, assess productivity efficiency by labor type and understand seasonal labor shortages or surpluses. It also facilitates other analysis of agricultural production and destination. For instance, heavy reliance on family labor may signal low commercialization, while higher use of hired labor may reflect expansion or semi-commercial farming.

Most holdings rely on labor from household members, with many of them depending on women compare to men.

The analysis of the type of labor used in crop production in Liberia shows that household labor is dominant, with 83.6 percent of holdings relying on male household members, 87.5 percent on women, and 23.7 percent on children[5]. Hired labor also contributes significantly, especially for men (71.9 percent) and women (47.5 percent), while free or exchange labor is reported by about one-third of holdings (34.0 percent for men and 32.2 percent for women). The highest household labor participation occurs in South Central (men 89.0%, women 92.5%), whereas North Western records the lowest (men 67.7%, women 71.3%), showing regional variations in labor availability and utilization.

TABLE 36: PERCENT DISTRIBUTION OF CROP HOLDINGS BY TYPE OF LABOR USED, GENDER AND REGION

Region	Household Labor			Hired Labor			Free/exchange Labor		
	Men	Women	Children	Men	Women	Children	Men	Women	Children
Southeastern A	83.5	84.1	20.6	62.8	33.9	4.8	30.8	27.0	4.1
Southeastern B	79.0	85.2	39.4	51.4	19.3	3.6	31.2	33.0	8.0
North Central	87.1	91.3	26.9	78.1	63.8	7.5	40.4	39.1	5.0
North Western	67.7	71.3	17.6	85.6	41.2	3.2	17.7	16.7	7.8
Montserrado	79.8	84.7	17.5	61.8	20.4	0.0	14.0	9.2	2.9
South Central	89.0	92.5	16.5	58.8	31.6	0.3	41.1	38.6	0.8
Liberia	**83.6**	**87.5**	**23.7**	**71.9**	**47.5**	**4.8**	**34.0**	**32.2**	**4.7**

5.1.2. Gender Role in Crop Production Activities among Household Members

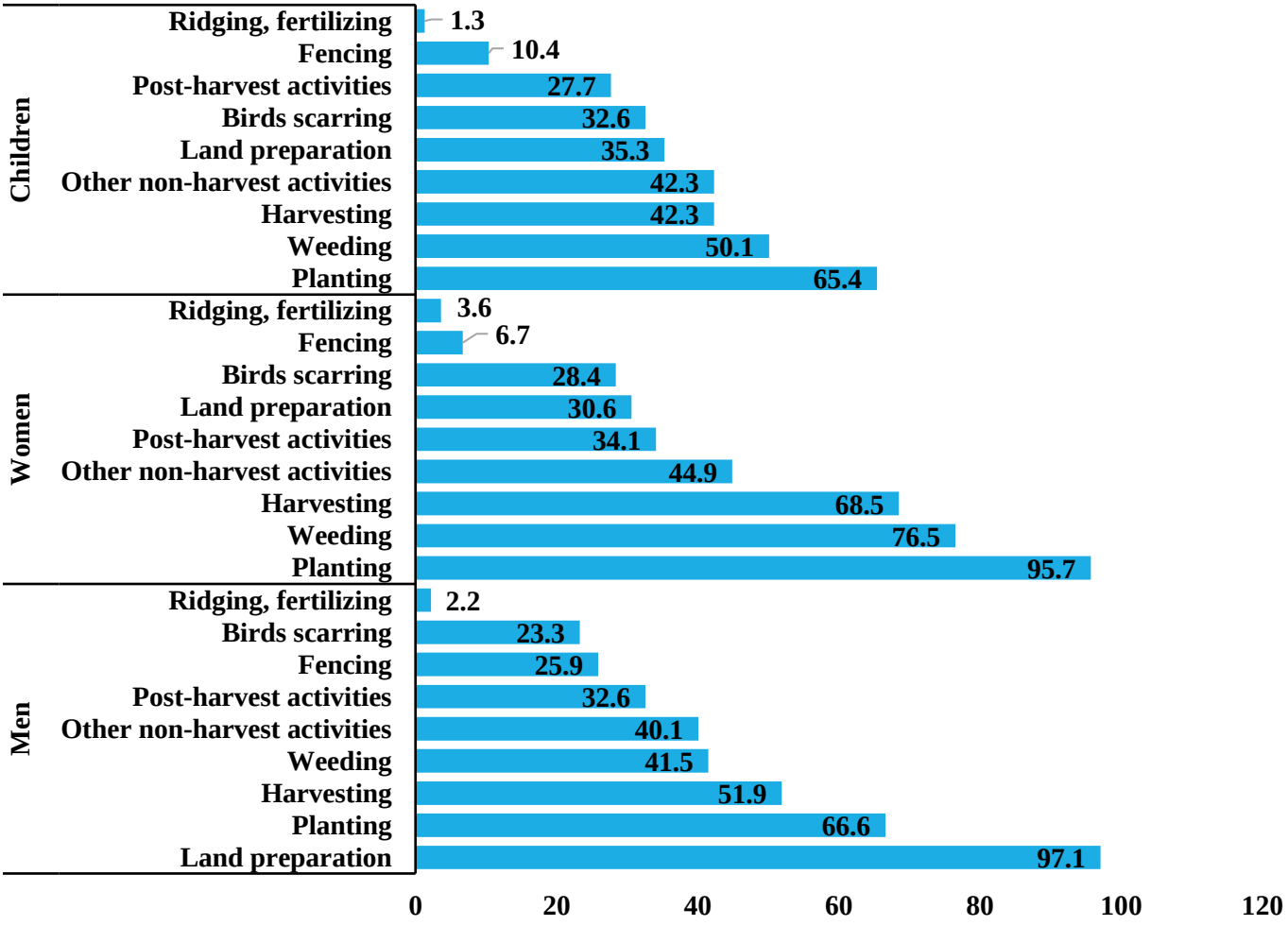
Land preparation is almost entirely carried out by men, while planting and weeding are overwhelmingly led by women and supported by children.

In terms of specific crop activities, gendered roles are clearly defined among household members. Land preparation is almost entirely carried out by men (97%), while planting is overwhelmingly led by women (96%) and

[5] All household members (male or female) that are less than 15 years old.

supported by children (65%). Women also play leading roles in weeding (77%) and post-harvest activities (34%), while men are more engaged in fencing (26%) and harvesting (52%). Children's participation is notable in planting (65%) weeding (50%) and harvesting (42%), indicating that they provide essential seasonal support during peak labor periods. These distributions are consistent across regions, with North Western and South Central showing the most balanced participation between genders as shown in **Annex 8**.

FIGURE 23: PERCENT DISTRIBUTION OF CROP HOLDINGS BY GENDER OF HOUSEHOLD MEMBERS ENGAGED IN CROP PRODUCTION AND TYPE OF CROP ACTIVITY



5.1.3. Size of Labor use for Crop Production

Crop production in Liberia relies heavily on family labor, but is significantly supplemented by hired and exchange labor, reflecting a dual labor system that combines household effort with external workforce support during peak seasons.

The total number of people working on crop activities further reflects this labor distribution. Nationwide, an estimated 426,700 men, 440,900 women, and 120,600 children from agricultural households are engaged in crop production activities. In addition, about 3.6 million men and 2.4 million women are employed as hired laborers[6], with an average of 15 workers per holding for both groups (men and women). Free or exchange labor[7] remains important, involving about 1.3 million men and 1.2 million women, averaging 11 workers per holding for both men and women. These figures underscore the dual nature of Liberia's crop labor system, anchored in family contributions but heavily supplemented by external labor during high-demand periods.

TABLE 37: TOTAL AND AVERAGE NUMBER OF WORKERS WHO WORKED ON CROP ACTIVITIES BY REGION, TYPE OF LABOR AND GENDER

Type of Labor/Gender	Region						
	Southeastern A	Southeastern B	North Central	North Western	Montserrado	South Central	Liberia
Household Labor							
Men							
Total number of workers	33,532	26,149	228,154	41,310	36,438	61,111	426,694
Average number of workers	1.4	1.7	1.5	1.5	1.5	1.5	1.5
Women							
Total number of workers	34,941	24,553	243,021	42,219	39,868	56,285	440,887
Average number of workers	1.5	1.5	1.6	1.5	1.5	1.3	1.5
Children							
Total number of workers	9,053	13,667	68,200	10,743	-	12,234	120,594
Average number of workers	1.6	1.8	1.5	1.5	-	1.6	1.5
Hired Labor							
Men							
Total number of workers	161,453	120,263	2,393,462	396,984	140,335	340,608	3,553,104

[6] It is possible that two or more households could hired the same individual and account for them separately, thus giving rise to double counting. Therefore, the figures given for hired labor represent the number of hiring and not the number of persons hired.

[7] Similarly, a household could provide free or exchange labor for multiple households and each of them might account for such labor separately, thus giving rise to double counting. The figures on free or exchange labor therefore represent the number of free or exchange services or events rather than actual number of persons.

Average number of workers	9.1	11.9	18.1	11.7	7.4	12.7	14.8
Women							
Total number of workers	100,752	64,877	1,797,158	137,814	44,516	215,494	2,360,611
Average number of workers	10.5	17.1	16.7	8.4	7.1	14.9	14.9
Children							
Total number of workers	-	-	147,984	-	-	-	225,625
Average number of workers	-	-	11.7	-	-	-	14.0
Free/exchange Labor							
Men							
Total number of workers	72,510	72,837	805,236	38,635	-	234,018	1,248,483
Average number of workers	8.3	11.8	11.8	5.5	-	12.5	11.0
Women							
Total number of workers	64,031	79,730	769,017	38,754	-	219,492	1,186,048
Average number of workers	8.4	12.3	11.6	5.8	-	12.5	11.0
Children							
Total number of workers	-	-	62,729	20,313	-	-	107,995
Average number of workers	-	-	7.4	6.5	-	-	6.9

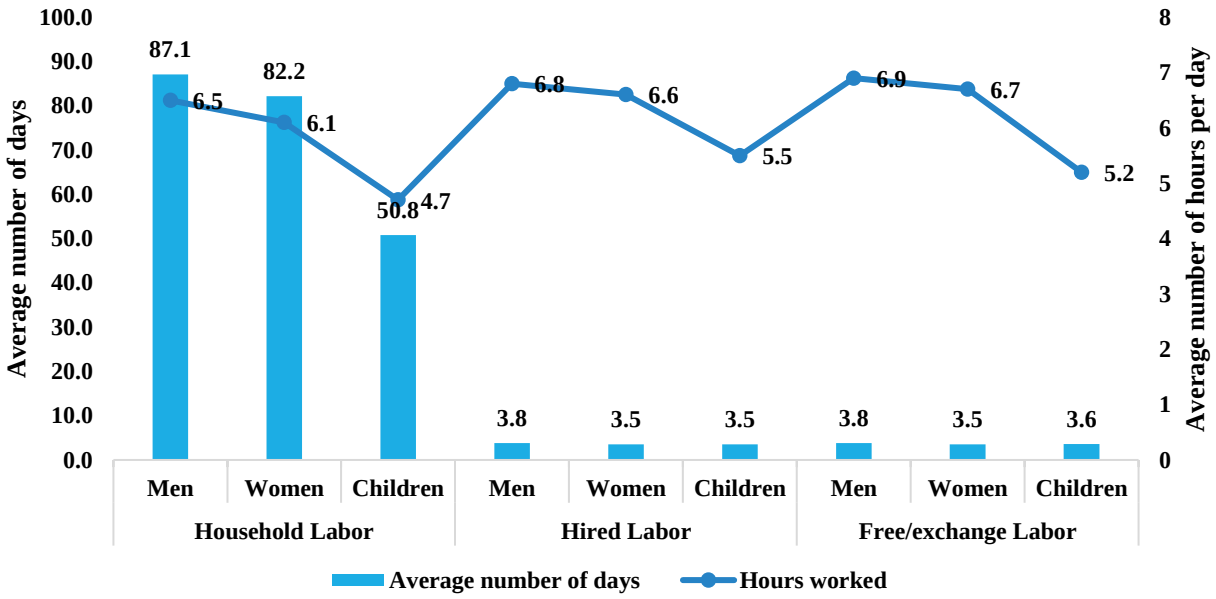
- Data withheld due to fewer than 30 unweighted cases.

5.1.4. Duration of Work on Crop Production Activities

Men work slightly more days compare to women and children. Also, hired and exchange laborers are engaged for shorter periods but work longer daily hours.

The duration of work further illustrates this dependence on household labor. On average, men work 87 days per year, women 82 days, and children 51 days on crop activities. Hired and exchange labor are typically employed for shorter durations of 3 to 4 days per task, primarily for specific operations such as clearing or harvesting. In terms of daily intensity, household men work about 6.5 hours per day, women 6.1 hours, and children 4.7 hours. Hired and free or exchange laborers work longer hours compare to household members, averaging about 7 hours a day for both men and women and 5 hours for children. Data on the regional distribution of the number of days and hours worked by labor type and gender are presented in Annexes 10 and 11.

FIGURE 24: AVERAGE NUMBER OF DAYS AND HOURS WORKERS WORKED ON CROP ACTIVITIES BY TYPE OF LABOR AND GENDER



5.1.5. Cost of Hired Labor for Crop Production Activities

Across all regions, men are consistently paid more wages for crop production activities than women and children.

Wage data show that men are consistently paid more than women and children across all regions. The national average daily wage for male hired labor is LRD 380, compared to LRD 328 for women and LRD 247 for children. Wages are highest in Montserrado (LRD 544 for men and LRD 496 for women) and lowest in North Central (LRD 323 for men and LRD 290 for women). This wage gap underscores the persistence of gender-based differences in agricultural pay, despite women's strong role in crop production.

TABLE 38: AVERAGE AMOUNT PAY TO HIRED LABOR PER DAY FOR WORK ON CROP ACTIVITIES BY GENDER AND REGION (IN LRD)

Region	Men	Women	Children
Southeastern A	464.8	441.3	280.2
Southeastern B	476.4	451.6	-
North Central	322.6	290.1	234.1
North Western	450.4	394.1	-
Montserrado	543.5	496.0	
South Central	366.0	351.2	-
Liberia	**380.1**	**327.6**	**247.4**

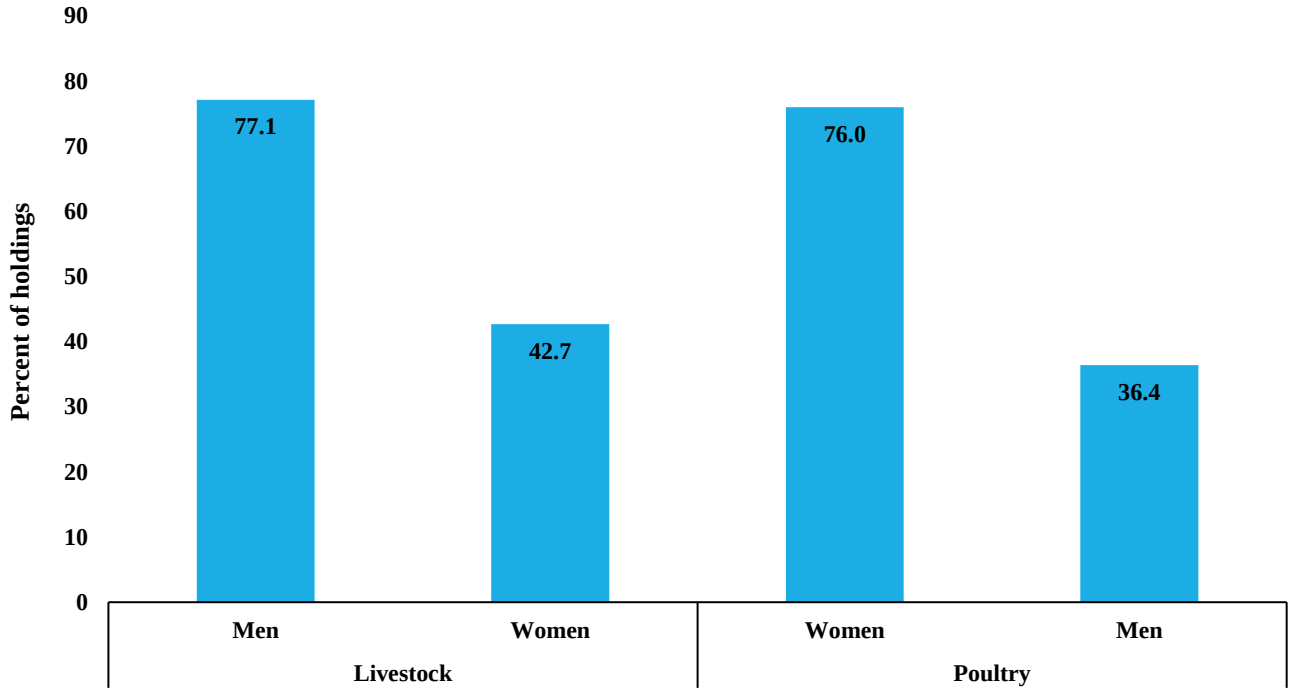
- Data withheld due to fewer than 30 unweighted cases

5.2. Labor in Livestock and Poultry Production[8]

Men dominate livestock care, while women play a leading role in poultry keeping.

Livestock and poultry management also rely mainly on household members, with clear gender distinctions. Men dominate livestock care (77.1 percent), while women play a leading role in poultry keeping (76.0 percent). On average, each livestock-holding household has about 2 men and 1 woman responsible for livestock care. Poultry holdings also involve 2 men and 1 woman.

FIGURE 25: PERCENT DISTRIBUTION OF LIVESTOCK AND POULTRY HOLDINGS BY GENDER OF HOUSEHOLD MEMBER INVOLVED IN KEEPING/RAISING ANIMAL IN THE PAST 3 MONTH

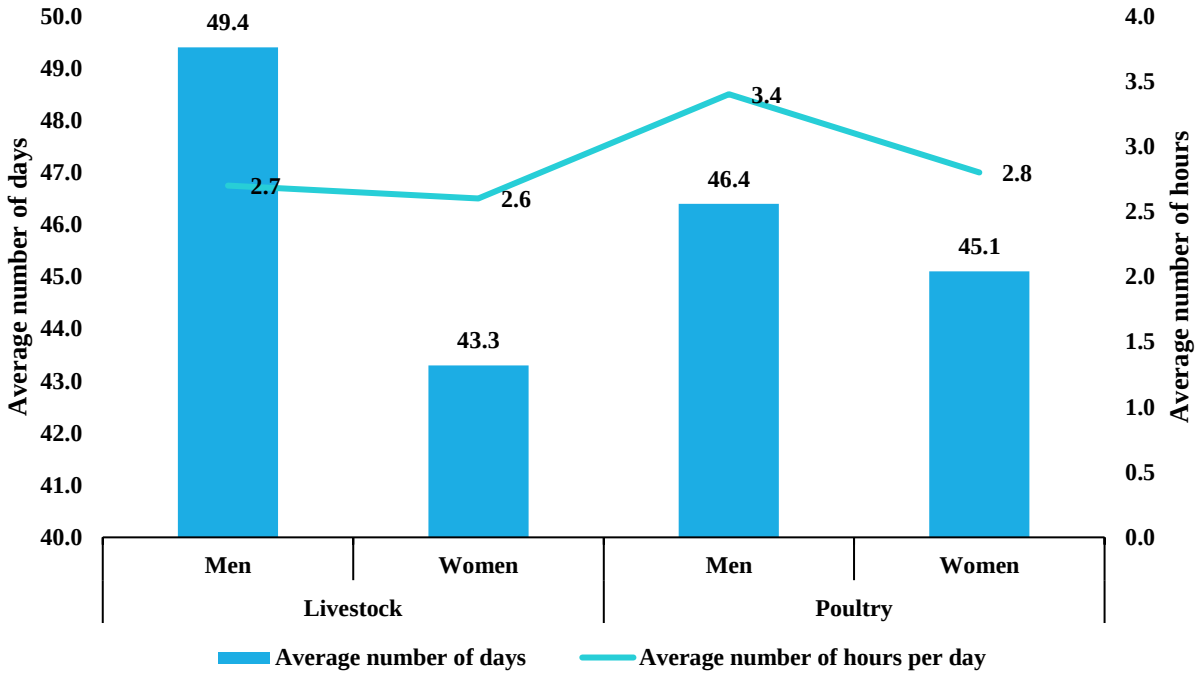


[8] All d*ata on children labor in livestock, poultry and the remaining agricultural production activities were withheld due to fewer than 30 unweighted cases.*

The number of days worked by each group in the last three months before the survey shows a balanced pattern. Men spend about 49 days managing livestock and 46 days managing poultry, while women average 43 and 45 days, respectively. On a typical day, men and women spend about 2.6 to 2.7 hours tending livestock and about 3.0 to 3.4 hours caring for poultry.

Overall, poultry management appears more inclusive, engaging both women and men in daily routines, while livestock management remains a male-dominated activity. The limited daily hours reflect the routine but low-intensity nature of animal care in Liberian smallholder settings.

FIGURE 26: AVERAGE NUMBER OF DAYS AND HOURS HOUSEHOLD MEMBER WORK TO RAISE LIVESTOCK/POULTRY



5.3.Labor in Aquaculture and Fishing Capture

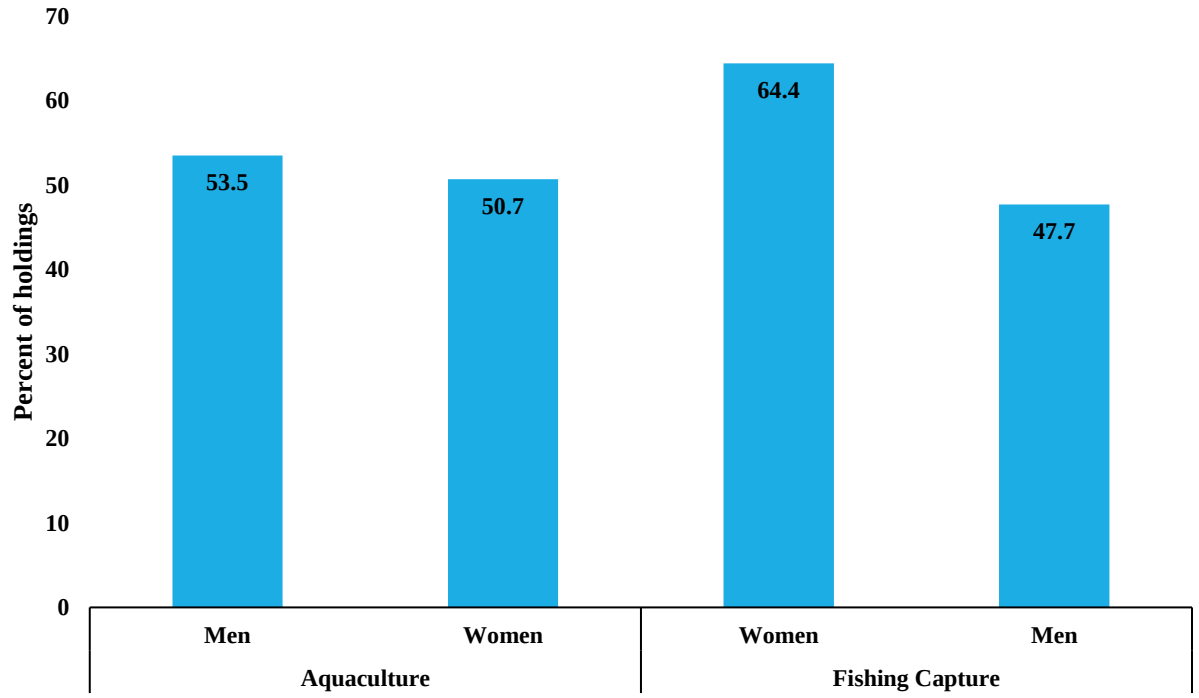
Aquaculture and fishing activities involve both men and women, but the intensity and division of work vary by activity type. The information presented in this section shows the proportion of aquaculture and fishing holdings that rely on labor from men and women. The section also presents data on the average number of household members involve in aquaculture and fishing activities and the duration of their labor, that is, the average number of days worked per month and the average number of hours they worked per day.

In aquaculture activities, men contribute slightly more than women, whereas in fishing activities, women contribute more than men.

In aquaculture activities, men contribute slightly higher than women, as 53.5 percent of holdings reported involvement of men in aquaculture activities in the past 12 months before the survey compare to 50.7 percent of holdings that reported women involvement during the same time period. However, in fishing, more holdings

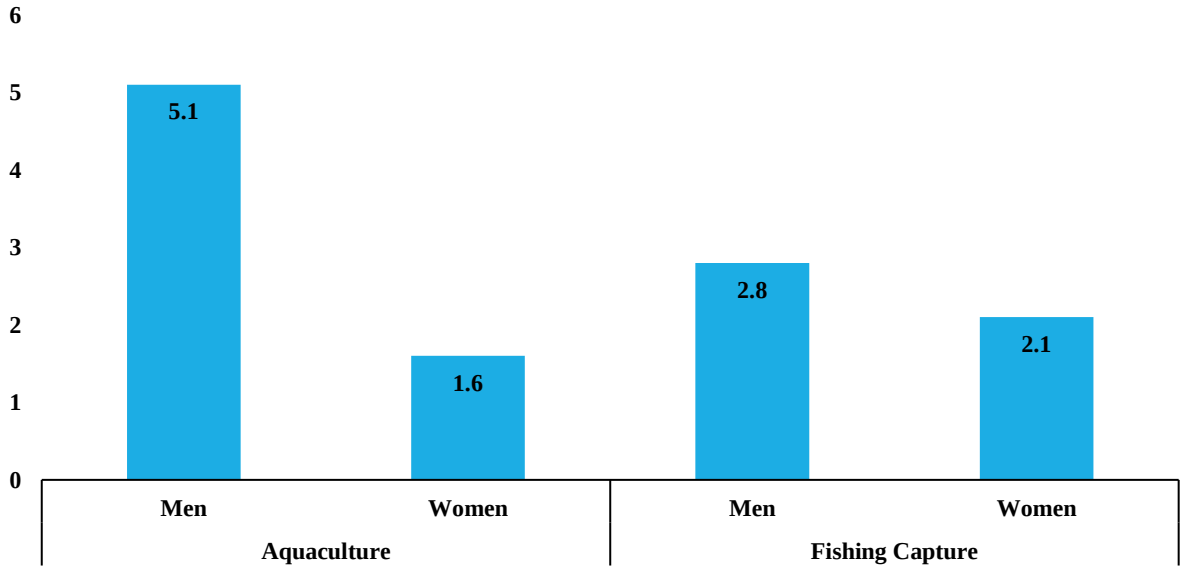
rely on women (64.4%) compare to men (47.7%), likely due to women role in artisanal river and creek fishing (common in rural Liberia).

FIGURE 27: PERCENT DISTRIBUTION OF AQUACULTURE AND FISHING HOLDINGS BY GENDER OF HOUSEHOLD MEMBER INVOLVED IN AQUACULTURE/FISHING ACTIVITIES



In aquaculture, men work with larger teams, averaging 5 household members per holding, while women average about 2 household members. In fishing, the average is 3 men and 2 women per holding, signaling that men may be more involve in large scale activities compare to women.

FIGURE 28: AVERAGE NUMBER OF HOUSEHOLD MEMBER INVOLVED IN AQUACULTURE/FISHING ACTIVITIES BY GENDER*

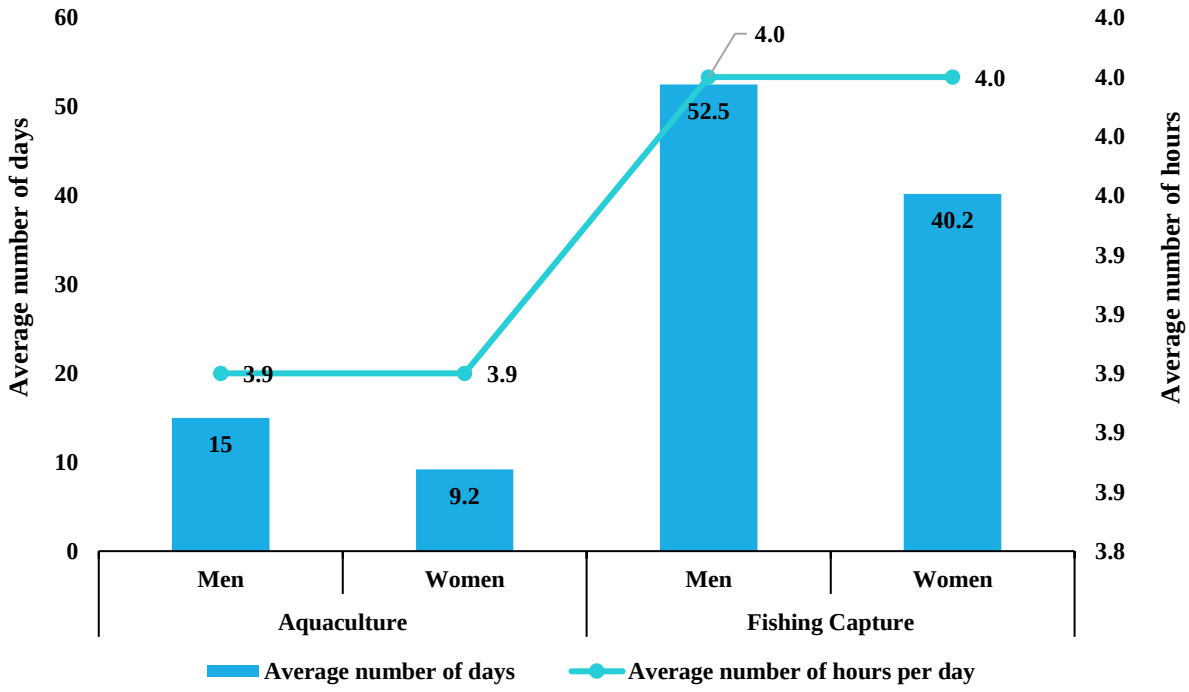


** Values for men working in aquaculture and fishing with CV > 33% are considered unreliable and should be interpreted with caution.*

The time commitment differs substantially between the two subsectors. Fishing is far more labor-intensive, with men working 52.5 days in the past 3 months before the survey and women 40.2 days, compared to 15 days and 9 days, respectively, in aquaculture. The number of hours worked per day is relatively similar across all gender, averaging about 4 hours.

These results show that fishing provides more continuous support to agricultural households' income and livelihood than aquaculture, which is practiced on a smaller scale. Women's high participation in fishing underscores their critical role in fish handling, processing, and trade, activities that sustain household income and local markets.

FIGURE 29: AVERAGE NUMBER OF DAYS AND HOURS HOUSEHOLD MEMBER WORK ON AQUACULTURE/FISHING ACTIVITIES



5.4.Labor in Forestry and Charcoal Production

Although participation levels vary widely across regions, men are far more engaged in forestry and charcoal labor compare to women.

Forestry and charcoal activities are among the most labor-demanding agricultural activities in Liberia, engaging large number of household members over extended periods. Men account for 77 percent of forestry and charcoal holdings works, women 45 percent, though participation levels vary widely across regions. Male

participation is highest in South Central, where 90.1 percent of holdings rely on them and lowest in Southeastern A, where only 61.3 percent of holdings rely on men for forestry and charcoal activities. Women's participation peaks in Southeastern A, where 55.6 percent of holdings use them for forestry and charcoal activities and is lowest in North Western (36.4 percent). It is important to observe that holdings in low producing forestry and charcoal regions utilize more women compare to those in high producing forestry and charcoal production. For example, the North Western region, which reported the highest production of charcoal, rely more on men than women. About 76 percent of holdings in the region rely on men compare to 36.4 percent of holdings that rely on women.

TABLE 39: PERCENT DISTRIBUTION OF FORESTRY AND CHARCOAL HOLDINGS BY GENDER OF HOUSEHOLD MEMBER INVOLVED IN FORESTRY/CHARCOAL ACTIVITIES

Region	Men	Women
Southeastern A	61.3	55.6
Southeastern B	78.0	38.8
North Central	75.2	44.7
North Western	76.0	36.4
Montserrado	74.7	39.9
South Central	90.1	50.0
Liberia	**76.6**	**44.9**

The analysis of the average number of household members involve in forestry or charcoal production activities shows that, on average, 2 persons per household participate in these activities, regardless of gender. This indicates that these activities often involve the entire household.

Across regions, participation levels vary modestly. Montserrado records the highest average participation for men (2.4) while North Central records the highest average participation for women (1.8).

In contrast, the lowest female participation is observed in the North Western region (1.3), while the lowest male involvement (1.6) occurs in Southeastern A. Despite these small differences, the data reveal a consistent pattern across regions.

TABLE 40: AVERAGE NUMBER OF HOUSEHOLD MEMBER INVOLVED IN FORESTRY/CHARCOAL ACTIVITIES BY GENDER

Region	Men	Women
Southeastern A	1.6	1.5
Southeastern B	1.9	1.7
North Central	1.9	1.8
North Western	1.8	1.3
Montserrado	2.4	-
South Central	2.0	1.4
Liberia	**1.9**	**1.6**

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.).

Forestry and charcoal work also demand long periods of labor. Nationally, men work 87 days in the last 12 months before the survey data collection and women 97 days. The long periods of work observe among women might largely be link to their primary role in firewood collection. The longest work periods occur in South Central, where both men and women work more than 130 days per year, driven by steady charcoal burning and firewood collection.

TABLE 41: AVERAGE NUMBER OF DAYS HOUSEHOLD MEMBER WORK ON FORESTRY/CHARCOAL ACTIVITIES

Region	Men	Women
Southeastern A	67.6	94.6
Southeastern B	74.0	93.1
North Central	79.0	92.9
North Western	60.5	68.6
Montserrado	92.9	-
South Central	135.8	130.4
Liberia	**86.8**	**96.9**

-Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.)

Daily working hours are moderate: men average 4.0 hours and women 3.6 hours, with the highest intensity observed in Montserrado (5.2 hours for men).

The data emphasize that forestry and charcoal production are key employment sources in Liberia, especially in rural areas, often engaging entire households for extended durations.

TABLE 42: AVERAGE NUMBER OF HOURS PER DAY THAT HOUSEHOLD MEMBER WORK ON FORESTRY/CHARCOAL ACTIVITIES

Region	Men	Women
Southeastern A	3.2	2.7
Southeastern B	3.0	2.4
North Central	3.9	3.6
North Western	4.3	3.8
Montserrado	5.2	-
South Central	4.4	4.2
Liberia	4.0	3.6

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.)

6. Access to Subsidies, Loans, & Transfers

Access to financial and material support is crucial for strengthening smallholder productivity and resilience. Yet, only a small fraction of Liberia's agricultural households benefits from financial and social assistance in the form of subsidies, loans, or transfers intended for agricultural purposes. The results presented below highlight the extent and form of assistance received by agricultural holdings nationwide.

6.1.Access to Subsidies

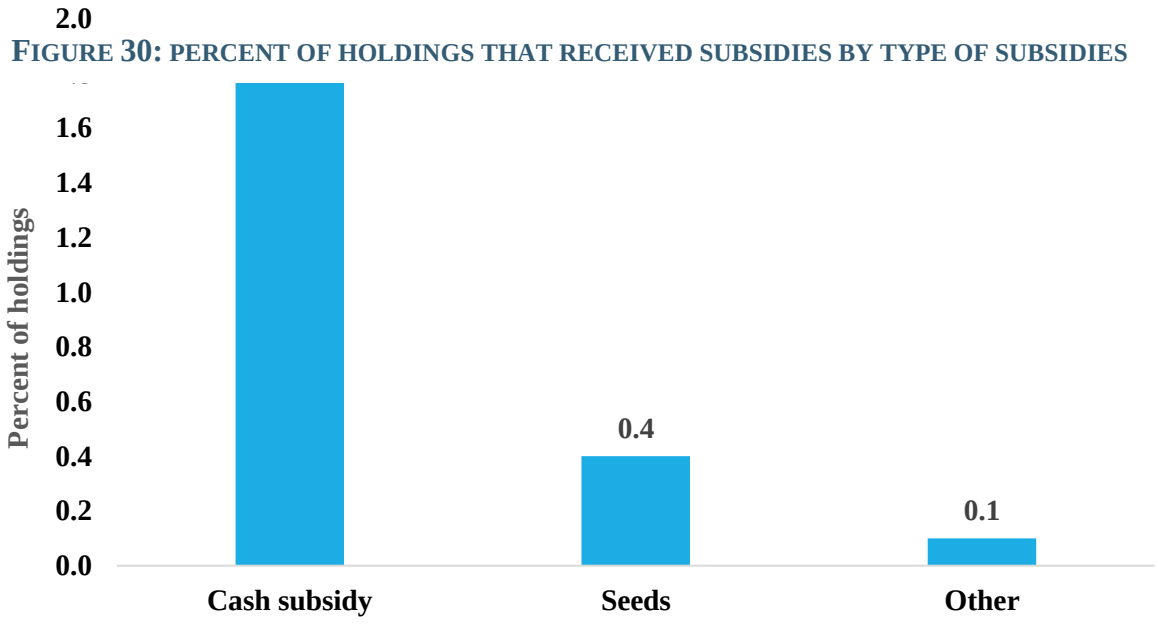
Subsidies in the agriculture sector are designed to ease production costs by providing farmers with cash, seeds, or other inputs. However, the data show that such support reaches only a minimal share of farmers.

Only a minimum share of holdings reported receiving any form of agricultural subsidies.

Across the country, only 1.8 percent of agricultural holdings reported receiving cash subsidies, representing about 6,266 holdings. Subsidies in the form of seed distributions were reported by 0.4 percent of holdings, while other types of support, such as fertilizers or farm tools, were received by just 0.1 percent.

These figures highlight the extremely limited coverage of subsidy programs in Liberia agricultural sector at the household level. Even where such interventions exist, they tend to be short-term or project-specific, often targeting select groups rather than the wider farming population. The results

FIGURE 30: PERCENT OF HOLDINGS THAT RECEIVED SUBSIDIES BY TYPE OF SUBSIDIES



underscore the need to expand subsidy mechanisms to reach more smallholders, particularly women and youth, who often face higher input costs and lower access to credit.

6.2.Access to Loans

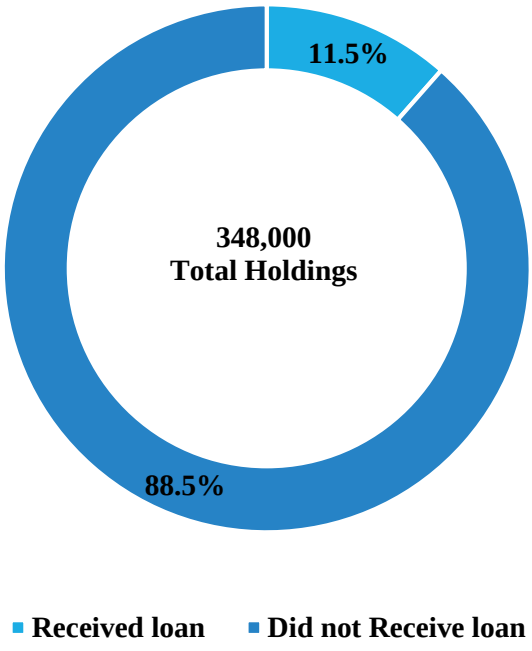
Access to agricultural credit remains one of the most persistent constraints for farmers in Liberia. Formal lending institutions, including commercial banks and cooperatives, have been slow to extend financial services to smallholders, largely due to collateral requirements and the perceived risks of agricultural lending.

Access to loans for agricultural activities is limited in Liberia.

The data indicate that only 39,982 holdings, equivalent to 11.5 percent of all agricultural households reported taking a loan for agricultural purposes. These loans included both cash and in-kind credit, such as seed or fertilizer provided on a repayment basis. Despite the modest uptake, access to credit is a critical determinant of productivity, allowing farmers to invest in inputs, hire labor, or expand cultivated areas.

The low rate of borrowing suggests that most farmers continue to rely on personal savings or informal borrowing from family and friends. Strengthening microfinance institutions and cooperative lending schemes could significantly improve farmers' access to credit while promoting financial inclusion in rural communities.

FIGURE 31: DISTRIBUTION OF HOLDINGS BY WHETHER OR NOT THEY TOOK CASH OR IN-KIND LOAN FOR AGRICULTURAL PURPOSES



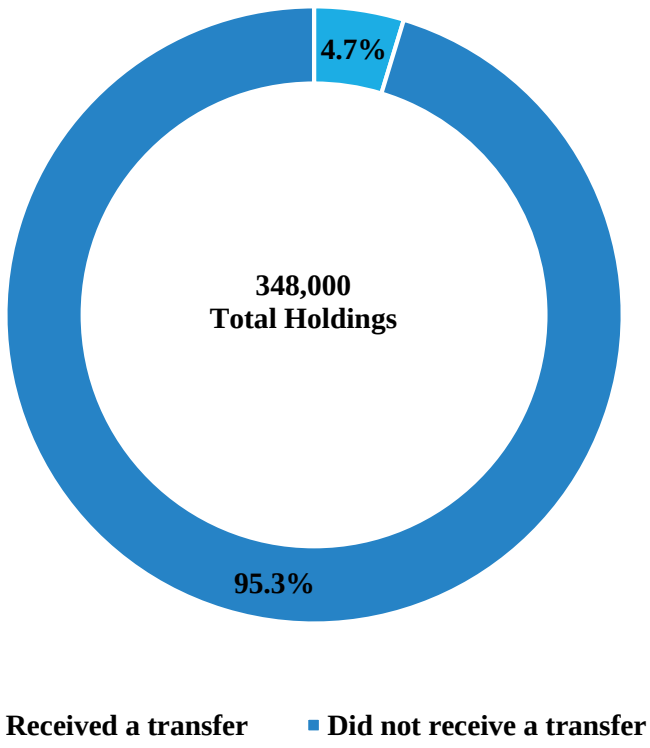
6.3.Access to Transfer for Agricultural Purposes

Social and humanitarian transfers can provide vital relief to farming households, particularly during times of economic hardship or climate-related shocks. However, the findings reveal that such assistance is also limited in scope.

Access to transfer for agricultural purposes is limited in Liberia.

Nationwide, 16,254 holdings (4.7 percent) reported receiving cash or in-kind transfers that were used for agricultural purposes. Although relatively few farmers benefit directly, these transfers play a vital role in helping vulnerable households sustain production during difficult seasons. Expanding such opportunities and integrating them into broader agricultural support frameworks could enhance their long-term developmental impact.

TABLE 43: DISTRIBUTION OF HOLDINGS BY WHETHER OR NOT THEY RECEIVED A TRANSFER IN CASH OR IN-KIND THAT WAS USED FOR AGRICULTURAL PURPOSES



7. Conclusion and Recommendation

7.1.Conclusion

The Liberia Annual Agriculture Survey (LAAS-2024) confirms that smallholder farming remains central to the national economy and rural welfare. Despite the sector's broad coverage, productivity is constrained by limited access to modern inputs, irrigation, credit, and mechanization. The dominance of manual labor, the heavy reliance on recycled seeds, and the low use of fertilizers and pesticides illustrate the persistence of traditional farming systems.

Livestock, forestry, and fishing continue to play complementary roles in household livelihoods, but these subsectors also face challenges of low investment and limited commercialization. Women and youth remain vital to agricultural labor yet have fewer opportunities for training and credit access.

The survey's findings provide an important baseline for monitoring progress toward Liberia's food-security and rural-development goals. They reaffirm the need for coordinated interventions to modernize smallholder farming, strengthen data systems, and integrate agricultural statistics into policy decision-making.

7.2. Recommendation

- Expand access to agricultural inputs.
- Establish reliable distribution systems for certified seeds, fertilizers, and pesticides at affordable prices, prioritizing women and youth farmers.
- Promote irrigation and mechanization.
- Invest in small-scale irrigation schemes, water-harvesting systems, and affordable mechanized services to reduce dependence on rainfall and manual labor.
- Strengthen agricultural finance and insurance.
- Develop microcredit and cooperative lending mechanisms tailored to smallholders, alongside risk-sharing instruments to reduce lending barriers.
- Enhance farmer training and extension services.
- Scale up training on improved agronomic practices, integrated pest management, and post-harvest handling to increase yields and reduce losses.
- Support diversification and value addition.
- Encourage the processing and marketing of livestock, forestry, and aquaculture products to expand rural income opportunities.
- Promote gender and youth inclusion.
- Target labor-saving technologies, leadership training, and entrepreneurship support to women and young farmers who provide much of the agricultural workforce.
- Strengthen data and monitoring systems.
- Institutionalize the annual agricultural production survey as a core component of the national statistical system to ensure consistent, high-quality agricultural data for planning.

8. Annexes

8.1. Annex I: Statistical Tables

ANNEX 1: TOTAL AGRICULTURAL HOLDINGS REPORTING PLOTS, NUMBER OF PLOTS AND PLOT AREA BY PLOT TYPE

Region	Total Agricultural Holdings reporting Plots	Total number of plots	A Kitchen Garden/Backyard			A Conventional Plot Cultivated			A Conventional P Temporarily Left Fa	
			Number of plots	Total area (HA)	Average area (Ha)	Number of plots	Total area (HA)	Average area (Ha)	Number of plots	Total area (HA)
Southeastern A	28,697	39,190	-	-	-	37,098	38250	1.0	-	-
Southeastern B	19,700	30,142	-	-	-	28,005	20658	0.7	-	-
North Central	170,500	304,677	9,010	12,193	1.4	278,772	376,265	1.3	16,895	238,935
North Western	39,741	63,686	6,363	1,161	0.2	54,970	62,535	1.1	2,353	58,259
Montserrado	30,657	40,501	13,975	1,003	0.1	24,501	14,214	0.6	-	-
South Central	45,755	58,881	-	-	-	54,554	36798	0.7	-	-
Liberia	335,050	537,076	37,145	15,894	0.4	477,900	548,720	1.1	22,031	331,779

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.)

ANNEX 2: PERCENT DISTRIBUTION OF PARCELS BY EROSION CONTROL METHODS

Region	No erosion Control	Terraces	Erosion control bunds	Gabions / Sandbags	Vetiver grass	Tree belts	Water harvest bunds	Drainage ditches	Other
Southeastern A	93.8	0.3	0.8	0.6	0.3	2.2	0.0	2.4	0.0
Southeastern B	94.9	0.6	2.0	0.0	0.0	1.5	0.0	0.9	0.7
North Central	85.4	0.2	6.6	0.7	0.2	3.1	1.3	3.3	0.2
North Western	88.7	0.0	0.5	2.3	0.3	7.6	0.3	0.7	0.1
Montserrado	83.7	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.7
South Central	87.8	0.0	3.5	0.0	0.0	0.1	0.0	1.7	6.9
Liberia	**87.2**	**0.2**	**4.2**	**0.7**	**0.2**	**2.9**	**0.7**	**3.5**	**1.1**

ANNEX 3: NUMBER AND PERCENT OF AGRICULTURAL HOLDINGS REPORTING CROP PRODUCTION BY CROP CATEGORIES

Region	Crop Categories

	Total Holdings	Cereals/tubers/roots		Legumes, Oil & Nuts		Fruits		Vegetables		Permanent Cash crops	
		Total	%	Total	%	Total	%	Total	%	Total	%
Southeastern A	28,285	26,640	94.2	102	0.4	3,451	12.2	3,481	12.3	5,027	17.8
Southeastern B	19,700	18,734	95.1	656	3.3	1,867	9.5	7,063	35.9	3,114	15.8
North Central	169,117	157,565	93.2	15,111	8.9	21,221	12.5	42,775	25.3	48,496	28.7
North Western	39,741	37,456	94.3	6,619	16.7	4,325	10.9	13,838	34.8	6,683	16.8
Montserrado	30,657	17,039	55.6	189	0.6	844	2.8	14,056	45.9	1,805	5.9
South Central	45,675	41,343	90.5	807	1.8	4,050	8.9	15,206	33.3	4,627	10.1
Liberia	**333,174**	**298,777**	**89.7**	**23,484**	**7.0**	**35,757**	**10.7**	**96,420**	**28.9**	**69,753**	**20.9**

ANNEX 4: PERCENT DISTRIBUTION OF AGRICULTURAL HOLDINGS BY CROP TYPE AND MAIN PROVIDED OF PURCHASED SEED

Crop Type	Local merchant/grocery	Farmer association	Cooperative	Agro-input dealers	Other
Rice/paddy	73.9	21.0	0.9	1.6	2.5
Corn/maize	92.6	6.5	0.0	0.9	0.0
Water melon	-	-	-	-	-
Bitterballs	83.0	8.5	0.0	7.4	1.1
Cucumber	96.4	1.2	0.0	1.3	1.1
Egg plant	88.1	6.6	0.0	5.3	0.0
Kitilay	-	-	-	-	-
Okra	87.7	6.6	0.3	5.4	0.0
Pepper	82.1	13.8	0.2	3.0	0.9
Plato	-	-	-	-	-
Pumpkins	93.8	4.4	0.0	1.9	0.0
Tomatoes	-	-	-	-	-

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.)

ANNEX 5: PERCENT DISTRIBUTION OF PLOTS USING ORGANIC FERTILIZERS BY TYPE OF ORGANIC FERTILIZERS USED

Crops	Type of Organic fertilizers used on crop						
	Solid manure	Liquid manure/slurry	Vegetable material & compost	Stabilized	Sewage sludge	Bio-stimulant	Other
Cereals/Tubers/Roots							
Rice/paddy	44.6	11.0	15.5	1.1	0.0	0.0	38.0
Cassava	52.8	5.7	0.0	0.0	0.0	0.0	47.2
Corn/maize	94.5	0.0	5.4	0.0	0.0	0.0	0.0
Eddoes	0.0	0.0	27.0	0.0	0.0	0.0	73.0
Sweet potatoes	47.4	0.0	35.7	42.1	35.7	0.0	10.5
LEGUMES, OIL & NUTS							
Beans	100.0	0.0	100.0	0.0	0.0	0.0	0.0
Sesame/beneseed	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Groundnut	0.0	0.0	64.7	0.0	0.0	36.2	0.0
Kola nut	0.0	61.7	0.0	0.0	38.3	0.0	0.0
Fruits							
Plantain	36.2	20.5	0.0	16.8	18.9	0.0	28.1
Water melon	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Vegetables							
Bitterballs	48.2	32.0	27.6	0.0	2.7	0.0	3.3
Cabbage	85.3	3.4	14.9	0.0	0.0	0.0	0.0
Collard greens	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Cucumber	73.8	25.6	35.3	0.0	0.0	0.0	0.0
Egg plant	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Okra	46.5	36.1	25.0	0.0	0.0	0.0	0.8
Pepper	33.9	34.0	31.7	0.8	2.1	0.0	11.2
Plato	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Water greens	54.6	43.5	2.0	0.0	0.0	0.0	0.0
Potatoes greens	41.6	49.1	21.7	0.0	0.0	0.0	0.0
Palava sauce	42.1	53.7	5.5	0.0	0.0	0.0	0.0
Cash Crops							
Cocoa	29.3	18.7	12.3	0.0	3.1	0.0	36.7
Coffee	0.0	13.1	0.0	0.0	8.1	0.0	79.2
Palm oil	76.5	0.0	5.6	0.0	17.9	0.0	0.0
Rubber	53.7	0.0	0.0	0.0	0.0	0.0	46.0
Sugar cane	84.3	53.9	0.0	0.0	0.0	0.0	15.7

ANNEX 6: PERCENT DISTRIBUTION OF PLOTS USING INORGANIC FERTILIZERS BY TYPE OF INORGANIC FERTILIZERS USED

Crops	Type of Inorganic (chemical) fertilizers used on crop								
	Urea	Other nitrogenous fertilizer	Superphosphates (above 35% of p205)	Other Phosphatic fertilizer	Potassium chloride (MOP)	Both potassic fertilizer	NPK	Diammonium phosphate (DAP)	Other
Cereals/Tubers/Roots									
Rice/paddy	8.7	13.3	5.7	0.0	3.3	2.1	28.1	0.0	41.9
Cassava	5.3	0.0	0.0	5.4	4.6	0.0	59.6	4.9	25.6
Corn/maize	0.0	11.9	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Eddoes	0.0	0.0	0.0	0.0	0.0	0.0	9.9	32.9	57.2
Sweet potatoes	19.9	0.0	0.0	0.0	0.0	0.0	74.5	0.0	5.9
LEGUMES, OIL & NUTS									
Beans	0.0	0.0	33.0	0.0	0.0	0.0	100.0	0.0	0.0
Palm nuts	0.0	0.0	0.0	0.0	7.2	7.2	85.7	0.0	0.0
Groundnut	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Kola nut	0.0	0.0	0.0	0.0	73.4	28.1	0.0	0.0	0.0
Orange	39.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Fruits									
Plantain	0.0	25.0	0.0	0.0	15.5	30.2	0.0	0.0	44.8
Water melon	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Vegetables									
Bitterballs	27.0	1.7	1.0	0.0	0.0	0.0	84.6	0.0	1.3
Cabbage	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Collard greens	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Cucumber	16.0	0.0	0.0	0.0	0.0	0.0	98.2	0.0	0.0
Egg plant	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Okra	35.9	0.0	0.0	0.9	0.0	0.0	93.6	0.4	0.0
Pepper	19.4	0.8	0.0	0.0	0.0	0.0	91.7	0.0	2.0
Plato	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Water greens	15.7	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Potatoes greens	29.3	0.0	0.0	0.0	0.0	0.0	96.3	0.0	0.0
Palava sauce	18.1	6.2	0.0	0.0	0.0	0.0	93.8	0.0	0.0
Cash Crops									
Cocoa	35.1	4.5	0.0	0.0	2.2	5.9	49.5	0.0	14.9
Coffee	13.1	0.0	0.0	0.0	0.0	8.1	0.0	0.0	79.2
Palm oil	7.8	0.0	0.0	0.0	1.7	8.3	81.1	0.0	6.1
Rubber	19.5	0.0	0.0	0.0	0.0	0.0	59.2	0.0	28.9
Sugar cane	0.0	0.0	0.0	0.0	0.0	0.0	77.1	0.0	22.2

ANNEX 7: PERCENT DISTRIBUTION OF PLOTS USING PESTICIDES BY TYPE OF PESTICIDES USED

Crops	Type of pesticides used on crop					
	Insecticides	Herbicide (solid)	Herbicide (liquid)	Fungicide	Rodenticide	Sex pheromones
Cereals/Tubers/Roots						
Rice/paddy	64.6	2.1	29.0	6.7	0.0	2.1
Cassava	73.6	5.1	11.6	1.6	0.0	8.1
Corn/maize	69.1	0.0	30.6	16.9	9.9	0.0
Eddoes	72.0	0.0	28.3	0.0	0.0	0.0
Sweet potatoes	50.9	0.0	49.1	18.6	0.0	0.0
Yams	0.0	0.0	100.0	0.0	0.0	0.0
LEGUMES, OIL & NUTS						
Beans	44.0	0.0	57.1	0.0	44.0	0.0
Palm nuts	80.1	0.0	19.9	0.0	0.0	0.0
Sesame/beneseed	51.0	0.0	50.0	0.0	0.0	0.0
Groundnut	73.3	0.0	26.1	0.0	0.0	0.0
Kola nut	100.0	0.0	0.0	0.0	0.0	0.0
Orange	79.9	0.0	20.4	34.4	27.8	0.0
Fruits						
Plantain	55.2	0.0	44.8	29.8	0.0	0.0
Water melon	100.0	0.0	0.0	0.0	0.0	0.0
Vegetables						
Bitterballs	91.5	0.5	3.9	41.9	0.8	0.0
Cabbage	68.2	0.0	0.0	70.8	0.0	0.0
Cucumber	97.0	0.0	3.2	27.7	1.6	2.0
Egg plant	100.0	0.0	0.0	77.9	0.0	0.0
Okra	98.3	0.0	1.7	17.7	0.9	0.0
Pepper	92.3	1.3	3.4	29.8	0.7	0.0
Plato	100.0	0.0	0.0	0.0	0.0	0.0
Water greens	100.0	0.0	0.0	0.0	0.0	0.0
Potatoes greens	90.2	0.0	9.8	5.2	1.6	0.0
Palava sauce	100.0	0.0	0.0	13.5	7.7	0.0
Cash Crops						
Cocoa	64.5	11.2	23.7	24.8	0.0	5.2
Coffee	86.4	0.0	13.1	0.0	0.0	0.0
Palm oil	71.1	21.4	22.5	14.0	0.0	0.0
Rubber	37.4	15.0	0.0	0.0	0.0	47.6
Sugar cane	100.0	0.0	0.0	0.0	0.0	0.0

ANNEX 8: PERCENT DISTRIBUTION OF CROP HOLDINGS BY GENDER OF HOUSEHOLD MEMBERS ENGAGED IN CROP PRODUCTION AND TYPE OF CROP ACTIVITY

Gender/Type of cropping Activities	Region						
	Southeastern A	Southeastern B	North Central	North Western	Montserrado	South Central	Total
Men							
Land preparation	95.6	97.7	97.1	96.6	96.8	98.0	97.1
Planting	53.3	68.0	63.9	78.3	77.9	68.9	66.6
Fencing	14.6	14.9	34.5	17.7	1.9	25.5	25.9
Weeding	46.1	71.6	33.4	27.3	54.0	58.8	41.5
Birds scarring	14.3	51.1	26.8	26.0	0.0	17.7	23.3
Ridging, fertilizing	0.1	1.1	2.7	0.6	6.3	0.4	2.2
Other non-harvest activities	26.9	42.4	39.0	30.3	54.2	48.5	40.1
Harvesting	33.9	70.1	57.5	30.6	35.0	59.3	51.9
Post-harvest activities	11.7	41.6	31.5	24.8	31.4	51.3	32.6
Women							
Land preparation	34.3	48.6	31.8	21.7	35.9	19.8	30.6
Planting	96.0	97.9	95.9	86.7	98.4	98.1	95.7
Fencing	4.6	8.1	8.7	2.7	0.7	6.1	6.7
Weeding	69.3	89.8	77.2	68.2	78.3	77.0	76.5
Birds scarring	17.3	57.5	33.6	20.9	3.0	24.9	28.4
Ridging, fertilizing	0.8	0.5	3.1	0.3	20.0	0.7	3.6
Other non-harvest activities	34.4	50.8	42.0	37.4	64.2	52.0	44.9
Harvesting	43.6	72.9	77.8	49.2	46.6	73.2	68.5
Post-harvest activities	18.7	38.4	31.6	31.7	37.8	49.2	34.1
Children							
Land preparation	34.2	45.2	33.2	35.2	-	40.1	35.3
Planting	68.0	65.6	56.1	80.2	-	83.7	65.4
Fencing	10.9	5.6	12.3	11.7	-	9.5	10.4
Weeding	56.0	67.1	45.0	32.2	-	70.3	50.1
Birds scarring	25.6	58.2	35.2	18.7	-	29.6	32.6
Ridging, fertilizing	0.4	0.0	1.6	0.0	-	0.9	1.3
Other non-harvest activities	13.7	51.0	44.1	32.1	-	50.7	42.3
Harvesting	24.7	49.3	42.8	28.8	-	60.8	42.3
Post-harvest activities	9.2	22.4	25.3	30.0	-	61.1	27.7

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.).

ANNEX 9: AVERAGE NUMBER OF DAYS WORKERS WORKED ON CROP ACTIVITIES BY TYPE OF LABOR, GENDER AND REGION

Region	Household Labor			Hired Labor			Free/exchange Labor		
	Men	Women	Children	Men	Women	Children	Men	Women	Children
Southeastern A	95.4	87.8	44.1	6.6	3.7	-	13.5	10.0*	-
Southeastern B	123.6	120.7	74.8	3.4	2.1	-	2.4	3.1	-
North Central	90.6	87.3	50.0	3.6	3.4	3.6*	3.2	3.0	2.9
North Western	69.3	58.8	35.5	4.2	5.8	-	3.4	3.9	4.9
Montserrado	52.5	47.2	21.7	3.2	3.1	-	-	-	-
South Central	88.1	82.3	71.7	2.9	2.5	-	2.4	2.6	-
Liberia	**87.1**	**82.2**	**50.8**	**3.8**	**3.5**	**3.5**	**3.8**	**3.5**	**3.6**

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.).

** Values with CV > 33% or SE > 17.5% are considered unreliable and should be interpreted with caution.*

ANNEX 10: AVERAGE NUMBER OF HOURS PER DAY THAT WORKERS WORKED ON CROP ACTIVITIES BY TYPE OF LABOR, GENDER AND REGION

Region	Household Labor			Hired Labor			Free/exchange Labor		
	Men	Women	Children	Men	Women	Children	Men	Women	Children
Southeastern A	6.8	6.2	4.8	7.0	6.7	-	7.1	6.8	-
Southeastern B	6.7	6.3	4.1	6.5	6.2	-	6.4	6.0	-
North Central	6.5	6.2	4.9	6.8	6.6	5.7	6.9	6.8	5.7
North Western	5.5	5.0	3.6	5.8	5.6	-	5.1	5.0	3.5
Montserrado	6.0	5.9	-	7.1	7.0	-	-	-	-
South Central	7.2	6.7	5.8	7.7	7.7	-	7.8	7.4	6.3
Liberia	**6.5**	**6.1**	**4.7**	**6.8**	**6.6**	**5.5**	**6.9**	**6.7**	**5.2**

- Data withheld due to fewer than 30 unweighted cases (Totals include withheld data.).

8.2. Annex II: Survey Design and Methodology

The Liberia 2024 Annual Agriculture Survey (LAAS-2024) primarily aims to produce timely and reliable data on crop and livestock production, as well as on agricultural inputs and practices, to support evidence-based agricultural policy, food security monitoring, and the compilation of national accounts.

The survey design and methodology align with the 50×2030 Initiative's methodological framework and builds upon the experience of the 2024 Liberia Agriculture Census (LAC-2024). It employs a stratified two-stage sampling design to ensure representative estimates at both national and regional levels.

Estimation Domains

The estimation domains are the six agricultural regions defined by the Liberia Institute of Statistics and Geo-Information Services for the purpose of collecting representative agricultural data in Liberia. The regions are North Western, North Central, South Central, South Eastern A, South Eastern B, and Montserrado. These regions are made of counties. Montserrado county was treated as a separate region because of its unique agricultural characteristics. The table below presents the composition of each region. The survey design allows for the production of statistically reliable estimates at both the regional and national levels, while providing indicative estimates at county level for some indicators.

TABLE 44: REGIONAL COMPOSITION

Region	Counties
Southeastern A	
	Grand Gedeh
	Sinoe
	Rivercess
Southeastern B	
	Maryland
	Rivergee
	Grand Kru
North Central	
	Lofa
	Bong
	Nimba
North Western	
	Bomi
	Grand Cape Mount
	Gbarpolu
South Central	
	Margibi
	Grand Bassa
Montserrado	
	Montserrado

Population and Sampling Units

The target population consists of all agricultural households that engaged in crop cultivation, livestock and poultry rearing, aquaculture, fishery or forestry/charcoal production during the reference period (2023/2024 farming season).
Two sampling units are defined:
Primary Sampling Unit (PSU): Enumeration Area (EA) established during the 2024 Liberia Agriculture Census.
Secondary Sampling Unit (SSU): Agricultural household identified within each sampled EA.

Sampling Frame

The sampling frame used for the LAAS-2024 was developed using data from the 2024 Liberia Agriculture Census (LAC-2024). Each EA was listed with the total number of agricultural households and area under cultivation reported during the census. The frame included 4,800 agricultural EAs and 227,122 agricultural households nationwide, stratified by county and urban/rural characteristics.

Sampling Design

A stratified two-stage cluster sampling design was used:

- First stage: selection of EAs as PSUs using probability proportional to size (PPS), where size was measured by the number of agricultural households per EA from the agriculture census.
- Second stage: within each selected EA, 10 agricultural households were chosen using simple random sampling without replacement procedure.

This design balances statistical precision and fieldwork efficiency while maintaining adequate representation of both small and large farming communities.

Stratification

To enhance precision, stratification was performed at multiple levels:

- Explicit stratification: by county, ensuring that all 15 counties are represented.
- Implicit stratification: within each county by urban and rural classification, and by ordering EAs based on geographic location and number of farming households before PPS selection.

This combined approach reduces sampling variance by capturing within-region diversity in agricultural intensity and land use.

Sample Size and Allocation

Sample sizes were calculated for each region considering requirements for reliable estimates of agricultural area and the available budget. The classical formula below was used for the calculation of sample size of farming households:

$$n = Deff \frac{1}{g} x \frac{CV_{yr}^2}{cv^{*2}}$$

Where:

CV_{yr}^2 is the population CV of the households' agricultural land (y) in region r computed from the LAC-2024 data.

cv^{*2} is maximum relative error accepted for the survey (5%-20%, depending on the contribution of a region to total agricultural population and area).

$Deff$ is an estimate of the design effect fixed at 2.5

g is the expected response rate (90% considered).

The number of farming households to be surveyed in each PSU is fixed to 10. Therefore, the size of the sample of PSU is the size of the sample of the households divided by 10.

$$n_d = \left[\frac{m_d}{10}\right] + 1$$

In each region, the sample of EAs was allocated in strata (urban/rural) proportionally to the numbers of farming households computed in the frame.

The total national sample comprises 585 primary sampling units (EAs), each containing 10 agricultural households, for a total of 5,850 households.

Sample sizes were allocated proportionally to the number of agricultural households in each region, ensuring representation consistent with their contribution to total agricultural activity. The North Central region received the largest sample allocation (397 EAs) due to its high concentration of farming households, while Montserrado and South Eastern B had the smallest allocations (15 and 27 EAs respectively).

Precision requirements targeted a coefficient of variation (CV) between 3% and 9% for key indicators at the national level. region-level CVs were expected to be higher due to smaller domain sizes, but all regions met the thresholds for acceptable precision.

TABLE 45: SAMPLE ALLOCATION BY REGION AND COUNTY

Region/County	Urban	Rural	Total
North Western	**5**	**46**	**51**
Bomi	2	15	17
Grand Cape Mount	2	16	18
Gbarpolu	1	15	16

North Central	**67**	**330**	**397**
Bong	17	87	104
Lofa	19	98	117
Nimba	31	145	176
Southeastern A	**5**	**47**	**52**
Grand Gedeh	5	13	18
Sinoe	0	10	10
Rivercess	0	24	24
Southeastern B	**4**	**23**	**27**
Maryland	1	6	7
Grand Kru	0	11	11
River Gee	3	6	9
South Central	**5**	**38**	**43**
Margibi	3	9	12
Grand Bassa	2	29	31
Montserrado	**10**	**5**	**15**
Montserrado	10	5	15
Liberia	**96**	**489**	**585**

Sample Selection

Within each stratum, the EAs were selected using probability proportional to the number of farming households. Following EA selection, all agricultural households within the selected EA were listed, and a simple random sampling selection was applied to select 10 agricultural households per EA. Replacement rules were applied only in cases of household relocation, or destruction. The overall design ensures that each agricultural household has a known and non-zero probability of selection, allowing for unbiased population estimates through appropriate weighting. Replacement households had the same probability of selection as those they replaced.

Estimation Procedures and Weighting

Each sampled household was assigned a design weight equal to the inverse of its overall probability of selection, incorporating both first- and second-stage probabilities.

Weights were adjusted for non-response and calibrated against known population totals from the 2024 Agriculture Census to improve consistency. Estimation of totals and means followed standard formulas for stratified two-stage cluster designs. Similarly, variances and coefficients of variation were computed to reflect the complex survey structure.

Notation

$h = stratum$

$H = total\ number\ of\ strata$

$i = \text{EA}$

$N = \ total\ number\ of\ EAs$

$I_h = \ total\ number\ of\ EAs\ in\ the\ h^{th}\ stratum$

$j = farming\ household$

$M_{hi} = \ total\ number\ of\ farming\ households\ that\ will\ be\ actually\ listed\ in\ the\ i^{th}$

$EA\ in\ the\ h^{th}\ stratum$

$M = \sum_h \sum_i M_{hi} = total\ number\ of\ farming\ households\ in\ Liberia$

$F_{hi} =\ total\ number\ of\ farming\ households\ of\ the\ i^{th}\ EA\ in\ the\ h^{th}\ stratum\ within\ the\ sampling\ frame$

$F_h = \sum_i F_{hi} =$ is the total number of farming households listed in the sampling frame in stratum h

$n_h = number\ of\ sample\ EAs\ selected\ in\ stratum\ h$

$m_{hi} = number\ of\ sample\ farming\ households\ selected\ in\ the\ i^{th}\ EA\ in\ stratum\ h$

$y_{hiy} = value\ of\ the\ target\ variable\ Y\ observed\ on\ the\ j^{th}\ farming\ household, in\ the\ i^{th}\ EA\ in\ stratum\ h$

Estimators

The probability of selecting the farming household j in the sample is the product of the probability of selection of the EA i in which it is located $\left(n_h \frac{F_{hi}}{F_h}\right)$ and its probability of selection in the EA i $\left(\frac{m_{hi}}{M_{hi}}\right)$.

Thus, the design weight assigned to the farming household j selected in the i^{th} EA in stratum h is:

$w_{hij} = \left(\frac{F_h}{F_{hi} * n_h}\right) * \left(\frac{M_{hi}}{m_{hi}}\right)$.

The design weights for the farming households in the survey need to take into consideration the design weights of the EAs selected for the LAC-2024 ($given\ by\ w_{lac}$). Thus, the final weight for the survey, noted ${w_{hij}}^*$ is given by ${w_{hij}}^* = w_{hij} *\ w_{lac}$

The final design weights will be adjusted and calibrated as need be.

An estimate of the total amount of Y for the entire population may be computed with the following formula:

$\hat{Y} = \sum_h \sum_i \sum_j {w_{hij}}^* y_{hij}$

The mean of Y can be estimated with two different estimators:

- Simple mean

  $\hat{\bar{Y}} = \frac{\hat{Y}}{M}$

- Weighted sample mean

  $\tilde{\bar{Y}} = \frac{\hat{Y}}{\sum_h \sum_i \sum_j {w_{hij}}^*}$

Variance

A simple approximate estimation of variance can be obtained with the following estimator, provided by Särndal, Swensson, and Wretman (1992, p. 154), which overestimates the actual variance as it considers a selection of cluster with replacement.

$$\tilde{V}(\hat{Y}) = \sum_{h=1}^{H} M_h^2 \frac{1}{m_h(m_h-1)} \sum_{i=1}^{I_h} \left(\hat{Y}_{hi} - \frac{1}{m_h} \sum_{i=1}^{I_h} \hat{Y}_{hi} \right)$$

where $\hat{Y}_{hi}$ and $\hat{Y}_h$ are the estimates of the total amount of Y at EA and stratum levels, respectively. An approximate estimator of the variance of the mean is:

$$\tilde{V}\left(\hat{\bar{Y}}\right) = \frac{1}{M^2} \tilde{V}(\hat{Y})$$

Coefficient of variation of the total

$$\widetilde{CV}(\hat{Y}) = \frac{\sqrt{\tilde{V}(\hat{Y})}}{\hat{Y}}$$

Coefficient of variation of the mean

$$\widetilde{CV}\left(\hat{\bar{Y}}\right) = \frac{\sqrt{\tilde{V}\left(\hat{\bar{Y}}\right)}}{\hat{\bar{Y}}}$$

Data Collection and Quality Assurance

Data were collected using computer-assisted personal interviewing (CAPI) with tablets equipped with real-time validation rules. Field teams were trained extensively on questionnaire content, area measurement protocols, and data-quality checks. Daily monitoring dashboards enabled monitors and data quality officers to track progress and consistency across regions.

To further ensure data quality, LISGIS implemented field verification of sampled households, cross-checks of GPS coordinates, and consistency reviews between crop and livestock modules. Weighting and variance estimation procedures were validated using SPSS to confirm accuracy of key estimates.

8.1. Annex III: Limitations of the Survey Results

The 2024 Liberia Annual Agriculture Survey (LAAS-2024) provides important evidence on agricultural production, income, labor, and productivity. However, several limitations should be taken into account when interpreting the results, particularly those related to cassava production and yield estimates.

1. Coverage of Cassava Harvest during the Reference Period

Cassava production and yield estimates are affected by the limited proportion of households that reported harvesting cassava during the survey reference period. Survey results indicate that only 28.3 percent of households reported harvesting cassava, while 71.7 percent reported no harvest at the time of the survey. As yield estimates are computed only for households reporting harvest, the effective sample size for cassava is substantially smaller than for other major crops, increasing sampling variability and reducing statistical precision.

2. Seasonality and Harvest Timing Effects

Cassava is a semi-perennial crop characterized by flexible and extended harvesting periods, often spanning several months or years. The survey indicates that 87.5 percent of households that did not harvest cassava reported that it was “not harvest season”, while an additional 8.7 percent reported delayed or deferred harvesting. These findings suggest that the timing of data collection did not fully coincide with cassava harvesting cycles. As a result, reported production and derived yield estimates may understate total annual cassava output.

3. Selectivity of Yield Estimates

Cassava yield estimates are based exclusively on households that harvested cassava within the survey period. This implies that the estimates reflect a non-random subset of cassava-producing households, namely those whose harvesting activities coincided with the reference period. Households that postponed harvest or maintain cassava in the field as a standing food reserve are not captured in yield calculations, potentially leading to downward-biased estimates of average yield.

4. Measurement Challenges Specific to Root and Tuber Crops

Accurate measurement of cassava production poses well-documented methodological challenges. Cassava is often harvested incrementally, consumed directly, or processed over time, which can complicate respondent recall of harvested quantities within a defined reference period. These characteristics increase the likelihood of measurement error, particularly when compared to annual crops such as rice that are harvested within a more clearly defined and concentrated period.

5. Interpretation of Reported Yield Comparisons

The finding that cassava yield appears lower than rice yield should be interpreted with caution. This result is not necessarily indicative of relative crop productivity, but rather reflects differences in crop biology, harvesting practices, and survey timing. Rice production benefits from synchronized planting and harvesting seasons that align more closely with annual survey designs,

whereas cassava production is less fully captured within short reference periods. Consequently, direct yield comparisons between cassava and rice may not be strictly comparable within the current survey framework.

6. Implications for Use of Cassava Indicators

Given these limitations, cassava production and yield indicators from the ILP survey should be interpreted as partial and timing-specific measures rather than comprehensive estimates of annual cassava productivity. For analytical and policy purposes, these results are best complemented with data from agriculture censuses, seasonally targeted production surveys, or other sources designed to capture the full cassava production cycle. Future survey rounds will consider methodological adjustments, such as extended reference periods or crop-specific modules, to improve the measurement of cassava production and yields.

8.2. Annex IV: List of Report Writers and Contributors

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