

Women in Coffee Farming: Economic Contributions of Female-Headed Coffee-Producing Households to Liberia's GDP

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Abstract

Background: Coffee is one of the primary agriculture products of Liberia, and it plays an important role for many Liberians who produce coffee for either subsistence (household) or selling coffee in their region. To create an inclusive agro-economic environment, it is essential to assess the gender make-up and participation of all coffee producers and to evaluate how women are included in the development of value-chain markets. There are many female-headed households in coffee producing countries such as Liberia, which are an under-utilized resource within this coffee-producing country.

Methods: Secondary data from Liberia's Agricultural Household Survey (2022) were utilized for this study, including all fifteen counties of Liberia. The study population included a total of 359,075 agricultural householders, of which 10,739 households were identified as coffee-producing households. The data in the data set were broken down by gender of the head of household, by the rural and urban regions of Liberia, and by the county of Liberia where each household resides. Descriptive statistics were used to assess the overall distribution of female coffee-producing households, as well as the women's share among the total agricultural household population as a whole. In Deciding Where to Get Coffee and to who (2008 - 2022) Coffee producing households' coffee production trends will be looked at from the perspective of time from this period in order to give a clearer understanding of participation per-gender in coffee production.

Results: 24,9% of coffee producing households are managed by females, while 75,1% are managed by males. Coffee producing households that are male headed, in rural areas, have higher male ownership (75,1%) than coffee producing households that are female headed (24,9%). Most female operated coffee producing households are located in urban centres (30,7%). At the county level, the

proportion of coffee producing households that are female headed varies widely from 14,2% for Rivercess County to 31,9% for Lofa County. There are several counties that have the largest numbers of coffee growing farmers in the country - counties such as Nimba County, Bong County, and Lofa County - where the participation of women has been highlighted. In total, in 2022, approximately 3% of all agricultural households were considered coffee growing households, down from 7,9% in 2008.

Conclusion: Women-operated households involved in coffee production represent approximately twenty-five percent of Liberia's coffee producers, however there are urban-rural divides and differences between counties throughout the country. In addition to providing agricultural livelihoods, these households contribute to how coffee contributes to the country's overall economy. Improving gender-sensitive agricultural and economic policies would allow for increased women's participation in the coffee industry, leading to a stronger contribution from coffee towards the country's overall gross domestic product.

Keywords: Coffee farming; Female-headed households; Gender and agriculture; Agricultural households; Liberia; Economic contribution; GDP

Introduction

Agriculture is still one of the most significant sectors in the Liberian economy, as it is the primary source of employment for a large proportion of the country's citizens and a major contributor to the national income [1]. At present, the sector is the main source of the rural areas' economies and a simple means of living for a high percentage of Liberian households. Among the traditional cash crops in Liberia, coffee, over the years, has not only been a major source of employment but also a significant earner of foreign exchange for the country [2]. As the most important coffee producer during the first phases of Liberia's economic growth, coffee production was the vehicle that propelled not only the income of the nation but also the rural economy for development. However, even though it is still in existence, coffee production in Liberia is just a little way from walking the red carpet due to low investment and changes in global market trends. It is, therefore, significant for economic developments in Liberia and the

fight against rural poverty, along with a revitalization in the agricultural sector to counter the effect of changes in the coffee market [3].

The relevance of gender issues in the agricultural production, resource use, and economic conditions of sub-Saharan Africa has been acknowledged in numerous pieces of research in recent years [4]. The crucial role of women in the agricultural value chain, including farm labor, post-harvest processing, and local marketing, has been spoken of less even though they have made significant contributions to agriculture. In fact, women's economic contributions to agriculture are mostly underreported, and they are not sufficiently reflected in the figures [5]. In Liberia, the proportion of female-headed households has been affected by various factors such as the impact of male migration, the after-effects of the civil war, and the changes of society over time. Hence, the gender analysis

issue cannot be overlooked in the agricultural sector [6].

The evidences from the previous studies are women empowerment as a strategy to increase women's participation in agriculture, can bring greater agricultural productivity, higher living standards, and increased contributions to national economies [7]. The major involvement of women in cash crops, e.g., coffee, can provide the means for more stable income, food security, and even the development of well-being over generations. Nevertheless, there is a dearth of empirical research that specifically explores the contribution of women to coffee production as a case study in Liberia; these studies are mostly descriptive, fragmented, and sparse [8].

Understanding the intrinsic framework, distribution, and characteristics of female-headed coffee-producing households is fundamental for the proper crafting of agricultural, gender, and economic policies [9]. Talking about such families with reference to their geographic and residential context can help in understanding not only the local inequalities, gendered processes but also the economic aspects of women's involvement in coffee production. Based on the existing framework, this manuscript explores the role of female-headed coffee-producing households among the total agricultural households in Liberia. The present study points to the participation of women in coffee production as the latent evidence which the study uncovers and also their corresponding contribution to overall economic

performance and potential economic growth are the areas that have been explored.

Methods

Study Design

This study utilized a descriptive cross-sectional design and was based on the analysis of agricultural household secondary data. A descriptive cross-sectional study is a common approach in agricultural economics and public policy research that aims to describe the characteristics of a population, structures, and spatial patterns at a particular point in time without changing the study variables [10]. The design was deemed suitable for evaluating gender composition, differences between residential areas, and variations at the county level of coffee-producing households. It was also used for the comparison of changes between survey years. The study, which was based on nationally representative datasets, thus, was able to provide coverage of the population at large and makes the findings more generalizable to Liberia's agricultural sector.

Study Population and Sample

Out of the national enumeration of 359,075 agricultural households, a total of 10,739 coffee producing households were identified as the sampling frame for this study. This sub-population includes only actively managed coffee producing households from the 2022 agricultural assessment. Collectively, the sub-population represents all coffee producing households rather than just a statistically significant sample which reduced error in the analysis of sample size. This provided a thorough examination of the gender and

geographic representation of the sample. The sample of coffee producing households was divided by household head sex; location; and county to facilitate gender-sensitive and/or spatial analysis.

Data Sources

We obtained secondary data from national assessments of agriculture and households from 2008 and 2022. For this research, there were standardized procedures for enumerating agricultural activities within households throughout Liberia, in all counties. Two years of surveys allow for comparison over time so we can conduct a temporal comparison of trends in terms of coffee production and the participation of households in this industry over time.

Variables established to use in our analysis include:

1. Gender of Head of Household (Male or Female),
2. Urban/Rural Setting,
3. County of Residence,
4. Number of Coffee Producing Households, and
5. Proportion of Total Agricultural Households that are Coffee Producing Households.

Our analysis utilises both years of national surveys to look at how coffee production changes between the two points in time.

Data Analysis

Descriptive statistical methods, including Frequency (Absolute) and percentages, were

used to Analyse Data on Female Participation in Agriculture, both in terms of its place in Agriculture and how it is measured. Data were also analysed according to statistical frequency where possible (e.g., this allowed for detailed breakdown of the total number of Coffee-Producer Households into a more easily understood format), highlighting how Women's Participation provides opportunities for greater number levels on each continent, how Gender Discrimination impacts the agricultural sector positively, and providing evidence with regard to Female Producers acting as an important part of National Economic Activity. Where frequency counts focused on how Women Participated within Coffee Production, this was compared to historical Data Sources from previous years, i.e. what has Changed over Time in terms of Participation by Women and Men (2008/2022), along with Comparing Women with Men who participated in Coffee Production and highlighting changes, if any. Results are also discussed in terms of Women's Economic Contributions to the Agricultural Sector, and subsequently to National Level Economy, providing a good example of the data analysis methodology of Developmental and Agricultural Economics [11].

Ethical Consideration

The Desh Bhagat University institutional review board provided ethical clearance for the research (IRB/DBU/2024/017). This research utilized anonymized secondary (agricultural household) datasets collected as part of national surveys conducted in 2008 and 2022. There was no direct interaction with human subjects nor were there any personally identifiable information used or reviewed in this research. Secondary use

of such data creates minimal risk for any individual or household.

Results

Coffee-Producing Households by Sex, Residence, and County in Liberia

Variable	Male-headed (%)	Female-headed (%)	Coffee (n)	2008 Coffee HH (%)	2022 Coffee HH (%)	Total Agricultural HH (n)
Residence						
Urban	69.3	30.7	2,837	7.3	3.7	76,224
Rural	77.3	22.7	7,902	8.1	2.8	282,851
County						
Bomi	77.4	22.6	137	1.3	1.1	12,345
Bong	78.0	22.0	1,580	2.4	3.0	51,939
Gbarpolu	75.6	24.4	135	3.9	1.3	10,665
Grand Bassa	83.3	16.7	965	1.1	3.5	27,799

Grand Cape Mount	71.7	28.3	637	4.1	4.8	13,166
Grand Gedeh	77.8	22.2	153	1.9	0.8	19,400
Grand Kru	69.3	30.7	101	0.8	1.2	8,330
Lofa	68.1	31.9	1,434	36.9	2.7	53,807
Margibi	76.9	23.1	480	3.0	3.2	15,164
Maryland	84.6	15.4	149	0.7	1.5	9,891
Montserrado	69.9	30.1	1,426	3.2	3.8	37,438
Nimba	75.9	24.1	3,212	9.8	4.6	70,062
Rivercess	85.8	14.2	176	1.5	1.6	10,786
River Gee	76.5	23.5	815	2.1	0.8	9,617
Sinoe	79.5	20.5	735	1.0	0.8	8,666
Total	75.1	24.9	10,739	7.9	3.0	359,075

Analysis of Coffee-Producing Households by Sex, Residence, and County

Liberia's coffee sector is characterized by distinct patterns of gender, space and time with respect to the household distribution of coffee producers. Thus, although men still dominate coffee production, there are an increasing number of coffee-producing households headed by women, constituting approximately 25% of Liberia's coffee producers (almost 1 in 4). This is a significant contribution that is generally overlooked by many.

In contrast, coffee producers located in urban areas show a much greater proportion of women (30.7% of all coffee producing households in urban areas) than in rural areas (22.7% of all coffee producing households in rural areas). Conversely, there is a much bigger prevalence of male-headed coffee producers in rural areas, accounting for 77.3% of all coffee producers, when compared to urban areas (69.3%). While there are significantly more coffee-producing households located in rural areas (7,902 total) than in urban areas (2,837 total), women's presence among coffee producers appears disproportionately higher in urban areas, which may be due to multiple factors, including urban access to markets, broader economic diversity among household members, and different types of household structure.

When comparing the years 2008 and 2022, it appears that there has been a significant decrease in the amount of agricultural households engaged in the production of coffee. The percentage of coffee-producing households nationwide has gone from 7.9% in 2008 to 3.0% in 2022 indicating that the coffee industry has

contracted substantially during that time frame. This decrease has affected both the urban and rural populations but was much more dramatic in the rural areas where the percentage decreased from 8.1% in 2008 to 2.8% in 2022, compared to a decrease from 7.3% to 3.7% in urban environments.

At the county level, there is considerable spatial variation with regard to coffee production as well as participation by female headed households. Female headed coffee producing households were highest in counties such as Lofa, Montserrado, Grand Kru, and Grand Cape Mount, each of which had over 28% female representation. Lofa County had the highest share of female headed households (31.9%) in addition to historically being one of the highest counties for coffee production (36.9% in 2008); however, by 2022 that number had decreased significantly to 2.7%.

Counties such as Rivercess, Maryland, and Grand Bassa have extremely low rates of female participation in coffee production; all together, females make up under 17% of coffee producers in these counties. Nimba County has the highest total number of coffee producing households (3,212), but because of its significant agricultural base, the percentage of total agricultural households producing coffee has gone down from 9.8% in 2008 to 4.6% in 2022.

With all that said, even though the overall data highlight many areas where the coffee sector has been declining, there are still many counties where female produced households contribute to various aspects of coffee production. The variations in production based upon location and gender demonstrate that women's

contributions to coffee production, as well as women's contribution to agriculture overall and the economic growth of the country, will vary considerably depending on where they are located. Because of these patterns, county-specific and gender-responsive interventions would help to revitalize coffee production and increase the impact of coffee production on Liberia's GDP.

Discussion

The results of this research reveal that out of all the coffee-producing households in Liberia, female-headed households make up a significant percentage, nearly one-fourth, of the national total. This magnitude of involvement visibly highlights the crucial role that women play in the country's coffee sector and agricultural economy, which is generally, but still, widely, somewhat, neglected [12]. Though the majority of households are still male-headed, the large number of female-headed households indicates that women are instrumental in keeping coffee production, household livelihoods, and the flow of economic activities to GDP going.

The reason for the higher proportion of female-headed households engaged in coffee production in urban areas than in the countryside might indicate various structural and socioeconomic changes. Cities normally provide better access to markets, transport routes, banking services, and off-farm income opportunities, which may allow women to be active in coffee production despite land constraints or labor shortages [13]. On the other hand, rural women farmers who may be facing a combination of differently intensified problems may have difficulties with land tenure security,

access to agricultural inputs, and extension support, hence their engagement in perennial cash crops such as coffee may be limited.

The county-level differences observed in this research have amplified the women spatial heterogeneity involved in coffee farming across Liberia. A closer look at the counties of Lofa, Montserrado, Grand Kru, and Grand Cape Mount shows that they had the most significant percentages of female-headed coffee-producing households. The changes in these patterns are possibly the result of the influence of different factors like localized cultural norms, land inheritance systems, migration histories, and the legacy of the conflict, which have not only reshaped household structures but also labor allocation in various regions. In such counties where high female participation is recorded, the involvement of women in coffee farming is a vital first step to be targeted for interventions aimed at the reactivation of production and the consolidation of the local economic contributions.

The conspicuous reduction in the percentage of coffee-producing households that was observed from 2008 through to 2022 is indicative of the structural problems that have been hovering over Liberia's coffee sector. Besides these structural issues such as an aging coffee sector, lack of investment, and price instability, the limited subsistence on the forest, as well as the production of other crops, has contributed to the problem [14]. The decline has affected both male- and female-headed households, but women are likely to be affected more due to inequalities in access to productive resources that currently exist. Still, the stubbornness of women to participate in the male-dominated

sector despite all these challenges is a reflection of their strength and resilience and also, their loyalty to coffee farming as a source of income.

Experiences from various countries in sub-Saharan Africa reveal that removing the gender-based barriers impeding the agricultural sector can result in a very significant increase in both productivity and the economy [15]. Contribution of women is boosted when they are given access to land, credit, extension services, and markets, as well as provided with the improved seed material [16]. If Liberia chooses to utilize gender-responsive approaches in the coffee sector they would not only be solving the problem of low production but also increasing the overall contribution of the coffee sector to GDP by opening up the untapped productive potential [17].

Essentially, one of the major points raised in the current investigation is that contributions made by women should be given due consideration in order not to miss the real economic worth of coffee production in Liberia. The lack of gender-disaggregated analysis in national agricultural statistics and economic planning frameworks may lead to overlooking women as vital productivity and growth drivers [18]. The inclusion of gender issues in agricultural and economic policymaking, therefore, becomes a prerequisite for achieving the desired growth that is characterized by inclusivity and also the developmental impact of the coffee sector being maximized.

In sum, this research provides substantial evidence to the claim that women are not insignificant players in the Liberian coffee-related economy but rather key contributors

whose roles need to be recognized more, invested and supported by the policy. Empowerment of female-headed coffee-producing households may be a source of the multiplier effect phenomenon at the household, community, and national levels thereby, promoting sustainable economic development and GDP growth..

Conclusion

Households led by females make up a large portion of Liberia's coffee-producing population and provide considerable support to agricultural economies, as well as the nation's overall economic activity. Even though there has been a general trend down in production of coffee, women are still involved in numerous areas of production across many counties. Policies that are supportive of women and increased financial investment in coffee farming would boost productivity while increasing household income and Liberia's contribution to GDP through agriculture.

Take-home message

In Liberia, approximately 25% of all households producing coffee are headed by females which highlight the importance of women in providing for the livelihood of agricultural families and contributing to the national economy through their agricultural produce. Although coffee has decreased as an agricultural product, women's involvement throughout many different counties has increased significantly. As such, if there were investments and policies that specifically addressed the issues faced by women farmers producing coffee, this would provide an

incentive to improve the sector and provide an increase in household income as well as increase agriculture's overall contribution to Liberia's gross domestic product (GDP).

Authors' Contributions

Dr. Stephen Monday developed the study, designed the methodology, interpreted the data, and wrote the first draft of the manuscript. Professor (Dr.) Harvinder Kaur Sidhu provided general academic guidance, critically reviewed the study design and methodology, and provided significant written input on the intellectual aspects of the paper. Shua-chet Daniel Gimbason organised the data and conducted descriptive statistical analyses and interprets the county and gender-specific findings and contributed to both the "Results" and "Discussions" sections. Dr. Arti Thakur developed the literature review, contributed to the theoretical framework and policy implications of the study, and reviewed the manuscript for consistency, clarity, and adherence to the journal's guidelines. All authors have read and approved the final version of the manuscript and take responsibility for its content.

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Conflict of Interest

The authors declare that they have no competing interests or conflicts of interest related to this study.

Disclaimer

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