Empirical Analysis of Intra-Household Resource Allocation for Women in Rural Society of Northern Ghana

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ABSTRACT

Historically, unitary household model used to dominate the field of economics. This model assumes that household is regarded as a group of individuals with the same preferences. The resources are pooled in the unit of household and the household maximizes a utility with use of pooled resource. However, with increase of argument to this model, household collective models have been proposed. These models allow different preferences of individual household members under the assumption of Pareto efficiency. Individual family members have thus different decision-making and bargaining power over intra-household resource allocation.

Women greatly contribute to household livelihood through agricultural production in rural Africa. It is evident that men and women separately manage farmland for their agricultural production in sub-Saharan African context. For income diversification, off-farm employment is important for rural women. However, there is a distinct gender inequality in access to productive resources and income generating opportunities relative to men, attributed to the discrimination embedded in rural society and women's weak bargaining power in family.

Ghana is viewed as a successful country with massive economic growth in sub-Saharan Africa. Yet this prosperity has not worked for all people, and increasing inequality between the south and the north remains a main challenge to Ghana's sustainable economic growth. As well as a huge difference in agro-climate environment, the nature of society and culture profoundly differs by region; the Southern part is characterized with Christianity and the maternal society, while the Northern part is mainly constituted of Muslims under the patriarchal society.

As for the Ghanaian ethnicity, there are various ethnic groups inhabiting

throughout the country. Regional differences in ethnicity exist across the country; the Akan ethnic family mainly concentrates in the south, while the Mole-Dagon ethnic family is predominant in the north. The Dagomba ethnic group, that belongs to the Mole-Dagon ethnic family, resides in Northern Region of Ghana. In the Dagomba culture, a woman with multiple children "cooking wife" is considered a higher position than other female family members.

Islamic religion is widespread in sub-Saharan Africa including in northern Ghana since brought to the continent. Polygamous marriage form is commonly adopted among the Muslims, and their family structure is more complex with plural wives and their children relative to monogamous forms. The different household structures, such as monogamy versus polygamy, may affect the mechanism of intra-household resource allocation and women's livelihood strategies. Therefore, it is important to consider such background features to estimate the characteristics of intra-household resource allocation for gender analysis.

This thesis provides empirical analysis of intra-household resource allocation for women in rural society, as an evidence of northern Ghana. Through estimating the linkage of labor and asset allocation for women, the study aims at exploring the characteristics of women's intra-household resource allocation by different household structure and women's position in the context of northern Ghana. The analyses used two different household micro datasets: the national level household aggregated data and the sex-disaggregated data in northern Ghana.

First, in order to capture the outline of intra-household resource allocation by gender, the analysis used the national level household survey. Regression analysis was applied to explore the relationship between two types of off-farm labor allocation

(self-managed employment and wage labor) and productive asset allocation by gender. The main findings show that there is a positive relationship between women's productive assets and self-managed off-farm labor allocation. The results also indicate that polygamous women are less likely to have off-farm labor allocation. Estimating the characteristics of polygamous women's intra-household resource allocation will contribute to growing the body of knowledge for rural development in northern Ghana. However, due to the data limitation, further analysis on polygamous women was not available for using the national household survey. The effects of women's intra-household bargaining power against a male household head, on their off-farm labor allocation were not confirmed and the model may not control for individual unobservable factors such as social status of women's blood relationships in local community, which may affect the distribution of agricultural assets within a household.

Therefore, based on these results of the first analysis, subsequent analysis dealt with the sex-disaggregated dataset the author had collected in three villages in northern Ghana, with attention to the different household structures and the wife's positions. There are three analytical steps: 1) capturing the trait of intra-household resource allocation, 2) estimating the relationship between off-farm labor allocation and productive asset allocation by gender and wife's position in family, and 3) exploring the gender roles and bargaining outcomes in decision-making between spouses. Both qualitative and quantitative approaches were adopted for the analyses. Results show the distinct gender patterns in intra-household resource allocation in rural society of northern Ghana where is characterized with patriarchy and Islamic religion. The determinants of off-farm labor allocation by gender were quantitatively estimated in regression models. Results indicate that women's labor allocation in off-

farm work is affected by their conditions concerned with children, instead of women's asset allocation. Woman's role and decision-making power were estimated based on the answers to several situational questions. Findings confirm that women are substantially constrained compared to men in many aspects, such as domestic violence, family status, and family planning. Interestingly, in the case of northern Ghana, no positive relationship between asset and labor allocation was observed. Rather, polygamous junior wives with poor asset allocation, are more responsible for their use of income compared to other women.

Social norms embedded in rural northern Ghana, characterized by Islamic patriarchy and the Dagomba culture, may strongly affect women's intra-household resource allocation. In the study areas of original survey, the mechanism of intra-household resource allocation is directory aligned with the patriarchal system and polygamous family structure. Woman's family status is influenced by the wife's seniority and the tradition of the Dagomba ethnicity, which brings differences in resource allocation among female family members. However, in terms of women's decision-making power, northern women are less likely to have power for decisions over their income use and family planning against men, irrespective of women's family position. Their high dependency on men's asset may explain this imbalanced power in decision-making between spouses. With combination of using the national household data and the sex-disaggregated survey restricted to northern Ghana, the thesis highlights the unique features of intra-household resource allocation and decision-making power for the Dagomba women in patriarchal Islamic dynamics of northern Ghana.

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LIST OF ABBREVIATIONS

EAs	Enumeration Areas
FAO	Food and Agricultural Organizations of the United Nations
GAD	Gender and Development
IFPRI	International Food Policy Research Institute
LSMS	Living Standards Measurement Survey
SDGs	Sustainable Development Goals
WEAI	Women's Empowerment in Agriculture Index
WID	Women in Development

CHAPTER I INTRODUCTION AND LITERATURE REVIEW

1.1 Background

Achieving gender equality and empowering all women and girls is one of the key targets of the Sustainable Development Goals (SDGs). The concept of "gender" has a different meaning of "sex"; sex refers to the innate biological categories of male or female and is thus a fixed category rooted in biological differences, while gender refers to the social roles and identities associated with what it means to be a man or a woman in a given society or context (Moser, 1989). Gender is shaped by ideological, religious, ethnic, economic, and cultural factors and is an important determinant for distribution of responsibilities and resources between men and women. Since The 1975 World Conference of the International Women's Year, gender-aware approach has widely attached attentions in development. After this period, more attentions to the gender role have been seen in literature and policy making for two decades, with a remarkable conceptual shift of "women in development" (WID) and "gender and development" (GAD) (Miller, 1995; Moser, 1989).

Despite of a greater awareness for women's empowerment in development for decades, gender inequality still remains in many developing countries. Women are economically, socially, and politically constrained than men (World Bank 2011). Many of the differences in access to resources and opportunities are linking to the different bargaining power between men and women within a household. School enrollment rate of women is remarkably lower compared to men, and their limited employment opportunity hinders economic development (Klasen, 2009). On the other hand, previous study (Basudeb, 2006) found that educated women are more likely to improve child's nutritional status and reduce poverty in household. Quisumbing (2003) turned out that

women with secured rights to land and other assets are more likely invest in child's nutrition and education. Thus, empowering women will not only protect a basic human right for women, but also address other targets in SDGs, such as eradicating poverty and hunger. Recently, Esther Duflo also states in her working paper (Duflo, 2011) as follows:

"*Women's empowerment and economic development are closely interrelated. While development itself will bring about women's empowerment, empowering women will bring about changes in decision-making, which will have a direct impact on development"*.

1.2 Women's Agricultural Contribution in Sub-Saharan Africa

Agriculture is a key driver for economic development in sub-Saharan Africa, where many of the world's poor live. More than half of Africa's population is engaged in agricultural sector, accounting for more than 15 percent of the GDP in sub-Sahara African countries (the World Bank, 2018). Despite of the majority employment in agriculture, productivity remains low due to many factors. Small scaled farmers who constitute a majority of African agricultural labor force heavily rely on rainwater and their production is susceptible to climate change. Moreover, due to a poor infrastructure in rural areas, smallholders suffer from high transaction costs for selling their products at market.

Boserup (1970) highlighted the importance of women in Africa for food security. A substantial labor force is provided by women in agricultural production. Recent study (Palacios-Lopez, 2017) investigates the labor inputs at plot level in six sub-Saharan African countries. It reveals that women provide about 40 percent of family labor in household farming in average. The labor division between male and female is clear in agricultural production in sub-Saharan Africa. The farmland is divided into men's and women's plots within household and they separately manage their farmland. Africa's

agriculture is dominated by a variety of staple food crops (maize, rice, sorghum, millet, cassava, yams, sweet potatoes, etc.) and a few traditional cash crops (coffee, cotton, cocoa, oil palm, sugar, tea, and tobacco) (The World Bank, 2015). For example, in Ghana, men tend to be in charge of commercial crops for market, while women tend to manage few crops mainly for home consumption (Doss, 2002; Carr, 2008). The array of literature points out that women's access to productive assets is more limited than men in many developing countries (Doss et al., 2015; Kieran et al., 2015, 2017; Deere and Leon 2003; Agarwal, 1994). In Africa, men and women separately carry out agricultural management on each farming plot within household, and Doss (2015) reveals that women have constraints to land accessibility in six sub-Saharan African countries. Agriculture is underperforming because women do not have equal access to the resources and opportunities they need to be more productive. Securing women's rights contribute to poverty reduction, environmental sustainability, and investments in the next generation (Deininger et al., 2010; Kumar and Quisumbing, 2013; Peterman, 2012)

1.3 Income Diversification by Women

In addition to contribution to family farming, woman devotes herself to her family by performing in various daily home duties and off-farm work activity. They spend a lot of time on heavy domestic burdens such as fetching water, collecting firewood in the bush, caring for children, and preparing meals. Moreover, under the constraint of farmland accessibility, women seek for the opportunity of off-farm work for income diversification. Most rural communities in Africa compliment about 42% of their income from rural non-farm activities (Haggblade et al. 2002), and especially women are more likely to participate. However, there are less decent employment for women due to poor human capital and gender discrimination (World Bank, 2011). Women are not fulfilled their

ability to mobilize labor due to strong social norms (Hill and Vigneri 2009). Doss and Morris (2001) note that men command women's labor while the opposite situation would not happen in many African countries.

1.4 Statement of the Problem and Need for Gender Research

In spite of importance of gender perspective in rural development, the number of empirical research on intra-household resource allocation for woman is still scarce. There are some impediments to conduct such analysis. First, a standard household survey is conducted at household level by interviewing one representative respondent, usually a male household head. Such dataset is assumed to mislead the women's intra-household resource allocation and family position, because the information is biased by men's perspectives. Second, it is difficult to capture women's empowerment because it is invisible. Measuring women's empowerment is substantially complexed. It is related to not only availability of resource and income, but also women's bargaining power such as decision-making and self-esteem. Moreover, gender equality can be influenced by social norms and traditions that are diversified across the region. Therefore, it is important to use the micro dataset at individual level in order to capture gender inequality with use of indicators concerned with women's bargaining power. The Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) is one of the sex-disaggregated datasets published by the World Bank. This dataset enables us to access to the plot-leveled information and Slavchevska (2015) dealt with the Tanzania's LSMS-ISA for their research. The International Food Policy Research Institute (IFPRI) has announced Woman's Empowerment in Agriculture Index (WEAI) in 2012, in collaboration with the Oxford Poverty and Human Development Initiative and United States Agency for International Development (USAID) (Alkire, 2013). WEAI is an

innovative indicator measuring women's empowerment composed of two sub-indices: one measures women's empowerment across five domains in agriculture, and the other measures gender parity in empowerment within the household. Improvements of this indicator also have been made and the abbreviated WEAI and the project-level WEAI are introduced (Malapit, 2017, 2019). For another approach exploring women's empowerment, Bandiera et al (2018) implemented a randomized control trial to evaluate the impact of policy intervention on women's empowerment. More empirical studies are needed to capture the women's empowerment for policy implementation based on the evidence.

1.5 Research Site – The Republic of Ghana –

1.5.1 General Information of Ghana

Ghana is viewed as a success story of African history; she was the first independent country in African continent. Today, more than sixty years after its historical independence, Ghana has been performing as a leading country for the sub-Saharan Africa's economy with political and social stability. International Monetary Fund (IMF) and the World Bank reports in 2019 that Ghana will grow its economy faster than any other country in the world; the annual growth rate of Ghana for 2019 is expected 8.8 percent in World Economic Outlook, that will be updating the previous growth rate (6.3 percent) recorded in 2018. The World Bank (2011) suggested that the poverty reduction in Ghana has been very significant in the last two decades, according to the national survey conducted between 1992 and 2006. The share of poor in total population has been largely declined from 51.7 percent in 1992 to 28.5 percent in 2006. Moreover, between 1992 and 2006, 6.9 million people increased, while the number of the poor was largely reduced by 1.6 million.

1.5.2 Growing Poverty Gap in the North

Ghana has achieved a great poverty reduction thanks to a remarkable economic growth so far, however, inequality across regions has been currently becoming a huge issue of the country. In particular, the northern part lags largely behind the southern part (The World Bank, 2011). Addressing the poverty gap within country is one of the main targets for sustainable economic development in Ghana. Therefore, in order to identify the current condition of northern Ghana, it is clear that empirical research focused on the rural north is worthwhile not only in terms of the growing body of knowledge but also contributing to the poverty gap's issue in Ghana.

1.5.3 Cultural Difference between the South and the North

- Islamic religion, Patriarchal social system, and the Dagomba ethnicity -

As well as a large difference in agricultural condition between the north and the south, cultural and social differences between the north and the south are substantial. The northern part of Ghana manifested in several characteristics: Islamic religion, patriarchal society, and the Dagomba ethnicity. The following describes these social features and the possibilities of each factor affecting women's livelihood.

First, a polygamous marriage form is common for the northern Muslim people, while monogamous marriage is prevalent for the southern Christian people (see the details in Appendix). This striking differences in household structure may affect women's livelihood strategies and intra-household resource allocation; co-wives often cooperate their housework, share the production and consumption, and compete over resources (Akresh et al, 2016; Madhavan, 2002; Tomomatsu, 2019). Many previous studies have argued whether polygamous marriage is advantage for women. Boserup (1970) mentioned that polygamous marriage is an ideal household form for men with respect to

family labor enhancement. On the other hand, from women's perspective, polygamous household can be a threat over resource allocation (Boltz, 2016): older wives tend to maintain self-insurance in preparation for the arrival of younger wives. To estimate women's domestic resource allocation, it would be important to explicitly pay attention to different household structures and women's seniority.

Second, the northern Ghana is organized along patrilineal lines, while a large part of the southern Ghana is predominant by the matrilineage. Between patriarchy and matriarchy, the inheritance patterns are substantially different; a man's property is transmitted only to his son and other male relatives under patrilineage, instead of female family members. With such striking inheritance rule, patrilineality may negatively affect women's intra-household resource allocation. According to the previous study (Baden et al., 1994), women commonly have smaller use and disposal rights over land compared to men, irrespective of the difference in social systems. However, Baden reveals that the main difference is that women in matrilineal society have a slight higher level of use rights over land, and no substantial difference in disposal rights in land as an asset, relative to those in patrilineage. Understanding the nature of patrilineal society is necessary to capture the women's intra-household resource allocation in northern Ghana.

Third, the majority of the Northern Region of Ghana's population belongs to the Mole-Dagban meta-ethnic family, which includes the Dagomba ethnicity. To the contrary, the Akan meta-ethnic family is prevailing in the southern part of Ghana. Given in the Dagomba's tradition, "cooking wife" is regarded as a higher family position among female family members (Warner, et al, 1997; Padmanabhan, 2007). The definition of "cooking wife" is the woman who has given birth to more than one child. According to the previous studies, "cooking wife" can sometimes offer not to prepare family meals,

instead, she can use her time in other economic activities to earn own income. In a crop shortage, "cooking wife" supports her husband by providing crops using her income. With easier access to income generating activity, such women can be empowered and strengthen their bargaining power than other female family members. Thus, the factor of "cooking wife" should be taken into account to estimate women's intra-household resource allocation in the context of the rural society of northern Ghana.

1.6 Objectives of the Study

The main objective of this study is to empirically examine the characteristics of intra-household resource allocation, such as asset and labor, as an evidence in rural society of northern Ghana. This research uses two different datasets; one is the household aggregated dataset for all regions in Ghana, and the other is the sex-disaggregated dataset collected by the author in northern Ghana, where is a relatively poor location of the country. The study attempts to elucidate the relationship between intra-household resource allocation and women's decision-making power by woman's family position with special attention to the social backgrounds of northern Ghana such as patriarchy, different household structures, and the Dagomba ethnic tradition.

1.7 Data Collection though a Field Survey

In addition to use of nationally representative dataset, sex-disaggregated data the author had collected in rural northern Ghana was used in the analysis. Prior to a main survey, three preparational steps were implemented: 1) preliminary survey and village selection, 2) household census, and 3) survey demonstration for questionnaire revision. Details of each approach are described below as well as the main survey procedure.

1.7.1 Preliminary Survey and Village Selection

First, a preliminary village survey was conducted for selection of the study areas.

A local enumerator and the author visited eight candidate villages: Cheshegu, Zugu, Namdu, Gupanarigu, Nyerizegu, Digu, Vili, and Tiring (Fig.1.1). All areas are nearby Kumbungu town, located in the northwest from Tamale (a regional capital town of Northern Region of Ghana). In order to select three villages as a sample from these candidates, we interviewed villagers and collected basic village information on several points: number of households in community, intervention of rural development program for women's empowerment, and proportion between monogamous and polygamous households. Because the study deals with gender difference, the sampled village should not have any treatment of development program for empowering women in the past. Moreover, monogamous and polygamous household should be well proportionally distributed within community for assuring each sample size. The locational characteristics of each village are assumed to strongly affect the villagers' livelihood. For example, if a community is close to market or main paved roads, people will have a better access to economic opportunity. Considering such possibility, when we arrived in each community, GPS information was recorded in our preliminary survey.

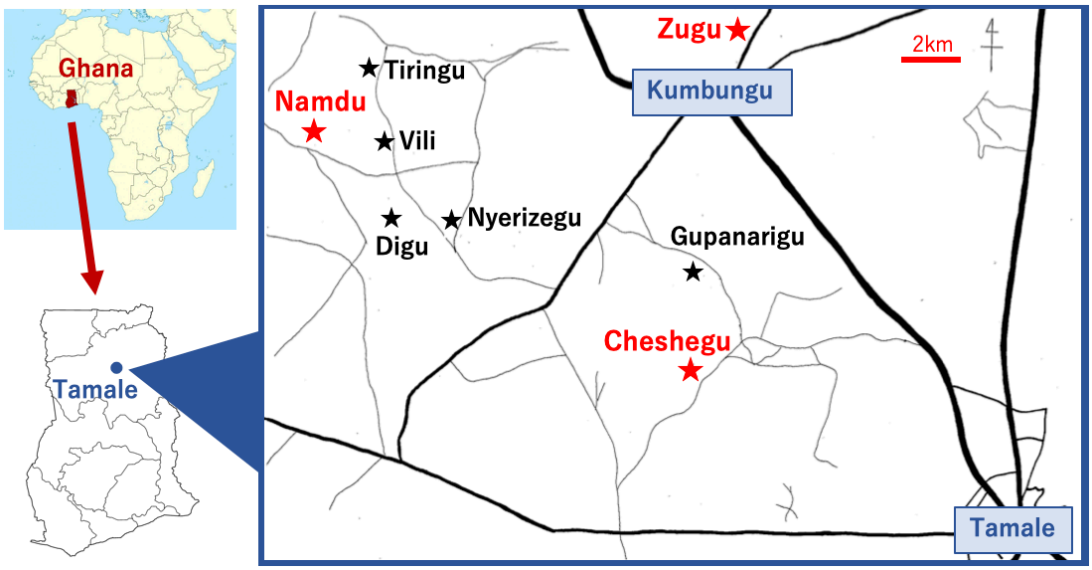


Fig. 1.1 Map of study areas

Based on the information reported by villagers as well as on the GPS tracking information on map, three communities – Cheshegu, Namdu, and Zugu – were finally selected as samples from eight candidates, for several reasons below. First, all three villages have not experienced any development program targeting on women, which means that women are not biased with a program treatment. Second, each village has a different locational characteristic. Cheshegu is comparatively close to Tamale, though the main paved roads are far from the village. Zugu locates close to Kumbungu market and the main road. On the contrary, Namdu is far away both from the market and main road. Third, all villages have a large number of household and the ratio of different marriage form is relatively well proportioned.

Details of each location character are as follows. The Cheshegu community is about 20km away from Tamale and 10km from the main paved road. The roads leading directly to the Cheshegu community are not paved and are prone to flooding when it rains. Thus, especially for the villagers who do not have own motorbike and other transportation tools, it is tough to access to the main market in Tamale. On the contrary, the Zugu community is relatively close to the main paved roads. Still about 25km far from Tamale, this location gives the Zugu villagers easy access to the weekly local market in Kumbungu. Compared to these two villages, the Namdu community lies in a remote area; it is about 40km from Tamale city, with about 15km distance from a main paved road. As well as in the Cheshegu community, the direct road to the Namdu community is unpaved, and access to market is restricted for the people especially who have no own transportation. Women living in these three villages do not own motorbike and instead use a tricycle bike taxi when travelling to markets.

1.7.2 Household Census in All Sampled Communities

As a second step, the survey team has conducted a census in order to implement a random household sampling. After obtaining the chief's consent to conduct a field survey in his community, we interviewed all household heads on several questions below to recognize each household.

1) Name of household head

2) Name of family

3) Number of household member (male, female, and children under 15 years old)

4) Size of farmland

5) Religion the family worships

6) Household head's phone number.

As a result of visiting more than 400 households in three communities, the census gives us an overall picture of each community. As listed in Table 1.1, the census confirmed the number of household in each community: 183 households in Cheshegu (consisting of 115 monogamous and 68 polygamous households), 111 households in Namdu (consisting of 68 monogamous and 43 polygamous households), and 110 households in Zugu (45 monogamous and 65 polygamous households).

Based on this picture of whole number of households, around 40% out of whole households both from monogamy and polygamy were randomly selected for the main household survey: 74 households from Cheshegu (consisting of 46 monogamous and 28 polygamous households), 48 households from Namdu (consisting of 28 monogamous and

Table 1.1 Number of household in each village

Name of community	Monogamous household	Polygamous household	Total
Cheshegu	115	68	183
Namdu	68	43	111
Zugu	45	65	110
	228	176	404

20 polygamous households), and 45 households from Zugu (consisting of 18 monogamous and 27 polygamous households). The main survey collects the household and individual information by interviewing all household heads and wives, respectively. Thus, at individual level, 167 males and 249 females answered the questionnaire. The list of sample size for the main survey in each community is summarized in Table 1.2.

Table.1.2 Number of household head and wife in each village

Community	Monogamous household		Polygamous household			Total	
	Male head	Wife	Male head	Senior wife	Junior wife	Male	Wife
Cheshegu	46	46	28	28	29	74	103
Namdu	28	28	20	20	22	48	70
Zugu	18	18	27	27	31	45	76
						167	249

1.7.3 Survey Demonstration and Training for Female Enumerator

As a final preparation before the main survey, we conducted a survey demonstration for 3 times to adjust the questionnaire contents according to the local conditions. In fact, the contents have changed significantly from the previous form which the author had prepared in Japan. As attached in the end of Appendix, the final questionnaire format is composed of 12 and 11 sections for men and women, respectively. The summary section is listed in Table 1.3. Irrespective of sex, questions are related to several topics: agricultural production, asset allocation, off-farm labor allocation, working role and operating hour at home, and power relationship between spouses. Hence male household heads are commander of family, they answered general demographic profile about household. Our preliminary survey found that women are responsible for preparing family meals at home, so women specifically responded the questions on household consumption. The survey targets on both male household heads and wives from different marriage forms (monogamous and polygamous households) allowing

scope for examining each characteristic. This unique survey design leads to the research strength and originality, because the LSMS dataset does not include the details on intra-household resource allocation, including productive asset and labor, by sex of different marriage form a at individual level.

Table 1.3 List of the contents of questionnaire

Questionnaire for household head	
Section A	Demographic profile of the household members
Section B	Household head & Spouse Information
Section C-1	Plot and crop information
Section C-2	Crop expenditure and profit
Section D	Livestock information
Section E	Self-employment and hired labor in the last 12 months
Section F	Non-labor income: Susu, remittance, and other service
Section G-1	Consumption and expenditure
Section G-2	Crop and cash distribution
Section H-1	Working role and time use
Section H-2	Working role: agricultural work
Section I	Power relationship
Questionnaire for wife	
Section C-1	Plot and crop information
Section C-2	Crop expenditure and profit
Section D	Livestock information
Section E	Self-employment and hired labor in the last 12 months
Section F	Non-labor income: Susu, remittance, and other service
Section G-1	Consumption and expenditure
Section G-2	Crop and cash distribution
Section H-1	Working role and time use
Section H-2	Working role: Daily working schedule
Section I	Power relationship
Section J	Special attitude to your husband

1.7.4 Main Survey

When the final questionnaire has been designed, two female enumerators joined research team and took a survey training specifically for interviewing rural women. They played a key role so that our team obtained a good quality of data from the female respondent; if the male enumerator interviews the female respondent, she tends to hesitate to answer the questionnaire or tell us the truth. During a survey test, we also found that women were not willing to answer us when the household head or other family members were around. Therefore, the survey team always made a great effort to have a separate interview, so that the respondents comfortably answered the questions. In addition, both two female investigators are mothers, so that the female respondents can easily answer the questions on family planning.

1.7.5 Process of Data Analysis

After a four-month household survey, collected dataset were checked and edited. In case any missing variables were detected on the questionnaires, the research team revisited the village and interviewed the respondent again to complete all questions as possible. Data management and calculation were conducted by the author with use of statistical software Stata.

1.8 Outline of the Thesis

This thesis is divided into six chapters. Chapter I provides a brief introduction and outline of the study. From Chapter II to Chapter V, the results of empirical analysis are reported. In Chapter II, using the dataset derived from the Living Standards Measurement Survey (LSMS), which implemented the Ghana Socio Economic Survey 2009/2010, intra-household resource allocation and relationship with asset and labor allocation are estimated. Main findings implied that the marriage form is one of the significant factors

affecting the women's off-farm labor allocation in the household. However, further research is not possible due to LSMS data limitations to polygamous wives. Based on these outcomes, from Chapter III to V, the original dataset covering the limitation of LSMS was analyzed. The datasets are collected by the author through a household survey conducted in three villages in Northern Ghana from August to December in 2017. In Chapter III, the characteristics of intra-household resource allocation, such as asset and labor, are examined in comparison with monogamous and polygamous wives. The main results show that monogamous women are more likely to be allocated farmland than polygamous women. Hence it is confirmed that off-farm labor allocation is prevalent among rural people, Chapter IV has conducted regression analysis for estimating the determinants of off-farm labor allocation by gender, marriage form, and women's family status. The main findings have revealed that off-farm labor allocation differs by several factors, such as marriage form, the traditional women's status in the Dagomba ethnicity, and child bearing. Chapter V investigates the women's decision-making power concerned with the use rights over crop and income, family planning and troubles by their family position. In study areas, women are generally less likely to express their opinion against male household heads. The concluding discussion is summarized in Chapter VI.

CHAPTER II EMPIRICAL ANALYSIS (1)

"The Determinants of Off-Farm Work Participation in Rural Ghana: Gender Differences for Self-Managed Business and Wage Labor"

2.1 Introduction

Sub-Saharan Africa accounts for over 50% of the world's poor (World Bank, 2016). Addressing food security for vulnerable agricultural smallholders is required via multiple livelihood strategies. Labor allocation in off-farm activity is regarded as one of the strategies to enable rural people to boost their incomes and improve household wellbeing (Reardon, 1997). Off-farm work is interchangeably called non-farm work, and defined as employment that takes place outside your farming plots.

In the context of African rural society, intra-household resource allocation tends to be decided not only in terms of the household unit, but also on an individual household member basis. This suggests that women's labor allocation in economic activity would rely on their own characteristics such as educational attainment or availability of assets they can manage. Such individual characteristics may be reflected in their internal household bargaining power, as examined by Kurosaki and Ueyama (2002) for the case of agricultural work. This mechanism is functionally equivalent to previous findings in a more general context, namely that women's bargaining position in household decision-making influences their labor market participation (Doss, 2013).

Women's labor allocation in economic activity may also be influenced by social traits. Discrimination resulting from culture or social customs may limit women's chances to enter the labor market (Minniti and Naude, 2010). In many developing countries, women face more constraints than men when they engage in economic activity, despite the fact that their income-earning activity contributes to farm household wellbeing (Doss,

2013).

In Africa, productive assets in a household, such as farmland and livestock, tend to be managed individually by multiple family members. Some women in rural Ghana have the right to manage farmland, though the size of such holdings is generally smaller than that of men (Doss, 2002).

The existing literature tells us that various factors influence women's off-farm labor allocation in rural Africa. In particular, a woman's asset availability seems to matter. It is postulated that the availability of assets managed by women may affect their decision-making regarding labor allocation in off-farm work through two channels. One channel is a positive relationship between asset availability and bargaining power in the household (Doss, 2013, 1996). The other channel is a negative relationship between asset availability and resource constraint to participate in off-farm work. Particularly, the latter channel may be the cases where women use income and/or products from their individually managed assets to start self-managed business.

These conjectures motivate us to investigate empirically the role of individually managed assets in women's decision-making regarding off-farm labor allocation and its effect on labor allocation in the different types of off-farm activities. Accordingly, we analyze the case of rural Ghana wherein productive assets tend to be managed individually by multiple family members.

2.2 Data and method

The data were derived from a Living Standard Measurement Survey (LSMS) published by the World Bank associating with Yale University, which implemented the Ghana Socio Economic Survey 2009/2010. The LSMS has provided a regionally representative sample covering 10 regions: 5,009 households and 18,889 individuals from

334 enumeration areas (EAs). In each EA, 15 households were selected. Based on the data composition, household members are defined as persons living together in the same household unit. Hence, children living apart from their parents are not counted on as household members. This study selected adult individuals who belong to male-headed households that manage farmland by individual household members (either self or other members) from the total of 18,889 individuals. Our definition of adult is 15 years old or older in age. Since one of the main objectives is to examine an effect of the intra-household bargaining on off-farm labor allocation, this research restricted the data to male-headed households, where the bargaining is most likely to be carried out between a male household head and a female spouse. The number of sample individuals amounts to 5,860, consisting of 2,995 men and 2,685 women. Also, note that because the sampled individuals are likely to cultivate farmland managed by themselves individually, this analysis call them "farm individuals".

Off-farm activities are categorized into four different work types: a) employment in the rural off-farm labor market, b) self-employment in the local off-farm sector, c) employment in the migration labor market, and d) employment in the farm labor market (Reardon, 1997). Given the distribution across four activity types in the data, we set two types of off-farm work: self-managed business equivalent to b), and wage labor including a), c), and d).

Given the data set of LSMS, gender differences are found to prevail in the labor market in Ghana. Men's main fields of wage labor are service, education, agriculture and transport, while educational work alone accounts for about 50% of women's employment. Women also have a lower labor allocation rate in wage labor: only 2% of total farm females participate in it. On the contrary, gender differences are smaller in self-

employment. Regardless of gender, main activities of self-managed business are retail sale of food products, management of restaurants, and processing of vegetables and animals. It should be noted, however, that the different questions were used in the survey to identify each individual's experience of off-farm activity. In the case of self-managed business, he/she was asked if he/she had ever been engaged in self-managed business during the past one-year period. In the case of wage labor, he/she was asked if he/she had ever been engaged in wage labor during the past 7-day period. Therefore, it is highly possible that the data fail to capture casual wage labor particular in agriculture and employment in seasonal migration. Thus, this research assume that the data is biased to formal wage labor to some (unknown) extent.

This research specifies three types of productive asset: land, large animals, and middle/small animals. As mentioned in the section of Introduction, it is hypothesized that the availability of such assets will influence women's labor allocation in off-farm work through two channels, namely enhancing bargaining power and mitigating resource constraint.

Other variables are composed of general characteristics of household and individual. The household characteristics are household member size, number of children in the household, and polygamous household defined as the household of which the head has more than one spouse. However, it should be noted that since LSMS has no information about the second and third wives, wives in polygamy on dataset equals to the first wives in polygamous household. The individual characteristics are age, education (basic and higher certification), marital status (formally married, consensual union, widowed, divorced, never married, others, and unknown), and relationship to household head (head, spouse, child, and others). "Others" categorized for marital status are those

being betrothed or separated, while “others” for relationship of household head include grandchild, parent/parent in law, son/daughter in law, other relative, and adopted/foster/stepchild.

The empirical analysis strategies consist of the two steps. In the first step, using the male and female observations described above, allocation in each off-farm activity is separately regressed by gender on the possible determinants, to compare the gender differences. To deal with the unobservable factors which may arise due to the diversity of ethnic groups, agro-ecological environments, and market conditions in Ghana, the model includes EA dummies and also adopts cluster robust standard errors on EAs.

In the second step, special attention is paid to the effects of household unobservable factors coupled with the above-mentioned two channels (i.e. bargaining power and resource availability) on women’s off-farm labor allocation. To deal with this issue, this study applies the household fixed effect model to the female sample, assuming that the bargaining over allocation in off-farm activities is carried out between women and the household head. This is because even though women’s labor allocation in off-farm activities were affected by their asset availability, it is not yet clear whether the bargaining power of women works unless the bargaining against whom is defined. The household fixed effect controls for unobservable factors of household and more aggregated levels. Because the characteristics of household head are also absorbed by the fixed effect, the results can be interpreted based on the assumption of bargaining between household head and women.

Since the household fixed effect model utilizes the variability of variables within household, the female sample is restricted to those who live together at least with one another women aged 15 years old or over. Recall that the sample is restricted to the

individuals in male-headed households to focus on the common bargaining between a male household head and a woman. This selected data set contains 1,529 observations.

In addition, woman's land share (woman's land size/household's land size) is introduced as an explanatory variable in an attempt to capture an effect of women's intra-household bargaining power on their off-farm labor allocation. Land share might serve as a proxy variable for women's bargaining power so that its effect on off-farm labor allocation can be examined separately from an effect of land size on it. An effect of land size is viewed as a resource availability effect, and it is a mirror of a resource constraint effect in a more general setting. Because the structure of the original data does not allow to specify the assets managed by a household unit, household's farmland size is a total of multiple household member's farmland sizes.

Despite the discrete nature of dependent variables, linear probability models are applied to all regressions instead of discrete choice models such as probit and logit. The main reason is that the linear probability model can be easily combined with the household fixed effect model without causing bias on the estimated coefficients when the model is linear (Bandiera, 2007).

2.3 Results

Table 2.1 summarizes the definition of variables of interest in the analysis and their descriptive statistics. It is found that a self-employment rate for females is higher than that for males. Contrarily, the participation rate for wage labor is much lower than males. Comparing means of other variables reveals the distinct features regarding gender differences. First, large gender differences exist in individually managed asset availability: men have the greater availability of farmland and livestock than women. Second, gender differences are also pronounced for education. The percentage of men

with an educational certificate is much higher than for women. It is hypothesized that these gender differences are reflected in behavioral differences by gender in allocation in

Table 2.1 Descriptive statistics of variables by gender

Variable	Variable Description	Male (n = 2,995) Mean	Male (n = 2,995) SD	Female (n = 2,685) Mean	Female (n = 2,685) SD
	Dependent Variables				
Self-Employment	1 if the individual manages self-owned business, 0 otherwise	0.09	0.28	0.16	0.36
Wage Labor	1 if the individual works for wage labor, 0 otherwise	0.09	0.29	0.02	0.12
	Independent Variables				
Asset					
Land Size	Self-managed land size (ha)	2.29	5.07	0.07	0.51
Land Share	Land share in the household	0.67	0.46	0.03	0.14
Large Animal	1 if own possessed large animal, 0 otherwise	0.28	0.45	0.06	0.24
Middle/Small Animal	1 if own possessed the middle or small animal, 0 otherwise	0.31	0.46	0.10	0.30
Other Variables					
Household characteristics					
Household Size	Number of household member	5.50	2.96	6.26	2.92
Household Land Size	Total land size in the household (ha)	3.61	5.89	3.65	6.14
Polygamy	1 if the household practices polygamy, 0 otherwise	0.13	0.33	0.22	0.41
Number of Children	Number of child member in the household	2.21	1.95	2.67	2.05
Individual characteristics					
Age	Age for individual	39.60	18.63	36.89	16.37
Education					
No Education	1 if the individual has no educational certification, 0 otherwise	0.66	0.47	0.83	0.37
Basic	1 if the individual acquires basic certification, 0 otherwise	0.26	0.44	0.14	0.35
Higher	1 if the individual acquires higher certification, 0 otherwise	0.08	0.27	0.02	0.15
Marital Status					
Formal Married	1 if the individual has been married formally, 0 otherwise	0.57	0.49	0.68	0.47
Consensual Union	1 if the individual has consensual union, 0 otherwise	0.07	0.25	0.07	0.25
Divorced	1 if the individual has divorced, 0 otherwise	0.03	0.17	0.00	0.05
Widowed	1 if the individual has widowed, 0 otherwise	0.02	0.12	0.05	0.22
Never Married	1 if the individual has been never married, 0 otherwise	0.30	0.46	0.18	0.39
Others	1 if the individual has been separated or betrothed, 0 otherwise	0.01	0.08	0.00	0.04
Unknown	1 if the individual has no specific marital status, 0 otherwise	0.01	0.09	0.01	0.11
Relation to Head					
Household Head	1 if the individual is a head of household, 0 otherwise	0.70	0.46		
Spouse	1 if the individual is a spouse of the head, 0 otherwise			0.73	0.44
Child	1 if the individual is a child of the head, 0 otherwise	0.25	0.43	0.18	0.38
Others	1 if the individual has other relation to the head, 0 otherwise	0.05	0.21	0.09	0.29

Note: 1) The minimum legislated age for entering primary school in Ghana is 6 years. Moreover, a new entrant will have to spend about 9 years to qualify to sit the Basic Education Certificate of Examination (BECE) or 10 years in the case of the Middle School Leaving Certificate (MSLC) before the 1987 Educational Reforms. In our analysis, "Basic" indicates possession of the Basic Education Certificate of Examination (BECE) and the Middle School Leaving Certificate (MSLC), while "Higher" indicates the acquisition of the certificates higher than the above.

off-farm work.

Table 2.2 presents the estimation results for determinants of engagement in self-managed business and wage labor for men and women. The coefficients for religion and EA dummies are not reported in the table. The standard errors reported in the table are the cluster robust standard errors on EAs. Note that household head is used as a base category for the relationship to the household head in the models for males and spouse as a base category in the models for females. The estimation results reveal that the availability of individually-managed assets has no significant effect on allocation in self-managed business and wage labor for both sexes. Even though this research assumed that productive assets would positively affect off-farm labor allocation, these results did not support the expectations. One plausible reason for this is that because managing larger farmland or more animals might need more time on a farm, it is likely that the availability

Table 2.2 Estimation results for determinants of engagement in self-managed business and wage labor by gender

	Self-Managed Business				Wage Labor			
	Male (n=2,995)		Female (n=2,685)		Male (n=2,995)		Female (n=2,685)	
	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)
Asset								
Land Size	0.003	(0.002)	0.017	(0.021)	0.000	(0.001)	-0.004	(0.002)
Large Animal	-0.003	(0.018)	0.066	(0.043)	-0.016	(0.017)	0.017	(0.013)
Middle/Small Animal	0.007	(0.016)	-0.004	(0.030)	-0.021	(0.014)	-0.017	(0.011)
Other Variables								
Household Size	-0.006	(0.005)	0.010	(0.006)	0.002	(0.004)	0.002	(0.002)
Polygamy	-0.001	(0.018)	-0.065**	(0.027)	0.025*	(0.013)	-0.006	(0.007)
Number of Children	0.009	(0.007)	-0.006	(0.008)	-0.005	(0.005)	-0.001	(0.002)
Age	0.002	(0.002)	0.008***	(0.003)	0.001	(0.002)	0.001	(0.001)
Age^2	-2.52E-5	(2.18E-5)	-9.95E-5***	(2.81E-5)	-3.85E-5*	(2.13E-5)	-6.11E-5**	(5.64E-6)
Education								
Basic	0.027*	(0.015)	0.029	(0.025)	0.037**	(0.017)	0.006	(0.009)
Higher	0.027	(0.024)	-0.037	(0.058)	0.239***	(0.030)	0.241***	(0.063)
Marital Status								
Consensual Union	0.030	(0.030)	-0.006	(0.041)	0.031	(0.033)	0.011	(0.015)
Divorced	-0.011	(0.040)	-0.004	(0.107)	0.043	(0.045)	-0.010	(0.031)
Widowed	-0.075**	(0.033)	-0.016	(0.060)	0.041	(0.051)	-0.002	(0.010)
Others	0.051	(0.101)	0.107	(0.190)	0.059	(0.110)	0.009	(0.008)
Never Married	-0.036	(0.022)	-0.062	(0.042)	-0.037	(0.028)	-0.003	(0.007)
Unknown	-0.080**	(0.036)	-0.037	(0.052)	-0.058*	(0.034)	-4.54E-4	(0.005)
Relationship to head								
Child	-0.031	(0.028)	-0.074	(0.045)	-0.106***	(0.033)	-0.013*	(0.007)
Others	-0.059**	(0.027)	-0.019	(0.049)	-0.086***	(0.030)	-0.009	(0.010)
EA dummies	included		included		included		included	
Religion dummies	included		included		included		included	

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) Adult individual observations only from male-headed households are used for the estimation; OLS model is used; standard errors are clustered by enumeration area.

of productive assets might have a negative impact on off-farm labor allocation. Thus, the expected positive effect of asset availability was offset by such a negative impact.

Regarding other variables, education has a significantly positive effect on wage labor regardless of gender. Educated people tend to participate in the off-farm labor market in rural Ghana, which is consistent with the previous studies (Barrett *et al*., 2001). Being household head has a positive effect on wage work allocation for men. In the case of women, older women are more likely to participate in self-employment. Polygamy is found to have a significantly negative effect on women's self-managed business; however, it has a significantly positive effect on men's allocation in wage work. This can be characterized as a striking gender difference in labor allocation in rural Ghana. Women in the polygamous household might be discouraged to work in the rural off-farm economy.

Asset ownership, especially middle/small animals, may have the endogeneity or reverse causality problem. These problems are considered more carefully for female sample in the next section by introducing the household fixed effect models. Before discussing the results, this study estimated the models which excluded a variable of middle/small animal ownership from the above models as a robustness check. The estimation results other than middle/small animal ownership remain unchanged though their results were not presented in this paper.

Table 2.3 indicates the results from the estimation of household fixed effect models for women's labor allocation in self-managed business and waged work. The table reports the cluster robust standard errors on EAs. Recall that land share (woman's land size/household's land size) is specified in the models to capture an effect of women's intra-household bargaining power on their off-farm labor allocation. Main findings are summarized as follows. First, both farmland size and large animal ownership positively

affect labor allocation in self-managed business. These estimates are different from those in Table 2.2, implying that unobservable household fixed effects were negatively correlated with these asset variables and the models without controlling for the fixed effects underestimated the coefficients. However, land share does not influence either self-managed business or wage labor. These results imply that asset availability or resource constraint may be a more important determinant of women's off-farm labor allocation than their bargaining power against male household heads. For robustness check, this study estimated the same model as for Table 2.2 using the sample used in Table 2.3. It is confirmed that the estimation results are similar to those of Table 2.2.

Second, the determinants of women's labor allocation in wage work markedly differ from those for self-managed business. Although education is found to be the most important factor for off-farm labor allocation, its effect differs by off-farm work activity type. Basic education has a negative effect on self-managed business, while higher

Table 2.3 Estimation results for determinants of women's engagement in self-managed business and wage labor (n=1,529)

	Self-Managed Business				Wage Labor			
	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)	Coef.	Robust (S.E.)
Asset								
Land Size	0.030**	(0.014)			-0.001	(0.003)		
Land share			0.023	(0.112)			0.051	(0.057)
Large Animal	0.111*	(0.067)	0.118*	(0.067)	0.027	(0.036)	0.026	(0.036)
Middle/Small Animal	-0.037	(0.049)	-0.045	(0.050)	-0.018	(0.024)	-0.019	(0.023)
Other Variables								
Age	0.010**	(0.004)	0.010**	(0.004)	4.58E-4	(0.001)	3.24E-4	(0.001)
Age^2	-1.11e-4***	(3.96e-5)	-1.13e-4***	(3.96e-5)	-6.21E-6	(1.09e-5)	-5.06E-6	(1.11e-5)
Education								
Basic	-0.109***	(0.034)	-0.112***	(0.034)	0.019	(0.012)	0.019	(0.012)
Higher	-0.040	(0.051)	-0.040	(0.051)	0.192***	(0.064)	0.192***	(0.064)
Marital Status								
Consensual Union	0.027	(0.088)	0.038	(0.088)	-0.053	(0.035)	-0.059	(0.036)
Divorced	0.021	(0.077)	0.033	(0.076)	-0.003	(0.010)	-0.005	(0.010)
Widowed	0.009	(0.096)	0.011	(0.097)	-0.011	(0.013)	-0.013	(0.013)
Others	0.094	(0.076)	0.094	(0.090)	-0.007	(0.010)	-0.024	(0.027)
Never Married	-0.030	(0.049)	-0.029	(0.049)	-0.027**	(0.011)	-0.028**	(0.011)
Unknown	-0.084	(0.068)	-0.082	(0.068)	-0.007	(0.006)	-0.008	(0.006)
Relationship to head								
Child	-0.064	(0.067)	-0.067	(0.068)	0.003	(0.011)	0.004	(0.011)
Others	-0.027	(0.076)	-0.030	(0.078)	0.011	(0.011)	0.014	(0.012)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) The sample in Table 2.3 is restricted to females living together at least with another woman aged 15 years old or over in the male-headed household; household fixed effect models are used, and standard errors are clustered by enumeration area.

education positively affects women's wage labor. The results for self-managed business are inconsistent with the results in Table 2.2. The results for wage labor suggest that getting a job in Ghana's formal labor market relies on individual qualifications such as education levels rather on household position (including asset availability) or social traits. Note, however, that the impact of education might be overestimated because the majority of female wage labors in the original data set are classified as formal wage labors.

2.4 Summary and conclusion

Women in rural Ghana tend to engage in self-managed business rather than wage work. It also suggests that low education is a main constraint for women from entering the wage labor market. Self-managed businesses are an alternative route for women to improve their economic status and wellbeing.

Differences in household structure, whether monogamous or polygamous, have different impacts both on women's and men's off-farm work labor allocation. However, the LSMS dataset is constrained to the information about the first representative wives, excluding the second and third wives in polygamous households. Future research should use a gender disaggregated dataset for two family structures, which covers all polygamous wives, to elucidate the intra-household resource and labor allocation by marriage form.

Applying household fixed effect models, this study tested the hypotheses of resource constraint and intra-household bargaining power for women's off-farm labor allocation. This research found that a resource constraint is a more important determinant of women's off-farm labor allocation in Ghana. Women who have the right to manage productive assets are more likely to engage in self-managed business. It implies that development projects aiming to reduce poverty in Ghana by promoting self-employment

may need to pay attention to their agricultural asset availability within the household.

In the estimation, the effects of women's intrahousehold bargaining power against a male household head, on their off-farm labor allocation were not confirmed. The household fixed effect model may not control for individual unobservable factors such as social status of women's blood relationships in local community, which may affect the distribution of agricultural assets within a household. Further research is required to identify their intra-household bargaining power with attention to how their assets function in decision-making regarding women's off-farm labor allocation. Considering institutions associated with the intra-household asset allocation may help understand such a decision-making process and their bargaining position.

CHAPTER III EMPIRICAL ANALYSIS (2)

"Women's Asset and Labor Allocation within Household: Special Attention to The Social Context of the Rural Northern Region of Ghana"

3.1 Introduction

The Northern Region is one of the poorest areas in Ghana and there remains a large economic disparity compared to the south (Ghana Statistic Service, 2015). Between 1992 and 2006, the number of the poor has reduced by 2.5 million in the southern Ghana, while 0.9 million poor people have increased in the north (World Bank, 2011). One of the factors leaving the northern people behind the south is poor agro-climate condition. Under savannah environment, soils contain few organic matter and poor nutrients, and annual precipitation is less than 1200 mm in the north (Logah, F.Y. et al, 2013). There is only one rainy season throughout the year in the north while it rains twice a year in the south. As a result, rural people in the north are assumed to be more vulnerable to shocks given by climate change and economic crisis. Another impediment to the economic growth in the north is weak infrastructure (World Bank, 2011). With a poor labor market, people in the north often migrate to the cities in the south seeking for job opportunity.

Rural women in northern Ghana face gender-specific constraints on access to productive resources and economic opportunities due to cultural norms in the Muslim patriarchal contexts. As common in rural Africa, property rights are separately distributed to individual household members. Women suffer from few land rights than men in the household, because land allocation usually goes to men and they are generally in charge of land transferring in family (Udry 1996; Quisumbing and Maluccio 2003; Deere et al. 2012). Women's poor property rights may lead to an inefficiently low investment in

Ghana (Udry, 2005). Men's plots are much more productive than women's plots, hence women have lower quality land, less access to fertilizer and other inputs as well as less credit and extension supports (Udry, 1996; Quisumbing, 1996). Bhaumik et al. (2016) reveals that even if women's land rights are assumed to be stronger in matrilineal society, only men still have the advantage in entering high value agriculture and increase household welfare, which caused by women's unequal access to resources for income generation. Doss (2017) suggested the presence of a cropping pattern related to gender inequality over resource allocation: crop choice as to what to grow on each men's and women's plots will vary derived from gender differences in access to inputs and land quality. In particular, patrilineal society limits the women's rights for inheritance as daughters (Iruonagbe, 2009) and Muslim daughters in Africa do not claim inheritance, instead entrust all land to brothers (Aldashev et al. 2012).

It is well renown that Muslim men are allowed to marry multiple wives as polygamous marriage. Boserup (1970) proposed that "*Polygamous household is an ideal household structure for the men*" from the perspective of high fertility and many family workforces. On the other hand, the monogamous households have an advantage in capital accumulation with a small number of household members relative to polygamy (Laiglesia 2008). The form of polygyny also influences social relationships within household through cooperation among co-wives regarding productive and reproductive aspects, such as agriculture and childbearing. However, under a great authority by husband, women are competitive to intrigue his attention over resource allocation (Madhavan, 2002). Thus, from the women's side, polygamy is controversial with both positive and negative aspects on household resource allocation. Among co-wives, cooperation is greater than among husbands and wives in polygamy, which resulting in efficient

production in Burkina Faso (Akresh et al, 2016). Another study in Nigeria revealed that behavior in polygamous household is less cooperative than in monogamous households (Barr, A. et al, 2019). Labor cooperation for a series of housework may take place in co-wife polygamous relationship, however, previous study points out that the arrival of a second wife can be the first wife's threat over resource allocation. Marie (2016) found a positive coefficient between a risk of polygamy and female savings as a self-insurance. Polygynous women's health is more vulnerable due to sexually transmitted infections and domestic violence (Riley, 2009). A household head's behavior, a woman's age, resource allocation, and cultural norms will determine the extent of competition with wives (Jankowiak et al. 2005).

In rural northern Ghana, society is dominated by a patriarchy in which asset allocation and responsibilities are aligned with gender, and the majority of people are Muslims mainly composed of the Dagomba ethnicity (see Appendix). According to the previous research (Ramatu, 1997; Padmanabhan, 2007) and the original survey of this study, the Dagomba woman can obtain a higher family status called "cooking wife" after giving birth to two children. This type of woman is profoundly different in time flexibility from other women (see Appendix). Thus, women's intra-household resource and labor allocation may be strongly affected by patriarchal society, polygamous household structure, and the Dagomba's traditional custom.

Most standard household surveys have been conducted at the household level interviewing only a male household head, which may be biased by a male perspective. As a result, the lack of sex-disaggregated data has a possibility to underestimate women's contribution to agricultural production. Recently the importance of individual-level dataset has been recognized based on household collective model and new quantitative

measurement tool such as WEAI has been developed to assess women's empowerment in agricultural sector. Yet, such efforts are still minor and the gender-sensitive dataset is limited. The LSMS dataset analyzed in Chapter II did not allow to further research on polygamous women due to women's data limitation. Therefore, the analysis of this chapter attempts to explicitly shed light on the polygamous women in northern Ghana with the original sex-disaggregated dataset. The main purpose of this study is to capture the gender characteristics of intra-household resource allocation targeting on rural women in northern Ghana, where many polygamous households inhabit. In this study, assuming that women's different family status may relate to their bargaining power at home, special attentions were paid toward women's attributes.

3.2 Data and Method

This study used the original dataset collected by the author through a random household survey in three villages located in the Northern Region of Ghana from September to December in 2017. Reflecting the estimation results of using the LSMS in Chapter II, whether the wife belongs to polygamous household might affect the women's labor allocation in off-farm work; polygamous women are less likely to have labor allocation in off-farm economic activities compared to those in monogamous household. Findings also show that individual asset allocation for woman may have a relationship with off-farm labor allocation. However, LSMS is a standard household survey, which does not explicitly pay attention to more detailed asset and labor information associated with polygamous household wives. Furthermore, in a design of LSMS, land information is restricted to only one representative wife and the dataset does not include any information related to the second and third wife in polygamous household. Assuming that such information is important for gender analysis, the author's original dataset contains

various information about all wives, regardless of the type of marriage.

In all three villages, both monogamous and polygamous households are living in the same community. Male household heads and wives are the respondents of the author's survey. Surveyed households are homogeneously composed of the Dagomba ethnicity, interviewing 92 monogamous and 75 polygamous households in three villages – Cheshegu, Namdu, and Zugu. At individual basis, 167 male household heads and 249 women (composed of 92 monogamous and 149 polygamous wives) responded a questionnaire. To identify a seniority of wife, this study sets two categories of wife who belongs to polygamous household – "senior wife" and "junior wife". Senior wife is defined as a woman who first married a household head, and junior wife equals to a woman who married after the first wife. Junior wife includes not only the second wife, but also the third or the fourth wife. As a result, 75 senior wives and 82 junior wives of polygamous household are detected. In summary, the survey has targeted on different individuals as respondent: monogamous individuals (household head and wife), and polygamous individuals (household head, senior, and junior wife). More details about the design of field survey and general information of study areas are described in Appendix.

The dataset includes a variety of information about intra-household resource allocation related to both on- and off-farm economic activities (see the attached questionnaire in Appendix). The main purpose of this study is to empirically explore the characteristics of intra-household resource allocation, such as asset and labor, by gender and woman's family position with considering social and cultural structure. This research summarizes statistics and cross tabulations related to on- and off-farm work for each sex. Since the study has dealt with three communities with different locational characteristics (see Appendix), differences between villages are also examined for all individuals by

each marriage form. Furthermore, in the context of the Dagomba ethnicity, “cooking wife” is a woman who has given birth to more than one child. According to the previous literature, the Dagomba people culturally view such woman as that in a higher family status (see Appendix). Such women culturally have the right to days off from regular cooking, and thus much more likely to be able to allocate their time in various economic activities both for on- and off-farm work. Assuming the status of cooking wife is also one of the factors influencing women’s intra-household resource allocation, this study also separately investigates the characteristics of cooking wife on intra-household allocation in comparison with those who have no or only one child.

3.3 Results

Table 3.1 summarizes the general characteristics on household and household head in both monogamous and polygamous family, respectively. Household characteristics are religions (Muslim, Dabandu as a local religion, and Christianity), family size (including male, female, and child member, respectively), and farmland size (upland and lowland). The variables for household head are educational attainment (none, pre-school, primary school, and secondary school), asset ownership (number of cattle and sheep, size of upland and lowland), age groups (25-34, 35-44, 45-54, 55-64, and 65 years old or over), and off-farm labor allocation. It should be noted that because the villagers were not so much aware of their own age, it was difficult to obtain the specific number of age through survey. Therefore, the age grouping range by 10 years was used instead of specific number of age for all individuals. To confirm the differences between villages, Table 3.2 displays descriptive statistics related to the identical variables shown in Table 3.1 for each community by marriage form.

Table 3.1 indicates that Muslim is a prevalent religion in study areas regardless of

Table 3.1 Summary statistics of characteristics about household and family head (monogamy and polygamy)

		Monogamy (n=92)		Polygamy (n=75)	
Variable	Variable description	Mean	SD	Mean	SD
Household information					
Religion					
Muslim	1 if the household is Muslim, 0 otherwise	0.74	(0.44)	0.88	(0.33)
Dabandu	1 if the household is Dabandu, 0 otherwise	0.24	(0.43)	0.12	(0.33)
Christian	1 if the household is Christian, 0 otherwise	0.02	(0.15)	0.00	(0.00)
Household size	Number of household member	8.83	(3.74)	14.88	(6.64)
Male member	Number of male household member	4.89	(2.48)	7.43	(3.64)
Female member	Number of female household member	3.93	(2.00)	7.24	(3.50)
Child member	Number of child member aged under 15 years old	3.70	(2.13)	7.64	(3.91)
Farmland					
Upland	Total upland size in the household (acre)	8.20	(6.15)	8.81	(5.78)
Lowland	Total lowland size in the household (acre)	2.14	(2.87)	2.21	(2.24)
Head information					
Education					
None	1 if the head has never been to school, 0 otherwise	0.85	(0.36)	0.85	(0.36)
Pre-school	1 if the head has finished pre-school, 0 otherwise	0.02	(0.15)	-	-
Primary school	1 if the head has finished primary school, 0 otherwise	0.10	(0.30)	0.07	(0.25)
Secondary school	1 if the head has finished secondary school, 0 otherwise	0.03	(0.18)	0.08	(0.27)
Head's asset					
Cattle number	Number of cattle the head manages	3.90	(3.83)	5.56	(7.39)
Sheep number	Number of sheep the head manages	11.79	(10.57)	13.60	(10.43)
Managed upland	Upland size the head manages (acre)	4.69	(2.43)	4.79	(2.07)
Managed lowland	Lowland size the head manages (acre)	1.05	(1.60)	1.41	(1.51)
Age					
25-34	1 if the head is aged from 25 to 34 years old, 0	0.11	(0.31)	0.05	(0.23)
35-44	1 if the head is aged from 35 to 44 years old, 0	0.26	(0.44)	0.36	(0.48)
45-54	1 if the head is aged from 45 to 54 years old, 0	0.43	(0.50)	0.39	(0.49)
55-64	1 if the head is aged from 55 to 64 years old, 0	0.11	(0.31)	0.12	(0.33)
>65	1 if the head is aged 65 years old or over, 0 otherwise	0.09	(0.28)	0.08	(0.27)
Head's off-farm work	1 if the head participate off-farm work, 0 otherwise	0.42	(0.50)	0.45	(0.50)

marriage forms, followed by the local religion Dabandu. On the contrary, Christianity is significantly minor in the northern part of Ghana. Across communities, heterogeneity in religious distribution is confirmed in Table 3.2; lots of people in the Namdu village worship the Dabandu, while people in other villages do not worship it. Regarding the size of household farmland and the number of animal family heads own, the Cheshegu community is smaller than other communities. As commonly observed in two marriage types, most household heads have no educational background. Household heads aged 45-54 years old are dominant irrespective of monogamous and polygamous households, followed by those aged 35-44 years old. The results show that less than half of the male population allocates work to off-farm employment, although heterogeneity within and

Table 3.2 Summary statistics of household and family head by village

	Cheshegu (n=74)				Namdu (n=48)				Zugu (n=45)			
	Mono (n=46)		Poly (n=28)		Mono (n=28)		Poly(n=20)		Mono (n=18)		Poly (n=27)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household information												
Religion												
Muslim	0.98	(0.15)	1.00	(0.00)	0.18	(0.39)	0.55	(0.51)	1.00	(0.00)	1.00	(0.00)
Dabandu	-	-	-	-	0.79	(0.42)	0.45	(0.51)	-	-	-	-
Christianity	0.02	(0.15)	-	-	0.04	(0.19)	-	-	-	-	-	-
Household size	8.20	(2.84)	13.82	(5.43)	9.32	(3.28)	13.40	(5.32)	9.67	(5.85)	17.07	(8.15)
Male member	4.26	(1.87)	6.96	(2.69)	5.61	(2.42)	6.65	(3.05)	5.39	(3.50)	7.96	(4.44)
Female member	3.93	(1.88)	6.86	(3.63)	3.71	(1.67)	6.75	(3.37)	4.28	(2.72)	9.11	(4.25)
Child member < 15	3.15	(1.67)	7.00	(3.23)	3.96	(2.01)	6.60	(2.68)	4.67	(2.91)	8.48	(4.43)
Land size												
Upland	5.79	(2.65)	6.36	(3.84)	12.25	(8.80)	9.68	(6.53)	8.06	(4.25)	10.72	(6.14)
Lowland	1.57	(1.54)	2.04	(2.09)	3.84	(4.33)	3.75	(2.54)	0.97	(1.06)	1.24	(1.46)
Head information												
Education of head												
None	0.74	(0.44)	0.68	(0.48)	0.93	(0.26)	0.95	(0.22)	1.00	(0.00)	0.96	(0.19)
Pre-school	0.04	(0.21)	-	-	-	-	-	-	-	-	-	-
Primary school	0.15	(0.36)	0.18	(0.39)	0.07	(0.26)	-	-	-	-	-	-
Secondary	0.07	(0.25)	0.14	(0.36)	0.00	(0.00)	0.05	(0.22)	-	-	0.04	(0.19)
Asset of head												
Cattle number	3.41	(3.95)	4.14	(3.77)	3.61	(2.75)	6.55	(4.84)	5.61	(4.60)	6.30	(10.95)
Sheep number	11.15	(11.92)	9.32	(6.51)	13.14	(7.93)	14.75	(12.30)	11.33	(10.83)	17.19	(11.00)
Managed upland	3.92	(1.52)	3.75	(1.79)	5.89	(3.26)	5.08	(1.91)	4.78	(2.16)	5.67	(2.06)
Managed lowland	0.73	(1.29)	1.11	(1.31)	1.80	(2.13)	2.63	(1.78)	0.69	(0.86)	0.83	(0.89)
Age of head												
25-34	0.15	(0.36)	0.04	(0.19)	0.11	(0.31)	0.10	(0.31)	0.00	(0.00)	0.04	(0.19)
35-44	0.24	(0.43)	0.50	(0.51)	0.25	(0.44)	0.30	(0.47)	0.33	(0.49)	0.26	(0.45)
45-54	0.43	(0.50)	0.32	(0.48)	0.43	(0.50)	0.40	(0.50)	0.44	(0.51)	0.44	(0.51)
55-64	0.11	(0.31)	-	-	0.11	(0.31)	0.15	(0.37)	0.11	(0.32)	0.22	(0.42)
65 or over	0.07	(0.25)	0.14	(0.36)	0.11	(0.31)	0.05	(0.22)	0.11	(0.32)	0.04	(0.19)
Head's off-farm work	0.35	(0.48)	0.43	(0.50)	0.57	(0.50)	0.30	(0.47)	0.39	(0.50)	0.59	(0.50)

across community is identified in Table 3.2.

Likewise, Table 3.3 shows the summary statistics for monogamous and polygamous women, and Table 3.4 shows by community. Results are displayed separately for different female categories, such as monogamy, polygamous senior, and polygamous junior wives. Variables for women are several factors: age group (under 25, 25-34, 35-44, 45-54, 55 years old or over), educational attainment (none, primary school, and secondary school), the number of child women have given birth to and living together (son, daughter, and baby or infant), farmland allocation and size, livestock ownership, off-farm labor allocation, and cooking wife. Junior wives across all communities are relatively younger

Table3.3 Summary statistics for characteristics of wives

		Mono (n=92)		Poly			
				Senior (n=75)		Junior (n=82)	
Variable	Variable Description	Mean	SD	Mean	SD	Mean	SD
Age							
<25	1 if the wife is aged under 25 years old, 0 otherwise	0.01	(0.10)	0.01	(0.12)	0.12	(0.33)
25-34	1 if the wife is aged from 25 to 34 years old, 0 otherwise	0.22	(0.41)	0.15	(0.36)	0.35	(0.48)
35-44	1 if the wife is aged from 35 to 44 years old, 0 otherwise	0.29	(0.46)	0.49	(0.50)	0.35	(0.48)
45-54	1 if the wife is aged from 45 to 54 years old, 0 otherwise	0.35	(0.48)	0.25	(0.44)	0.11	(0.31)
>55	1 if the wife is aged over 55 years old, 0 otherwise	0.13	(0.34)	0.09	(0.29)	0.06	(0.24)
Education							
None	1 if the wife has never been to school, 0 otherwise	0.96	(0.21)	0.89	(0.31)	0.83	(0.38)
Primary school	1 if the wife has finished primary school, 0 otherwise	0.03	(0.18)	0.07	(0.25)	0.13	(0.34)
Secondary	1 if the wife has finished secondary school, 0 otherwise	0.01	(0.10)	0.04	(0.20)	0.04	(0.19)
Child member							
Son	Number of sons born to wife	2.24	(1.53)	2.31	(1.40)	1.30	(1.25)
Daughter	Number of daughters born to wife	1.25	(1.24)	1.28	(1.13)	0.95	(0.95)
Farmland							
Land allocation	1 if the wife is allocated farmland (upland), 0 otherwise	0.83	(0.38)	0.72	(0.45)	0.57	(0.50)
Land size	Total allocated land size the wife manages	1.03	(0.79)	0.69	(0.55)	0.54	(0.55)
Livestock holding	1 if the wife manages livestock, 0 otherwise	0.03	(0.18)	0.01	(0.12)	0.04	(0.19)
Off-farm work	1 if the wife participates off-farm work, 0 otherwise	0.89	(0.31)	0.84	(0.37)	0.78	(0.41)
Cooking wife	1 if the wife has delivered more than one child, 0 otherwise	0.86	(0.35)	0.87	(0.34)	0.63	(0.48)

than senior women. Statistics remarkably show that most wives have no educational attainment, as well as men. Polygamous wives of the Cheshegu community have a better education than other women. Polygamous junior wives have a small number in child member in all communities. Note that the number of daughters is restricted to those living in the household. Thus, married daughter living outside is not included as a household member.

There is a clear difference in household resource allocation depending on the type of marriage and the seniority of wife. In the cultural settings of study areas, male household head is a major decision-maker of household resource allocation, and he often assigns wife to manage part of his farmland (see Appendix). Monogamous women are significantly more likely to be allocated farmland than those in polygamy in Table 3.3, though there is a heterogeneity across communities in Table 3.4. Within polygamous households, senior wives have a better access to farmland than junior wives. Compared to the average size of household farmland over 8 acres (shown in Table 3.1), woman's

Table3.4 Summary statistics for characteristics of wives by village

	Cheshegu						Namdu					
	Mono (n=46)		Poly				Mono (n=28)		Poly			
			Senior (n=28)		Junior (n=29)				Senior (n=20)		Junior (n=22)	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age												
<25	0.02	(0.15)	-	-	0.10	(0.31)	-	-	0.05	(0.22)	0.14	(0.35)
25-34	0.28	(0.46)	0.21	(0.42)	0.45	(0.51)	0.21	(0.42)	0.10	(0.31)	0.36	(0.49)
35-44	0.17	(0.38)	0.54	(0.51)	0.31	(0.47)	0.29	(0.46)	0.50	(0.51)	0.32	(0.48)
45-54	0.39	(0.49)	0.11	(0.31)	0.03	(0.19)	0.39	(0.50)	0.30	(0.47)	0.14	(0.35)
>55	0.13	(0.34)	0.14	(0.36)	0.10	(0.31)	0.11	(0.31)	0.05	(0.22)	0.05	(0.21)
Education												
None	0.91	(0.28)	0.75	(0.44)	0.66	(0.48)	1.00	(0.00)	1.00	(0.00)	0.91	(0.29)
Primary	0.07	(0.25)	0.18	(0.39)	0.28	(0.45)	-	-	-	-	0.05	(0.21)
Secondary	0.02	(0.15)	0.07	(0.26)	0.07	(0.26)	-	-	-	-	0.05	(0.21)
Child member												
Son	2.28	(1.50)	2.29	(1.33)	1.48	(1.40)	2.57	(1.67)	2.50	(1.50)	1.45	(1.18)
Daughter	1.37	(1.36)	1.39	(1.23)	0.59	(0.82)	1.11	(1.10)	1.00	(0.92)	1.18	(1.14)
Baby or infant	0.87	(0.88)	0.89	(0.96)	0.79	(0.82)	0.71	(0.66)	0.80	(0.77)	0.95	(1.00)
Farmland												
Land allocation	0.76	(0.43)	0.54	(0.51)	0.41	(0.50)	0.89	(0.31)	0.85	(0.37)	0.82	(0.39)
Land size	0.77	(0.53)	0.46	(0.53)	0.33	(0.45)	1.54	(1.00)	0.98	(0.57)	0.89	(0.62)
Livestock holding	0.07	(0.25)	-	-	-	-	-	-	0.05	(0.22)	0.14	(0.35)
Off-farm work	0.80	(0.40)	0.89	(0.31)	0.69	(0.47)	1.00	(0.00)	0.85	(0.37)	0.73	(0.46)
Cooking wife	0.89	(0.31)	0.89	(0.31)	0.59	(0.50)	0.89	(0.31)	0.80	(0.41)	0.77	(0.43)

	Zugu					
	Mono (n=18)		Poly			
			Senior (n=27)		Junior (n=31)	
Variable	Mean	SD	Mean	SD	Mean	SD
Age						
<25	-	-	-	-	0.13	(0.34)
25-34	0.06	(0.24)	0.11	(0.32)	0.26	(0.44)
35-44	0.61	(0.50)	0.44	(0.51)	0.42	(0.50)
45-54	0.17	(0.38)	0.37	(0.49)	0.16	(0.37)
>55	0.17	(0.38)	0.07	(0.27)	0.03	(0.18)
Education						
None	1.00	(0.00)	0.96	(0.19)	0.94	(0.25)
Primary	-	-	-	-	0.06	(0.25)
Secondary	-	-	0.04	(0.19)	-	-
Child member						
Son	1.61	(1.24)	2.19	(1.44)	1.03	(1.14)
Daughter	1.17	(1.15)	1.37	(1.18)	1.13	(0.85)
Baby or infant	1.11	(1.02)	0.89	(0.80)	1.13	(0.76)
Farmland						
Land allocation	0.89	(0.32)	0.81	(0.40)	0.55	(0.51)
Land size	0.92	(0.60)	0.72	(0.47)	0.48	(0.47)
Livestock holding	-	-	-	-	-	-
Off-farm work	0.94	(0.24)	0.85	(0.36)	0.90	(0.30)
Cooking wife	0.72	(0.46)	0.89	(0.32)	0.58	(0.50)

farmland is substantially small (less than 1 acre) irrespective of marriage form. Women in study areas are mostly not involved in livestock management. Remarkably, much more women are engaging in off-farm work than men, in comparison with Table 3.1 and 3.3. Among women's different categories, polygamous junior wives, especially in Cheshegu

and Namdu communities, are significantly less likely to participate off-farm work. Across communities, polygamous junior wives are less likely to be cooking wives.

Table 3.5 shows the summary characteristics for cooking and non-cooking wife. The definition of non-cooking wife means woman who has less than two children. Note that there is a large difference in sample size: 196 cooking and 53 non-cooking wives. Cooking wives are more likely to be composed of older women while non-cooking wives are relatively younger. Educational status seems not important to become a cooking wife. Farmland is significantly more likely to be allocated to cooking wives. Consistent with the previous literature regarding the Dagomba ethnicity, off-farm labor allocation is more common among the cooking wives compared to those who are not qualified cooking-wife. The statistics indicates that livestock management is not common all women irrespective of higher family status of women.

Clear gender differences have been confirmed in labor allocation such as crop production, domestic chores, and off-farm work activities. The majority of women

Table 3.5 Summary statistics for cooking and non-cooking wife

	Cooking wife (n=196)		Non-cooking wife (n=53)	
	Mean	SD	Mean	SD
Age				
<25	0.01	(0.10)	0.19	(0.39)
25-34	0.22	(0.41)	0.32	(0.47)
35-44	0.42	(0.49)	0.21	(0.41)
45-54	0.26	(0.44)	0.17	(0.38)
>55	0.09	(0.29)	0.11	(0.32)
Education				
None	0.91	(0.28)	0.83	(0.38)
Primary school	0.06	(0.24)	0.13	(0.34)
Secondary school	0.03	(0.16)	0.04	(0.19)
Child member				
Son	2.39	(1.33)	0.32	(0.47)
Daughter	1.39	(1.14)	0.30	(0.46)
Baby or infant	1.04	(0.87)	0.38	(0.49)
Farmland				
Land allocation	0.74	(0.44)	0.60	(0.49)
Land size	0.80	(0.69)	0.66	(0.62)
Livestock holding	0.03	(0.17)	0.02	(0.14)
Off-farm work	0.84	(0.37)	0.72	(0.45)

cultivate two agricultural crops on allocated farmland; groundnut is the major crop for women and okra is secondary planted on the edge of their farmland. Conversely, a variety of crops are cultivated on men's farmland. As shown in Table 3.6, maize is the primary crop for men, while groundnut, rice, and chili are regarded as secondary or tertiary crops. Other crops such as yam, cassava, sorghum, and beans are few but planted on male's farmland. Even though not reported in the table, when divided into three villages, men in the Cheshegu community are significantly more likely to grow chili compared to other two communities. This could be explained that hence the land size in average is significantly smaller than those in other communities, commercial crop such as chili is more likely to be planted by men for market.

Table 3.6 Proportion for men's agricultural crop (%)

	Monogamous head (n=92)	Polygamous head (n=75)
Maize	98.9	100.0
Groundnut	63.0	64.0
Rice	43.5	58.7
Pepper	39.1	33.3
Yam/Cassava	8.7	6.7
Sorghum	9.8	4.0
Beans	6.5	6.7
Other crops	4.4	1.3

Table 3.7 and 3.8 indicate labor allocation for major crop production on male's and female's farmland, respectively. Each table shows the percentage about who have engaged in specific farm activity divided into 5 processes; land preparation, planting, weeding, harvest, and threshing or shelling. In Table 3.7, there are four labor sources: family labor, hired labor, machinery rent with operator, and other labor sources. For male's dominant crops seen Table 3.6, maize, groundnut, rice, and chili are selected, while women's major crops are groundnut and okra. Note that "M" and "P" in Table 3.7 stands for monogamous and polygamous males, respectively, and the sample size is shown in

Table 3.7 Proportion of labor source for agricultural production on men's plots by major crop type

	Maize		Groundnut		Rice		Chili	
	M (n=92)	P (n=75)	M (n=58)	P (n=48)	M (n=40)	P (n=44)	M (n=39)	P (n=26)
Land preparation								
Family labor	16.3	6.7	10.3	2.1	10.0	2.3	89.7	92.3
Hired labor	-	-	-	-	-	-	-	3.8
Machinery / Operator	83.7	93.3	94.8	97.9	97.5	97.7	20.5	11.5
Other labor resource	1.1	-	1.7	-	-	-	-	-
Planting								
Family labor	98.9	100.0	100.0	97.9	97.5	95.5	100.0	100.0
Hired labor	1.1	-	-	-	2.5	2.3	-	-
Machinery / Operator	-	-	-	2.1	10.0	6.8	-	-
Weeding								
Family labor	95.7	94.7	98.3	95.8	97.5	86.4	100.0	96.2
Hired labor	10.9	9.3	10.3	8.3	12.5	15.9	2.6	11.5
Machinery / Operator	3.3	-	5.2	-	-	0.0	-	-
Other labor resource	3.3	-	5.2	-	2.5	0.0	2.6	-
Harvest								
Family labor	98.9	100.0	100.0	97.0	97.5	93.2	100.0	96.2
Hired labor	5.4	2.7	41.4	33.3	17.5	18.2	5.1	11.5
Machinery / Operator	-	-	-	-	-	-	-	
Other labor resource	1.1	-	3.5	-	5.0	-	-	
Thresh/Shelling								
Family labor	98.9	98.7	94.8	91.7	80.0	90.9		
Hired labor	3.3	-	12.1	2.1	45.0	11.4		

Note: Women who have no land allocation are excluded from the sample.

the brackets. The results reveal a striking difference in labor allocation for each process by gender and crop type. Machinery rent with operator is usually applied to land preparation irrespective of sex. Male's chili production exceptionally requires family labor for almost all procedures. Family members are more likely to allocate work to male's farm than that for female. Thus, women require hired worker more than men, especially in weeding. Interestingly, for harvesting work in men's crop production, groundnut harvest is conducted by more hired labors than other crops. This trend is consistent with women's groundnut harvesting. Among women, for groundnut harvest, monogamous women are more dependent on hired labor than those in polygamous household. Okra harvesting does not require external labor irrespective women's type.

As for off-farm labor allocation, men who participate off-farm work have a single activity while women tend to engage in multiple ones. Major field for men's off-farm work is not related to agriculture, including sale or trading, straw weaving,

Table 3.8 Labor allocation in women's agricultural production (%)

Groundnut

Monogamous wife (n=72)

	Land preparation	Planting	Weeding	Harvesting	Threshing/Shelling
Family labor	4.17	70.83	41.67	100.00	98.61
Hired labor	8.33	58.33	58.33	58.33	-
Machinery/Operator	87.50	-	-	-	-
Other labor resource	-	-	-	-	1.39

Polygamous senior wife (n=52)

	Land preparation	Planting	Weeding	Harvesting	Threshing/Shelling
Family labor	-	86.54	38.46	94.23	94.23
Hired labor	7.69	25.00	61.54	28.85	-
Machinery/Operator	92.31	-	-	-	-
Other labor resource	-	-	-	-	5.77

Polygamous junior wife (n=46)

	Land preparation	Planting	Weeding	Harvesting	Threshing/Shelling
Family labor	4.35	80.43	26.09	95.65	93.48
Hired labor	6.52	30.43	73.91	26.09	-
Machinery/Operator	86.96	-	-	-	-
Other labor resource	-	-	-	-	6.52

Okra

Monogamous wife (n=62)

	Land preparation	Planting	Weeding	Harvesting
Family labor	4.84	96.77	48.39	98.39
Hired labor	6.45	3.23	43.55	-
Machinery/Operator	82.26	-	-	-
Other labor resource	6.45	3.23	8.06	1.61

Polygamous senior wife (n=52)

	Land preparation	Planting	Weeding	Harvesting
Family labor	3.85	98.08	40.38	98.08
Hired labor	9.62	1.92	59.62	-
Machinery/Operator	86.54	-	-	-
Other labor resource	-	-	-	1.92

Polygamous junior wife (n=40)

	Land preparation	Planting	Weeding	Harvesting
Family labor	7.50	95.00	20.00	97.50
Hired labor	7.50	-	75.00	-
Machinery/Operator	80.00	-	-	-
Other labor resource	5.00	5.00	5.00	2.50

Note: Women who have no land allocation are excluded from the sample.

construction, Muslim pastor, driver, and mechanics. On the other hand, agricultural off-farm work is popular for lots of women in study areas. As shown in Table 3.9, groundnut harvest is the most important agricultural off-farm work for women as seen in Photo 1, followed by rice threshing, shea nut picking in the bush, and maize harvest, respectively. Non-agricultural off-farm work activities such as hair dresser and tailor are also conducted by women, but minor especially for polygamous junior wives.

For the women who have not participated off-farm work, the survey asked the reason not to participate, as reported in Table 3.10. Their answers imply that physical and health problems are the main reasons.

Table 3.9 Contents of women's off-farm activity

	Monogamous wife (n=82)	Polygamous wife	
		Senior (n=63)	Junior (n=58)
Groundnut harvest	91.5	90.5	96.6
Rice thresh	68.3	71.4	65.5
Shea nut picking	41.5	60.3	48.3
Maize harvest	29.3	25.4	29.3
Non-agricultural work	22.0	23.8	13.8

Table 3.10 Reasons for women not to participate in off-farm work

	Monogamous wife (n=10)	Polygamous wife	
		Senior (n= 12)	Junior (n=17)
Sickness	3	3	2
Age	1	2	1
Pregnancy / maternity	3	4	11
Other reasons	3	3	3

Note: The sample of Table 3.9 is restricted to the surveyed women have participated in off-farm work.
The sample of Table 3.10 is restricted to the surveyed women who did not participate in off-farm work

Photo 1 Groundnut harvesting off-farm work

3.4 Summary and Conclusion

This study empirically explores the characteristics of intra-household resource and labor allocation by gender with special attention to the cultural backgrounds in northern Ghana. Findings suggest that there is a striking difference in each interest between men and women, as well as between the woman's family categories: household structure, wife's seniority, and traditional woman's status. Aligned with gender line and woman's family position, labor allocation also differs both for on- and off-farm work activities. Results indicate woman's traditional status of the Dagomba ethnicity – cooking wife – may have a cultural meaning for intra-household resource allocation; they get more farmland from husbands and free to engage in off-farm activities.

Difference in cropping pattern for men and women also gave an interesting insight implying the gender working role embedded in agrarian society of the Northern Ghana. Previous literature (Padmanabhan, 2007) proposed the linking concept between gendered responsibility and access to the specific crops with ideological implication of who has contributed to the meal at home. She emphasized that men are in charge of preparing staple food material while women serve a soup ingredient through her production. Consistent with this perspective, most women in this study grow two crops (groundnut and okra) for soup ingredients. Men mainly cultivate maize which is the major staple crop in north, and a variety of other crops (rice, yam, cassava, beans, and sorghum, groundnut, pepper, tomato, and garden egg). Agricultural labor distribution is characterized by gender in specific farming process.

CHAPTER IV EMPIRICAL ANALYSIS (3)

"Regression Analysis of the Relationship between Asset and Labor Allocation by Gender and Women's Attributes: Empirical Evidence of the Northern Region of Ghana"

4.1 Introduction

In the analysis of Chapter II, two main findings are obtained: 1) positive coefficient between woman's labor allocation in off-farm work and farmland allocation, and 2) polygamous wives are unlikely to allocate their labor sources to off-farm work. The results in Chapter III indicate that there are striking differences in productive asset and labor allocation by gender and woman's family position. Based on these findings, the analyses in this chapter attempted to use regression models to estimate whether the similar relationships reported in Chapter II were observed in the case of rural society in northern Ghana. The coefficient of women's productive asset on labor allocation in off-farm work was explored with special attention to the difference in female attributes (e.g. monogamous wife, polygamous senior and junior wife, and cooking wife).

Previous literature reveals that women tend to diversify their income source through multiple economic activities such as wage labor and self-employment. However, whether to allocate their labor to off-farm work is assumed to differ by women's characteristics. This might be attributed to women's different bargaining power and gender roles embedded in the cultural context. Constraints facing female farmers in social and economic aspects may lead to household food insecurity especially in sub-Saharan Africa, where female farming is prevalent (Boserup, 1970).

In study areas, as reported with statistics in Chapter III, agricultural off-farm labor is widely undertaken by female household members in all villages. Groundnut is viewed

as a woman's primary agricultural crop and female members even harvest on others' groundnut farmland as an off-farm work, which is commonly seen in study areas. In other words, some women receive external female workforce for harvest work. According to the previous literature in ethnology (Tomomatsu, 2019), it is called "*sahibu*" in the Dagbani language that a cultivator gives a part of the harvest to those who help harvest the crop. It also reports that most of the participants are women and their small children.

The main purpose of this study is to quantitatively measure the relationship of labor allocation in various off-farm work activities with particular attention to the social and traditional structures, characterized with Muslim society, patrilineage, and the Dagomba ethnic scheme in northern Ghana. The following sections are organized threefold. The data and methodology are summarized in Section 4.2, and the results are described in Section 4.3. Summary and conclusion are discussed in Section 4.4.

4.2 Data and Method

The dataset for this study was identical to the one dealt with in Chapter III, which the author had originally collected through the survey in three villages of the Northern Region of Ghana in 2017. In order to quantitatively estimate the relationship between productive asset allocation and labor allocation in various off-farm work activities for women, different regression analysis has been conducted as follows.

1) Regression analysis by gender

First of all, regression analysis has been conducted to estimate the gender difference in off-farm labor allocation. Regression estimation model is separately conducted by sex. As the explained variable is binary on whether to participate off-farm work regardless of work contents, probit estimation model is applied. Explanatory variables common to both male and female are as follows: household structure

(polygamy), women's farmland (land allocation and size), household size, household head's assets (number of cattle and sheep, size of managed upland and lowland), villages (Zugu, Namdu), age of individual, labor member (male and female), and child member. There are different categories of household children depending on the estimation by sex; the total number of children in household is applied to the estimation for the case of men, while women's regression analyses have various categories of children (wife's child and other child). The variable category of "Other child" (including "Boy" and "Girl") is defined as a boy or girl aged from 5 to 14 years old, who are not her biological son or daughter, such as adoption and grandchildren. On the other hand, the variable category of "wife's child" contains three types of children by sex and age, whose parents are the household head and his wife: 1) son, 2) daughter, and 3) baby or infant. Both wife's son and daughter are those who are aged 5 years or over and unmarried, while the variable of wife's baby or infant is restricted to those who are 0-4 years old. Moreover, for women's regression analysis, in order to explore woman's different bargaining power, explanatory dummy variables such as polygamous junior wife and cooking wife are also estimated.

2) Regression analysis for women's different off-farm work activities

As a second approach, the regression analysis is conducted by different work content for women. In study areas, as reported in Chapter III, men are less likely to have off-farm labor allocation and the most of their off-farm employments are not related to agriculture. On the other hand, engagement in off-farm work is much popular among women and agricultural off-farm work is commonly conducted across three surveyed villages, while non-agricultural off-farm work is minor. Specifically, agricultural off-farm work activities can be divided into four: 1) groundnut harvest, 2) rice threshing, 3) maize harvest, and 4) shea nut picking. Therefore, explained variables are binary whether to

have labor allocation in: 1) groundnut harvest, 2) rice threshing and maize harvest, 3) shea nut picking, and 4) other off-farm work related non-agriculture.

3) Regression analysis in household fixed effect model for polygamous women

Thirdly, household fixed effect estimation model applied to the calculation of the determinants of labor allocation in various off-farm work activities restricted to polygamous women. Because multiple wives belong to the identical household of polygamy, there might be unobservable characteristics attributed to polygamous household structure. The household fixed effect controls for unobservable factors of polygamous household. Thus, explanatory variables about individual female only remains in estimation model: cooking wife, polygamous junior wife, wife's farmland, age of wife, and the number of wife's child.

4) Regression analysis for labor recipient and provider in groundnut harvest

Lastly, bivariate probit estimation model is calculated to detect the coefficient of women's recipient and provider in groundnut harvest. As reported in Chapter III, women with farmland allocation tend to mainly cultivate groundnut in study areas. When the harvest season arrives, some women provide a labor force to the harvesting in others' groundnut farms while they get some proportion of the harvest as their wage. This study defines such woman as a labor provider and the woman who hosts labor provider in her farmland as a labor recipient. Women in study areas reciprocally play a role as a labor provider and a labor recipient by occasion. Bivariate probit estimation model is performed to estimate the coefficient between labor provider and recipient in groundnut harvest, in addition to explore other determinants as regressed in previous models. Note that women are restricted to those who have farmland allocation because they would not become labor recipient without farmland allocation.

4.3 Results

1) Regression analysis by gender

Table 4.1 and 4.2 show the estimation results of determinants of off-farm labor allocation for men and women, respectively. Regression analysis confirms polygamous marriage has no significant effect both for men and women. Men who have a large size of lowland negatively affects men's labor allocation in off-farm work while women are not significantly affected by household head's assets. People in the Cheshegu community are less likely to have labor allocation in off-farm work compared to those in the Zugu community, and to males in the Namdu. Age is not an important factor to determine off-farm labor allocation irrespective of sex. Men are less likely to have labor allocation in off-farm work in the household with a large number of adult females. Such relation is not observed in the women's off-farm labor allocation. Interestingly, women are affected by the number of their own children; a large number of daughters have a positive impact on

Table 4.1 Estimation results for the determinants of men's off-farm labor allocation (n=167)

Variables	Coef.	(S.E.)
Polygamy	0.0834	(0.27)
Women's farmland		
Whether to be allocated	-0.3808	(0.35)
Farmland size	0.0089	(0.23)
Household size	0.1994	(0.16)
Head's assets		
Number of cattle	-0.0248	(0.02)
Number of sheep	-0.0109	(0.01)
Managed upland size	-0.0150	(0.06)
Managed lowland size	-0.1362*	(0.08)
Village		
Zugu	0.4864*	(0.28)
Namdu	0.5379*	(0.29)
Age of head		
35-44	-0.1039	(0.41)
45-54	-0.2489	(0.41)
55-64	0.3700	(0.52)
65 or over	-0.3106	(0.59)
Number of labor member		
Male	-0.0537	(0.18)
Female	-0.4484**	(0.19)
Number of child member	-0.0900	(0.16)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) Number of child member equals to the total child member aged 0-14 years old in household, irrespective of parents (including adoption and grandchild).

Table 4.2 Estimation results for the determinants of women's off-farm labor allocation (n=249)

	Coef.	(S.E.)
Polygamy	-0.3990	(0.34)
Polygamous junior wife	-0.2639	(0.29)
Cooking wife	-0.0657	(0.36)
Women's farmland		
Land allocation	-0.3410	(0.38)
Farmland size	-0.0538	(0.29)
Household size	-0.0216	(0.09)
Head's assets		
Number of cattle	0.0450	(0.03)
Number of sheep	-0.0041	(0.01)
Managed upland size	0.0381	(0.06)
Managed lowland size	-0.0912	(0.08)
Village		
Zugu	0.5629*	(0.31)
Namdu	0.4903	(0.32)
Age of wife		
25-34	-0.2620	(0.50)
35-44	-0.1693	(0.54)
45-54	-0.4459	(0.58)
55 or over	-0.8940	(0.64)
Number of labor member		
Male	-0.1010	(0.11)
Female	-0.0081	(0.13)
Number of child member		
Wife's child		
Son	0.2119	(0.14)
Daughter	0.3166*	(0.18)
Baby or infant	-0.2681*	(0.16)
Other child		
Boy	0.0560	(0.14)
Girl	0.1156	(0.12)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) Other child is a 0-14 year old boy or girl living in the household, who is not wife's son or daughter, such as a foster and a grandchild.

wives' labor allocation in off-farm work activities, meanwhile a large number of baby or infant have negative effect on their off-farm labor allocation. Interestingly, the number of other boys and girls do not have any significant effect on women's off-farm labor allocation. These results may imply that daughters tend to help mothers so that wives are able to leave home. Conversely, if their own child is small, they may have difficulty in off-farm labor allocation due to child care, because childcaring is one of her major duties at home. These findings are strongly reflected by the gender working role in rural society of northern Ghana.

2) Regression analysis by women's different off-farm work activities

Table 4.3 shows the results. Household head's asset ownership has a different

effect depending on the work contents. Women who belong to the household where

Table 4.3 Estimation results for the determinants of women's off-farm labor allocation by type (n=249)

	Groundnut		Rice and Maize		Shea nut		Other off-farm work	
	Coef.	(S.E.)	Coef.	(S.E.)	Coef.	(S.E.)	Coef.	(S.E.)
Polygamy	-0.3298	(0.29)	-0.0085	(0.26)	0.2165	(0.26)	0.1474	(0.31)
Polygamous junior wife	-0.1337	(0.26)	-0.2401	(0.24)	-0.4670*	(0.24)	-0.2122	(0.28)
Cooking wife	0.1839	(0.32)	-0.2844	(0.30)	-0.2182	(0.30)	0.4199	(0.36)
Women's asset								
Land allocation	0.0266	(0.33)	0.4122	(0.29)	-0.0408	(0.29)	0.0975	(0.35)
Land size	-0.0733	(0.25)	-0.2597	(0.20)	0.1092	(0.21)	-0.0824	(0.27)
Household size	0.0089	(0.08)	0.0179	(0.07)	0.0907	(0.07)	0.0878	(0.08)
Head's assets								
Number of cattle	0.0279	(0.02)	0.0454**	(0.02)	0.0250	(0.02)	-0.0126	(0.02)
Number of sheep	0.0012	(0.01)	-0.0042	(0.01)	0.0097	(0.01)	0.0117	(0.01)
Managed upland	-0.0065	(0.06)	-0.0250	(0.05)	0.0863*	(0.05)	0.0009	(0.06)
Managed lowland	-0.1222*	(0.07)	-0.0561	(0.07)	-0.1692**	(0.07)	-0.1310	(0.09)
Village								
Zugu	0.6690**	(0.27)	-0.0007	(0.24)	0.5764**	(0.25)	-0.6976**	(0.29)
Namdu	0.8827***	(0.29)	0.7031***	(0.26)	0.2027	(0.25)	-0.5084*	(0.29)
Age of wife								
25-34	0.4412	(0.41)	0.5617	(0.41)	0.5670	(0.47)	-1.3854***	(0.44)
35-44	0.5891	(0.44)	0.6701	(0.42)	0.7234	(0.48)	-1.1649***	(0.45)
45-54	0.4462	(0.48)	0.7390	(0.46)	0.7964	(0.50)	-0.7906*	(0.48)
55-64	-0.3758	(0.53)	-0.1266	(0.51)	0.2673	(0.58)	-0.6616	(0.53)
Number of labor member								
Male	-0.0669	(0.10)	-0.0090	(0.09)	-0.1524	(0.09)	-0.0095	(0.11)
Female	-0.0714	(0.11)	-0.0855	(0.10)	0.0251	(0.10)	-0.0151	(0.12)
Number of child member								
Wife's child								
Son	0.0025	(0.12)	-0.0212	(0.10)	0.0893	(0.10)	-0.1213	(0.12)
Daughter	0.1298	(0.14)	0.0674	(0.12)	-0.2010	(0.13)	0.0312	(0.14)
Baby or infant	-0.3280**	(0.14)	-0.2248*	(0.13)	-0.0039	(0.13)	-0.0749	(0.14)
Other child member								
Boy	-0.0401	(0.12)	-0.0510	(0.11)	-0.1455	(0.11)	-0.1986	(0.13)
Girl	0.0587	(0.11)	0.0214	(0.10)	-0.1955*	(0.10)	-0.0741	(0.11)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) Other child is a 0-14 year old boy or girl living in the household, who is not wife's son or daughter, such as a foster and a grandchild.

family heads own a large number of cattle are more likely to have labor allocation in rice threshing and maize harvest, while groundnut harvest and shea nut picking are not affected by such factor. As for the size of lowland household heads manage, women's groundnut harvest and shea nut picking are negatively affected. There is a great heterogeneity in off-farm labor allocation by village and work type. Especially in groundnut harvesting work, women in the Cheshegu community are less likely to have labor allocation than those in other villages. This can be attributed to that land allocation

for women is significantly small (see in Chapter III), and the number of women who cultivate groundnut is also smaller than those in other villages. As previously shown in Table 3.2, the average size of farmland is substantially small in the Cheshegu village compared to other villages, because this community is located near neighbor villages and is susceptible to land pressure. Therefore, the farmland is basically not abundant in the Cheshegu village. Negative coefficient with age (younger than 25 years old is base) and labor allocation in other off-farm work (fourth column) is detected. Regarding the number of wife's children, a large number of woman's own baby or infant negatively affects groundnut, rice, and maize harvest. These results confirm the different factors influencing each off-farm labor allocation and emphasize the connection between labor allocation and gender role; the presence of small children reduces the participation rate of women in harvesting work.

3) Regression analysis only for polygamous women in household fixed effect model

Table 4.4 shows the estimation results in household fixed effect model for polygamous wives. Cooking wife has a positive effect only on groundnut harvesting off-farm work, which is the most major off-farm work in study areas. On the contrary, wife's seniority has no significant coefficient with off-farm work labor allocation. These findings highlight the striking importance of child delivery experience among polygamous women. However, polygamous women who currently feed own baby or infant are less likely to have labor allocation in groundnut harvest work. These results suggest that though it might be difficult to engage in off-farm work while the child is small, they are more likely to participate in groundnut off-farm work as the child grows.

Table 4.4 Estimation results in household fixed effect model for polygamous wives (n=157)

	Groundnut harvest		Rice and Maize		Shea nut picking		Other off-farm work	
	Coef.	(S.E.)	Coef.	(S.E.)	Coef.	(S.E.)	Coef.	(S.E.)
Cooking wife	0.2706*	(0.15)	-0.0757	(0.17)	0.2170	(0.17)	-0.0685	(0.15)
Polygamous junior wife	-0.0028	(0.10)	-0.0217	(0.12)	-0.0950	(0.12)	-0.0340	(0.10)
Women's asset								
Land allocation	0.3716	(0.29)	0.5285	(0.33)	-0.1681	(0.32)	-0.3949	(0.29)
Land size	-0.0683	(0.21)	-0.1443	(0.24)	0.3746	(0.24)	0.1774	(0.21)
Age if wife								
25-34	0.1461	(0.23)	0.4400	(0.26)	0.1986	(0.26)	-0.1249	(0.23)
35-44	0.3029	(0.30)	0.4893	(0.34)	0.2378	(0.34)	-0.0429	(0.30)
45-54	-0.0289	(0.41)	0.2988	(0.47)	0.3117	(0.46)	0.0135	(0.41)
55-64	-0.4809	(0.58)	0.1889	(0.65)	-0.4035	(0.65)	0.5010	(0.57)
Number of wife's child								
Son	-0.0269	(0.05)	-0.0032	(0.06)	-0.0119	(0.06)	-0.0070	(0.05)
Daughter	-0.0131	(0.07)	0.0336	(0.08)	-0.0539	(0.08)	0.0774	(0.07)
Baby or infant	-0.1267*	(0.07)	-0.0293	(0.07)	-0.0480	(0.07)	0.0196	(0.07)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.

4) Regression analysis for labor recipient and provider for groundnut harvest

Table 4.5 shows the estimation results in bivariate probit model to examine the relationship between labor recipient and provider in women's groundnut harvesting off-farm work. The results confirm that there is no significant coefficient between labor recipient and provider; whether to provide or accept labor source is not symmetrically determined. The striking differences are observed in the factors influencing labor recipient and provider. Polygamous wives and cooking wives are less likely to receive external labor to their groundnut farm for harvest than monogamous wives and non-cooking wives, respectively. The village dummy reveals that women in the Cheshegu community are more likely to receive external labor force while they are less likely to perform as a labor provider on others' groundnut harvest. However, these results may be due to the restriction of sample; many wives in the Cheshegu community have no land allocation compared to those in other communities, thus, such women are excluded from the estimation model. The number of wife's baby or infant has a positive impact on receiving other labor source for groundnut harvest. This result implies that women who

Table 4.5 Estimation results in bivariate probit model for women's labor recipient and provider (n=177)

	Recipient		Provider	
	Coef.	(S.E.)	Coef.	(S.E.)
Polygamy	-0.8715**	(0.37)	-0.2156	(0.36)
Cooking wife	-0.7789*	(0.44)	0.0146	(0.44)
Women's asset				
Land allocation	-0.0961	(0.23)	-0.1128	(0.27)
Land size	-0.2474	(0.36)	-0.0849	(0.34)
Household size	-0.0041	(0.10)	-0.0376	(0.10)
Head's assets				
Number of cattle	-0.0153	(0.03)	0.0442	(0.03)
Number of sheep	-0.0169	(0.01)	-0.0010	(0.01)
Managed upland size	0.0288	(0.06)	-0.0063	(0.06)
Managed lowland size	-0.0596	(0.08)	-0.0995	(0.09)
Village				
Zugu	-2.0768***	(0.36)	0.6674**	(0.33)
Namdu	-1.0213***	(0.30)	1.0548***	(0.35)
Age if wife				
25-34	-0.8047	(0.78)	-0.0214	(0.80)
35-44	-0.5057	(0.77)	-0.1242	(0.77)
45-54	-0.6652	(0.79)	0.0712	(0.79)
55-64	-0.1966	(0.81)	-0.9589	(0.78)
Number of labor member				
Male	-0.0768	(0.12)	0.0182	(0.12)
Female	0.1832	(0.13)	-0.0908	(0.14)
Number of child member				
Wife's child				
Son	0.0521	(0.15)	-0.0141	(0.15)
Daughter	0.1869	(0.17)	0.3267*	(0.19)
Baby or infant	0.2957*	(0.17)	-0.2287	(0.17)
Other child				
Boy	-0.0221	(0.16)	-0.0199	(0.16)
Girl	-0.0535	(0.14)	0.1875	(0.13)

Note: 1) *, ** and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively.
2) The sampled women are restricted to those who have land allocation in the household.

feed and care for their children are more likely to invite labor provider from other household. Interestingly, if the women have more own daughters in household, they tend to visit other women's farming plot to harvest groundnut as a labor provider. Since such significance is not observed in the factor of other child, the results suggest the importance of women's own daughter to engage in off-farm work in study areas.

4.4 Summary and Conclusion

This study empirically investigates the determinants of labor allocation in off-farm work with use of gender disaggregated dataset collected by the author in rural northern Ghana. Difference in the determinants of off-farm labor allocation is confirmed

by gender and women's position. Men are affected by labor family member while women are influenced by the number of daughter and small children. Compared to the results in Chapter II, women's productive asset allocation has no significant effect on their off-farm labor allocation in northern Ghana. These results can be attributed to the mechanism of asset attainment; northern men in patriarchal society has a substantial power over resource allocation and women cannot stress out their rights. Thus, women's asset allocation may be less likely to represent their bargaining power in rural settings of northern Ghana. Instead, in the context of the Dagomba ethnicity, the traditional family status for woman of "cooking wife" may especially entitle only polygamous women more bargaining power. However, the cooking wife's status has no significant effect on other women. Therefore, the results of this study imply small impact of cooking wife in labor allocation, which is inconsistent with the previous literature (Warner, et al, 1997; Padmanabhan, 2007). The impact of the determinants diversifies when estimated by the type of women's major jobs; a striking heterogeneity is confirmed by village. Each village has a different locational setting such as distance from the main road, access to the market, and the land size in the community. Intra-household labor allocation can be affected by these background features of community.

Regarding women's labor exchange over groundnut harvesting off-farm work, polygamous women are less likely to be a labor recipient. Previous literature mentions that polygamous marriage itself is a living strategy by providing a rich workforce in agricultural production (Boserup, 1970). Moreover, risk diversification can be accomplished within household through allocating farmland to multiple wives. Thus, polygamous women may have lower incentive to share the crop with outside women, as shown in Table 4.5 by a negative coefficient between polygamous wives and labor

recipient. Hayami (2000) interprets that sharing the work and farming output with others can greatly reduce the risk where the production risks are high. Peasants who are susceptible to the risk and shock are more likely to participate in labor exchange. However, the results of bivariate probit model suggest that labor exchanging in groundnut harvest is not completely reciprocal in study areas. Women might have ambiguous contracts based on anticipation that recipient would get reward for labor acceptance one day in the future when their crop yield is scarce. Such relationship is also seen in the labor exchange of "yui" in rural Japan (Asami, 2006). Moreover, since child feeding is one of the major duties for women, whether they have small child affects to be labor recipient. As the results show, women with more daughters in household may have an advantage in off-farm work engagement with the help by daughters. In addition, the previous literature in folklore reports the complex features of "*sahibu*" (Tomomatsu, 2019); to harvest on men's and women's farmland has a different system where women can work on men's farmland without invitation while harvesting on women's farmland requires the cultivator's invitation. However, the dataset has no information about when and how often the woman works on which farmland, and whether the daughter is helping with housework. The author's dataset does not cover such detailed information of "*sahibu*"; the data only contains information of whether the respondent has received or provided labor force through off-farm harvesting work. Thus, the relationship between labor recipient and provider in groundnut harvest cannot be further analyzed using the current data.

CHAPTER V EMPIRICAL ANALYSIS (4)

"Exploring the Relationship between Decision-Making Power and Family Position of Rural Women in Northern Ghana"

5.1 Introduction

The unitary household model emphasizes that the household works as a single substance (Becker, 1965, 1981). In this model, a representative household head maximizes household utility with use of pooled resources and income at home. However, a number of economists argue this model; Haddad et al. (1997) suggest that understanding intra-household behavior by individual family member will lead to better policy making. Then, the household collective models have been proposed (Chiappori, 1988, 1992, 1997). It is assumed that each household member has specific preference and the outcome is assumed to be Pareto-efficient under household collective models. Households are indeed constituted of multiple actors with different abilities and various preferences.

In household, not only consumption and expenditure, but also various outcomes such as labor allocation, property ownership, child's education and health, family planning, and domestic violence arise from negotiations by family members in different positions. Previous literature indicates that those outcomes described above are correlated with each other; for example, women in Bangladesh have lower risks of violence if they have better education, higher socioeconomic status, non-Muslim religion, and extended family residence (Koenig, 2003). The matrilineal kinship system is common in the southern Ghana. Evidence from the Democratic Republic of Congo indicates that matriarchy increases women's support from their own kin groups, and husbands have less decision-making power over the wives, compared to polygamous wives (Lowes, 2017).

Moreover, the study illustrates that children of matrilineal wives are healthier and better educated, and women experience less domestic violence relative to polygamous women.

In the study areas, there are both monogamous and polygamous households in the same community under patriarchal Islamic society. A variety of women are present in study areas, such as monogamous and polygamous wives. Moreover, within polygamous family, multiple wives such as senior and junior wives share the housework and home consumption. Junior wives often work as the capacity of a servant for the first wife, unless it happens to be a love match (Boserup, 1970). Therefore, the women's position may differ depending on the wife's seniority in polygamy.

In the Dagomba tribal tradition, cooking wife, who has more than one child, is regarded to be entitled with a higher family position compared to other women (M. W. Warner, et al, 1997; Padmanabhan, 2007). Specifically, cooking wives are less responsible for preparing meals at home and can easily find time for economic activity. Such women may have a different decision-making power and behavior from other women because of better economic opportunities.

This study provides the insights on power relationship of family member through investigating the intra-household decision-making especially by different women's position, as an empirical evidence in northern Ghana. In the study areas of the author's survey, as already reported in Chapter III, men and women have different characteristics in access to agricultural resources and economic opportunities by household structure and woman's position. Moreover, the analysis in Chapter IV confirms that there are different roles between men and women within family. This study explicitly pays attention to the differences in women's family positions: monogamous wives, polygamous wives (seniors and juniors), and cooking wives. Remaining part is composed as follows. Section 2

introduces the data and analytical approach. Results are described in Section 3 constituted of two sub parts. First, the results concerned with gender difference, household structure, wife's seniority within polygamous household are reported in (1) of Section 3. Then, in (2), the same calculations as reported in (1) were conducted targeting on the difference between cooking wife and non-cooking wife. In the end, the summary and conclusion are discussed in Section 4.

5.2 Data and method

The sex-disaggregated dataset collected in northern Ghana was used for this research. As attached in Appendix, the questionnaire includes the questions on decision-making over crop revenue: 1) the purpose of using crops, 2) the purpose of income use derived from crop sale, and 3) who is the most responsible for use of crop income. These outcomes are assumed to be reflected by gender role and power balance between men and women over crop production. In study areas, lots of women are participating in agricultural off-farm work and acquire crop harvest. Thus, it was also investigated on how such women use crop and income though off-farm work, in order to compare with activities from their own farming.

As another channels implying women's power relationship with men in the household, the survey interviewed both male and female respondents on domestic troubles, family planning, and attitudes toward spouse. The question items were created with reference to the LSMS dataset of Ghana (Even though the LSMS dataset contains the similar sections, all variables in the section are not available due to many missing values). As seen in the attached questionnaire, both men and women were separately interviewed on whether physical violence and quarrel had occurred in the last 30 days. In order to investigate gender difference on family planning, the author separately

investigated both males and females on whether contraceptives are being implemented, and how individuals are aware of contraception. There are eleven situational questions for investigating household decision-making power toward spouse. This study explores the relationship between decision-making power and different wife's position, by dividing into each group of individuals in cross tabulation.

5.3 Results

1）Difference by gender, household structure, and wife's seniority in polygamy

Table 5.1 and 5.2 show the use of men's and women's crops produced from individual plots: home consumption or sale. Note that crop use is overlapped if she or he both sells and consumes crops at home. Clear trends are observed by crop type both for men and women. In the case of male agriculture, maize is mostly consumed at home, and this feature is more evident in polygamous household. On the other hand, groundnut and pepper are like cash crops on male's farming. Rice is almost equally for the market and home consumption, especially for monogamous household heads.

Regarding women's agricultural production, there are two major crops: groundnut and okra. Groundnut is not only consumed at home, but also sold at market. On the other hand, okra is mostly consumed at home. This clear difference in the use of groundnut and okra can be attributed to the scale of farming; okra is normally planted as a secondary crop on the edge of a groundnut farm. Monogamous wives are more likely to sell groundnut at market, which accounts for around 80% of them.

Table 5.1 Crop use of men's agricultural production (%)

Crop name	Monogamous head	Polygamous head
Maize	(n=92)	(n=75)
Home consumption	100.0	100.0
Sale	42.9	17.3
Groundnut	(n=58)	(n=48)
Home consumption	37.9	31.3
Sale	91.4	97.9
Rice	(n=40)	(n=44)
Home consumption	90.0	75.0
Sale	95.0	100.0
Pepper	(n=36)	(n=25)
Home consumption	-	4.0
Sale	100.0	100.0

Note: Sample size is restricted to the man who cultivates each crop.

Table 5.2 Crop use of women's agricultural production (%)

Crop name	Monogamous wife	Polygamous seniors	Polygamous juniors
Groundnut	(n=72)	(n=52)	(n=46)
Home consumption	100.0	96.2	97.8
Sale	79.2	50.0	54.3
Unknown	4.2	-	-
Okra	(n=62)	(n=52)	(n=40)
Home consumption	95.2	98.1	95.0
Sale	3.2	7.7	2.5

Note: Each sample size is restricted to the woman who cultivates groundnut and okra, respectively.

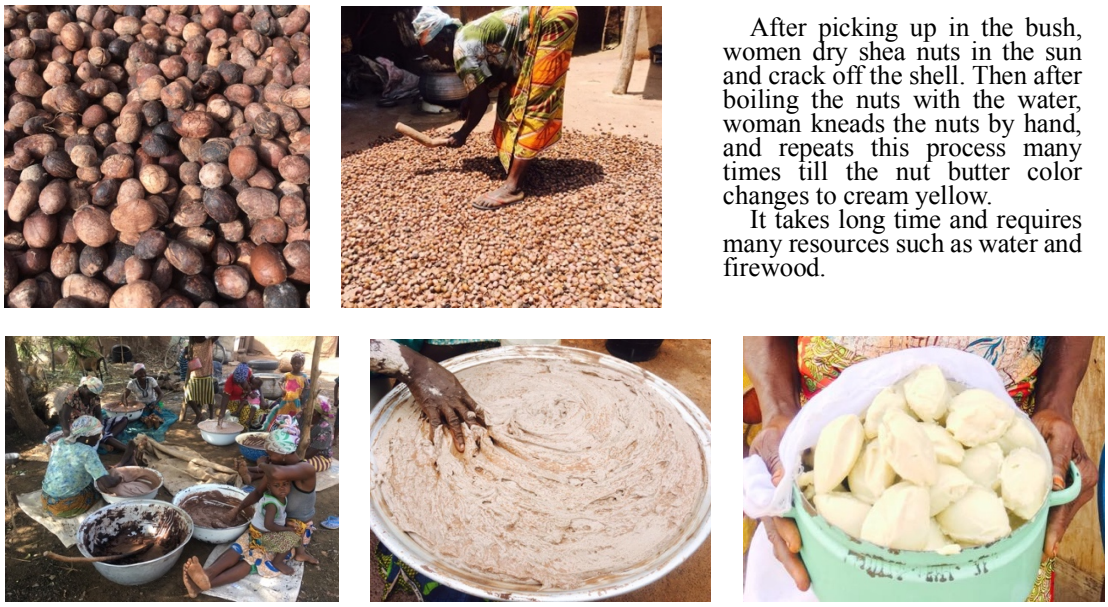
Most of women in study areas obtain agricultural crops through off-farm work activities for home consumption or sale at market as supplements to their own crop. There are four typical agricultural off-farm activities conducted by women in study areas: groundnut harvest, rice threshing, shea nut picking, and maize harvest. The survey interviewed women participating in such work on how to use the crops, as summarized in Table 5.3. Most crops are used for both home consumption and sale, though there is a trend by crop type. For example, shea nut is more likely to be for sale while groundnut is mainly consumed at home. Although women do not cultivate rice and maize on their

allocated farmland, they obtain them through off- farm work for both home consumption and sale. Shea nut is market oriented, but monogamous women are more likely to consume at home. Shea nuts are processed into shea butter by women to make cooking oils and skin creams as seen Photo 2.

Table 5.3 Crop use of women's agricultural off-farm work (%)

Off-farm work	Monogamous wife	Polygamous seniors	Polygamous juniors
Groundnut harvest	(n=75)	(n=57)	(n=56)
Home consumption	86.7	79.0	85.7
Sale	68.0	56.1	53.6
Rice threshing	(n=56)	(n=45)	(n=38)
Home consumption	83.9	64.4	79.0
Sale	71.4	66.7	57.9
Shea nut picking	(n=34)	(n=38)	(n=28)
Home consumption	61.8	42.1	46.4
Sale	97.1	81.6	82.3
Maize harvest	(n=24)	(n=16)	(n=17)
Home consumption	91.7	87.5	52.9
Sale	45.8	37.5	70.6

Note: Each sample size is restricted to the woman who works for specific off-farm work.



After picking up in the bush, women dry shea nuts in the sun and crack off the shell. Then after boiling the nuts with the water, woman kneads the nuts by hand, and repeats this process many times till the nut butter color changes to cream yellow.

It takes long time and requires many resources such as water and firewood.

Photo 2 Shea butter processing by woman

Table 5.4 and 5.5 show how the men and women have spent their income derived from agricultural production, and Table 5.6 indicates women's income from agricultural off-farm work. Note that the sample size for these three tables is limited to the individuals selling their products at market. The results turn out that there are striking gender differences in income use. Men tend to use their income for family welfare such as medicine and medical treatment. Crop production and child education are also included in men's major spending. Especially monogamous household heads are more likely to spend their income for crop production than those in polygamy. The costs of purchasing food, livestock, and social events are also supported by income from men's agriculture. Men use their income for various purposes, such as personal needs and emergency savings; these are summarized in one variable "Others" in Table 5.4.

Table 5.4 Income use of men's crop production (%)

	Monogamous head (n=90)	Polygamous head (n=73)
Buy food	34.4	35.6
Crop production	63.3	39.7
Education for child	52.2	57.5
Family health	85.6	89.0
Social events	12.2	17.8
Livestock purchase	17.8	15.1
Others	50.0	39.7

Note: Sample size is restricted to the household head who sells his crops.

Table 5.5 Income use of women's crop production (%)

	Monogamous wife (n=56)	Polygamous seniors (n=27)	Polygamous juniors (n=26)
Buy food	91.1	63.0	80.8
Crop production	21.4	25.9	26.9
Child education	46.4	37.0	26.9
Others	10.7	11.1	7.7

Note: Sample size is restricted to the wife who sells her crops

Table 5.6 Income use of women's agricultural off-farm work (%)

	Monogamous wife (n=62)	Polygamous seniors (n=49)	Polygamous juniors (n=43)
Buy food	90.3	91.8	81.4
Crop production	12.9	24.5	18.6
Child education	59.7	51.0	34.9
Business capital	8.1	2.0	7.0
Others	19.4	4.1	16.3

Note: Sample size is restricted to the wife who works for off-farm work and sells her crops.

On the other hand, regarding women's income use, they mostly spend on meeting basic needs for family, such as buying food materials for home cooking, followed by child education. The general trends of women's income use are similar for all women, regardless of the income source from on- and off-farm work. Given a large difference in the scale of agriculture between men and women, women may supplement their income by engaging in agricultural off-farm work activities. Women, as well as men, pay their own agricultural production costs by themselves, which includes purchasing seeds and paying machine rent. Only income from agricultural off-farm work applies to their business capital and investments.

Use rights for crop income is summarized in Table 5.7 and 5.8. Each table indicates the percentage of whether and who has been involved in decision-making on men's and women's crop income use, respectively. In case men and women jointly have the right to use income, "Joint" applies in tables. For men's crop income, the majority of men solely decide on how to use it, while women rarely get involved on men's income use; only 1% of monogamous households have a joint responsibility with men and women for the use of men's agricultural income. Conversely, in the case of women's crop income, the single use right by male household head rarely occurs on women's income, and many wives have primary responsibility for their income use. This trend is remarkable for

Table 5.7 Use rights for crop income from men's agricultural production (%)

	Monogamous head (n=90)	Polygamous head (n=73)
Head	98.9	100
Joint	1.1	-

Table 5.8 Use rights for crop income from women's agricultural production (%)

	Monogamous wife (n=56)	Polygamous seniors (n=26)	Polygamous juniors (n=26)
Head	5.4	-	3.9
Wife	41.0	65.4	76.9
Joint	53.6	30.8	19.2
Unknown	-	3.8	-

polygamous wives; more than a half of polygamous women are in charge of their income use while only around 40 percent of monogamous women are solely responsible for the agricultural income use. Moreover, within polygamous household, surprisingly junior wives are more likely to have sole decision-making on her crop income than senior wives. These results clearly show that the trend in women's income use right is quite opposite to that in farmland allocation reported in Chapter III. On the other hand, joint use rights for women's income is more common among monogamous women. Polygamous junior wives are least likely to have joint use right over their income compared to other wives. Considering a striking difference in women's farmland access by household structure and women's position shown in Chapter III, these results may suggest that the impact of women's asset allocation less affect their economic decision-making power toward husband.

Table 5.9 and 5.10 summarize whether the household has spousal troubles and birth control by household structure, separately reported from both men and women in the survey. The bottom row of two tables summarizes individual perceptions of contraception. Regarding the spousal troubles, the results show a clear gender gap. More women reported family troubles with their husband in the past, including both physical violence and quarrel, compared to men. In particular, monogamous household heads reported no physical violence before, while 12 percent of monogamous wives answered the troubles. There is also a huge gap in the reports of quarrel between men and women irrespective of marriage forms.

Table 5.9 Report of spousal troubles and family planning (%)

		Monogamous household (n=92)	
Contents	Answer	Head	Wife
1) Physical violence with spouses in the last 30days	Yes	0	12.0
2) Quarrel with spouses in the last 30 days	Yes	8.7	37.0
3) Having birth control	Yes	18.5	7.6
4) Recognition of the need for contraception	Not needed	14.4	4.4
	Needed	46.7	91.3
	Neutral	38.9	1.1
	Unknown	-	3.3

Table 5.10 Report of spousal troubles and family planning (%)

	Answer	Polygamous household (n=75)		
		Head (n=75)	Wife	
Contents			Senior (n=75)	Junior (n=82)
1) Physical violence with spouses in the last 30days	Yes	4.0	10.7	7.3
2) Quarrel with spouses in the last 30 days	Yes	9.3	46.7	37.8
3) Having birth control	Yes	17.3	13.3	17.1
4) Recognition of the need for contraception	Not needed	14.7	2.7	3.7
	Needed	38.7	82.7	90.2
	Neutral	45.3	13.3	4.9
	Unknown	1.3	1.3	1.2

As for family planning, the survey has found that villagers generally do not have birth control. However, the answer reveals that many wives feel the need for contraception more than men. Most men report that contraception is “needed” or “neutral”. Given the fact that birth control is not common in the villages, there is a huge gap between reality and people’s awareness. Taken women’s wish for contraception into account, the fact women’s opinions over contraception rarely lead to the actual family planning may imply the women’s weak decision-making power even in the aspect of family planning, irrespective of women’s position.

Table 5.11 and 5.12 indicate the reports in nine case situations regarding decision-making and attitudes toward spouse, separately answered by men and women from each household. The answers to the first and second question show that women in monogamy are more likely to insist their involvement in important decision-making and rights to express their opinions in household, compared to those in polygamy. However, when looking at the third question's answer, the majority of wives agree to be beaten by their husbands in order to keep family peace, irrespective of marriage types. These results may

Table 5.11 Household decision-making and attitude between household head and wife in monogamy (%)

		Monogamous household (n=92)	
		Head	Wife
1) The important decision in the family should be made only by the male family member?	Agree	26.1	6.5
	Disagree	73.9	92.4
	Neutral	-	1.1
2) A wife has a right to express her opinion even when she disagree with what her husband is saying?	Agree	84.8	89.1
	Disagree	15.2	10.9
	Neutral	-	-
3) A wife should tolerate being beaten by her husband in order to keep the family together?	Agree	37.0	88.0
	Disagree	59.8	8.7
	Neutral	2.2	1.1
	Unknown	1.1	2.2
4) It is better to send a son to school than it is to send a daughter?	Agree	10.9	4.4
	Disagree	31.5	25.0
	Neutral	57.6	70.7
5) (For men) A wife should stay at home for working household rather than working out of house	Agree	7.6	-
	Disagree	91.3	
	Neutral	-	
	Unknown	1.1	
5) (For women) Will you accept it if your husband wants you to stay at home for housework not to engage in business out of house?	Agree		76.1
	Disagree	-	23.9
	Neutral		-
6) When a wife has earned some money she has the right to spend on herself or her children without asking her husband?	Agree	35.9	9.8
	Disagree	62.0	89.1
	Neutral	1.1	1.1
	Unknown	1.1	-
7) A wife is correct in refusing to have sex with her husband when she knows her husband has sex with other women?	Agree	69.6	21.7
	Disagree	30.4	75.0
	Neutral	-	2.2
	Unknown	-	1.1
8) If a wife refuses sex, is it correct for her husband to withhold money from her?	Agree	58.7	78.3
	Disagree	41.3	18.5
	Neutral		2.2
	Unknown		1.1
9) If a wife refuses sex, is it correct for her husband to beat her?	Agree	45.7	80.4
	Disagree	52.2	16.3
	Neutral	2.2	1.1
	Unknown	-	2.2

Table 5.12 Household decision-making and attitude between household head and wife in polygamy (%)

		Polygamous household (n=75)		
	Answer	Head (n=75)	Wife	
			Senior (n=75)	Junior (n=82)
1) The important decision in the family should be made only by the male family member?	Agree	13.3	41.3	35.4
	Disagree	85.3	58.7	61.0
	Neutral	-	-	-
	Unknown	1.3	-	3.7
2) A wife has a right to express her opinion even when she disagree with what her husband is saying?	Agree	86.7	70.7	67.1
	Disagree	13.3	29.3	32.9
	Neutral	-	-	-
3) A wife should tolerate being beaten by her husband in order to keep the family together?	Agree	37.3	94.7	92.7
	Disagree	60.0	4.0	7.3
	Neutral	1.3	-	-
	Unknown	1.3	1.3	-
4) It is better to send a son to school than it is to send a daughter?	Agree	24.0	4.0	6.1
	Disagree	32.0	34.7	37.8
	Neutral	44.0	61.3	54.9
	Unknown	-	-	1.2
5) (For men) A wife should stay at home for working household rather than working out of house	Agree	16.0		
	Disagree	82.7	-	-
	Neutral	1.3		
5) (For women) Will you accept it if your husband wants you to stay at home for housework not to engage in business out of house?	Agree	-	66.7	73.17
	Disagree		30.7	25.61
	Neutral		2.7	1.22
6) When a wife has earned some money she has the right to spend on herself or her children without asking her husband?	Agree	41.3	37.3	20.7
	Disagree	58.7	61.3	85.3
	Neutral	-	-	-
	Unknown	-	1.3	1.2
7) A wife is correct in refusing to have sex with her husband when she knows her husband has sex with other women?	Agree	69.3	32.0	32.9
	Disagree	29.3	66.7	64.6
	Neutral	1.3	-	-
	Unknown	-	1.3	2.4
8) If a wife refuses sex, is it correct for her husband to withhold money from her?	Agree	74.7	68.0	69.5
	Disagree	22.7	28.0	30.5
	Neutral	1.3	2.7	-
	Unknown	1.3	1.3	-
9) If a wife refuses sex, is it correct for her husband to beat her?	Agree	45.7	69.3	76.8
	Disagree	52.2	29.3	23.2
	Neutral	2.2	-	-
	Unknown		1.3	-

imply a striking gender gap in power balance between spouses. As for sending a son to school rather than a daughter, both men and women have neutral ideas. In comparison with only disagreement and agreement, many men and women disagree to send a son instead of a daughter. Regarding wife's engagement in off-farm business, most men want their wives to work outside in addition to housework. These answers may reflect that men consider women as labor resources (Boserup, 1970). On women's side, most women

accept husband's order to stay at home instead of working outside. In the answer to the sixth question, regarding women's income spending, both men and women feel that wives should ask for husband's permission. Of particular note is that women are more likely to disagree to spend her money without husband's permission, compared to men. Questions from seventh to ninth are related to sexual relationship with spouse. The answers to these questions reveal a shocking gender gap implying women's lower position between spouse; regardless of women's position, women believe that sex refusal to her or the husband should not be accepted in any case, more than men. According to the previous literature in rural Ghana (Awusado-Asare et al., 1993), sexual intercourse with husband is a marital duty for women. In other words, women should not in any occasion reject sexual requests by her or the husband, otherwise, women's refusal could lead to divorce. Divorced women are very vulnerable, especially under patriarchy where women are at a disadvantage for resource accumulation. Thus, the results may imply that women in study areas are significantly obedient to their husbands, with small decision-making power irrespective of women's type.

2) Difference by the traditional women's status "cooking wife"

The concept of "cooking wife" is a very unique women's status in the Dagomba ethnic group. The Dagomba people assume that women with multiple children are in a higher status at home. In this study, the author set the non-cooking wife with no or one child, as a comparison group with cooking wife. Aligned with the order of the tables' contents reported in the previous sub part, the cross tabulations were calculated on each topic in order to estimate a difference in family position between the cooking wife and the non-cooking wife. Note that the sample size of the cooking wife (n=196) is significantly larger than that of the non-cooking wife (n=53).

Table 5.13 shows the use of women's crops produced from individual plots, while how to use the crops derived from off-farm work is summarized in Table 5.14. There is no significant difference between the cooking and the non-cooking wives in the use of groundnut and okra production. Crops from off-farm work are mostly consumed at home except shea nut, irrespective of women's types.

Table 5.13 Crop use of the cooking and the non-cooking wives' agricultural production (%)

Crop name	Cooking wife	Non-cooking wife
Groundnut	(n=138)	(n=32)
Home consumption	97.8	100.0
Sale	60.1	75.0
Unknown	2.2	-
Okra	(n=125)	(n=29)
Home consumption	95.2	100.0
Sale	4.8	3.5

Table 5.14 Crop use of the cooking and the non-cooking wives' agricultural off-farm work (%)

Name of off-farm work	Cooking wife	Non-cooking wife
Groundnut harvest	(n=151)	(n=37)
Home consumption	84.1	83.8
Sale	59.6	62.2
Rice threshing	(n=107)	(n=32)
Home consumption	76.6	75.0
Sale	69.2	56.3
Shea nut picking	(n=80)	(n=20)
Home consumption	50.0	50.0
Sale	90.0	85.0
Maize harvest	(n=42)	(n=15)
Home consumption	85.7	60.0
Sale	45.2	66.7

Table 5.15 and Table 5.16 show how the cooking and the non-cooking wives use their crop income derived from farming and off-farming, respectively. Results turn out that the cooking wives are more likely to spend their income both from own farming and

off-farm work on child education than the non-cooking wives. These results can be attributed to the fact that the cooking wives have more children than the non-cooking wives. According to the traditional concept of the Dagomba tribe, cooking wife is believed to have less responsibility for cooking and sometimes they can be free from preparing meals. However, the results show that they still spend most of their income for food purchase.

Table 5.15 Income use of the cooking and the non-cooking wives' agricultural production (%)

	Cooking wife (n=85)	Non-cooking wife (n=24)
Buy food	82.35	79.17
Crop production	22.35	29.17
Education for children	42.35	29.17
Others	9.41	12.5

Note: Sample size is restricted to the wife who sells her crops

Table 5.16 Income use of off-farm work for the cooking and the non-cooking wives (%)

	Cooking wife (n= 124)	Non-cooking wife (n= 30)
Buy food	90.32	80
Crop production	16.13	26.67
Education for children	52.42	40
Business capital	4.84	10
Others	12.1	20

Table 5.17 indicates the use rights for women's income derived from agricultural production on their allocated plot. There is no distinct difference in income use right between the cooking and the non-cooking wives, which differs from the case in

Table 5.17 Use rights for crop income from women's agricultural production (%)

	Cooking wife (n=85)	Non-cooking wife (n=24)
Head	3.5	4.2
Wife	55.3	54.2
Joint	38.8	41.7
Unknown	2.4	-

comparison with household structure and wife's seniority, reported in Table 5.8. More than a half of women in both groups have an individual use right over income. Joint right for income use by men and women is equally common irrespective of groups, accounting for around 40%.

Table 5.18 and Table 5.19 show the percentage of domestic troubles and family planning, and decision-making and the attitudes toward husbands, respectively. As seen in Table 5.18, both of the cooking and the non-cooking wives feel that contraception is needed, however, having birth control is very low in reality. These results suggest that women, irrespective of women's position, are less likely to express their opinion against husband. Such inferiority of women to men is also well reflected in the results of Table 5.19. The majority of women tend to accept punishment by their husbands for family, regardless of their positions. Previous analysis in Chapter V shows that the cooking wives are more likely to have labor allocation in groundnut harvesting work than other women. Thus, women's position as a cooking wife may differ among women, however, it rarely influences the power relationship between husband.

Table 5.18 Report of spousal troubles and family planning (%)

Contents	Answer	Cooking wife (n=196)	Non-cooking wife (n=53)
1) Physical violence with spouses in the last 30days	Yes	11.3	7.6
2) Quarrel with spouses in the last 30 days	Yes	45.4	35.9
3) Having birth control	Yes	13.3	11.3
4) Opinion toward contraception	Not needed	3.57	3.77
	Needed	87.76	90.57
	Neutral	6.12	5.66
	Unknown	2.55	-

Table 5.19 Household decision-making and attitude between the cooking and the non-cooking wives (%)

		Cooking wife (n=196)	Non-cooking wife (n=53)
1) The important decision in the family should be made only by the male family member?	Agree	25.0	32.1
	Disagree	73.0	67.9
	Neutral	0.5	-
	Unknown	1.5	-
2) A wife has a right to express her opinion even when she disagree with what her husband is saying?	Agree	76.0	77.4
	Disagree	24.0	22.6
	Neutral	-	-
3) A wife should tolerate being beaten by her husband in order to keep the family together?	Agree	90.8	94.3
	Disagree	7.1	5.7
	Neutral	0.5	
	Unknown	1.5	
4) It is better to send a son to school than it is to send a daughter?	Agree	3.1	11.3
	Disagree	32.7	30.2
	Neutral	63.8	58.5
	Unknown	0.51	
5) Will you accept it if your husband wants you to stay at home for housework not to engage in business out of house?	Agree	73.0	69.8
	Disagree	26.0	28.3
	Neutral	-	-
	Unknown	1.0	1.9
6) When a wife has earned some money she has the right to spend it on herself or her children without asking her husband?	Agree	22.5	18.9
	Disagree	76.0	81.1
	Neutral	0.5	-
	Unknown	1.0	-
7) A wife is correct in refusing to have sex with her husband when she knows her husband has sex with other women?	Agree	29.1	26.4
	Disagree	69.4	67.9
	Neutral	-	3.8
	Unknown	1.5	1.9
8) If a wife refuses sex, is it correct for her husband to withhold money from her?	Agree	74.0	66.0
	Disagree	24.0	30.2
	Neutral	1.0	3.8
	Unknown	1.0	-
9) If a wife refuses sex, is it correct for her husband to beat her?	Agree	78.1	67.9
	Disagree	20.9	28.3
	Neutral	-	1.9
	Unknown	1.0	1.9

5.4 Summary and conclusion

The study confirms that women in study areas greatly contribute to household food security and child education through their agricultural crop and cash income. Especially, women's income derived from on-farm work tends to contribute to family, while a part of earnings from off-farm work is allocated to her business capital. Results also prove a striking difference in power relationship between men and women in many aspects, such as domestic violence, family planning, and decision-making and attitudes

toward spouse. Since social norms in study areas inhibit women's rights for land inheritance and resource availability, women's ability is severely limited.

Findings related to contraception propose a shocking difference between men and women. Women's wish basically do not reach the outcome in reality, irrespective of women's different position. Hence man is a breadwinner of household agricultural production, he might strongly aspire women to give birth to children for strengthening family workforce. However, from the woman's side, giving birth to a lot of children may be heavy burden because she has to feed and care for them as an additional housework (Hill, R. V., and M. Vigneri. 2009). There might be a hidden huge gap in preference of family planning between men and women. However, due to women's weak decision-making power to men, implementing contraception as women wish may be difficult.

The results related to household decision-making and the attitudes toward spouse also connote women's lower status within family. Most answers give a picture of that women are basically obedient to household heads. Both in monogamous and polygamous homes, or, for both of the cooking and the non-cooking wives, the majority of women responded that they will accept punishment; beaten by husbands for keeping family peace, and withholding her money or slapped by him when she refuses sex. These results strongly suggest the existence of absolute power disparity between men and women. Previous literature claims that economic factors leading to the dependence of women on men are a major reason for women's lack of control over their sexuality (Awusabo-Asare et al, 1993). Under a patriarchy, because women's asset allocation is based on men's decision, women have to rely on the means via men. For men, as previous literature reported (Boserup, 1970), wife is regarded as a labor resource. Especially the northern Ghana has harsh environment and the human resources are indispensable for maintaining

agricultural production for the rural poor. Therefore, the husband may differently assign his wife the farmland to maximize household productivity. On the other hand, from a woman's perspective, childbirth and childcare may be top priorities in securing her family status under patrilineage where women have a difficulty to access to the resource. Thus, women's labor allocation in off-farm work is largely affected by their conditions concerned with children. The research found that though the intra-household asset allocation is varied among women in study areas, such difference does not affect women's decision-making power regarding family planning, spousal attitudes, and her income use rights. Hence the surveyed women's off-farm work is mostly agricultural off-farm work, the development projects aiming at women's empowerment should focus on woman's capacity building in study areas through vocational training based in the community. If women can work independently of men's asset allocation, they may become more financially independent and improve their wellbeing.

CHAPTER VI SUMMARY AND CONCLUSION

This thesis has provided a unique insight into intra-household resource allocation for rural women in northern Ghana, characterized by the Muslim religion, the Dagomba ethnicity, and patrilineage. The conclusions from each chapter are described below.

In the first analysis, the study used the nationally representative dataset from all regions in Ghana to get an overall picture of intra-household resource allocation for the rural family. In addition, the study aimed at exploring the relationship between labor and asset allocation both by gender and the women's position attributed to the household structure. The results indicate a striking gender difference; rural women tend to have labor allocation in self-managed business rather than wage work. It also suggests that low education is a main constraint for women from entering the wage labor market. Self-managed businesses are an alternative route for women to improve their economic status and wellbeing. Differences in household structure, such as monogamous versus polygamous households, have different effects on off-farm labor allocation for men and women. Applying household fixed effect models, the study tested the hypotheses of resource constraint and intra-household bargaining power for women's off-farm labor allocation. The research found that a resource constraint might be a more important determinant of women's off-farm labor allocation in Ghana. Women who have the right to manage productive assets are more likely to have labor allocation in self-managed business. It implies that development projects aiming to reduce poverty in Ghana by promoting self-employment may need to pay attention to their agricultural asset availability within the household. In the estimation, the effects of women's intra-household bargaining power against a male household head, on their off-farm labor

allocation were not confirmed. The household fixed effect model may not control for individual unobservable factors such as women's social status, which may affect the distribution of agricultural assets within a household. However, due to the data limitation of the LSMS, the analysis in Chapter II did not allow further studies on that perspective.

Thus, based on these findings, subsequent three analyses from Chapter III to V used the original sex-disaggregated dataset the author had collected through her survey in northern Ghana. The survey interviewed not only the household head but also his wife to cover more information about women missing from the LSMS dataset. This dataset enabled to examine the mechanism of intra-household resource allocation and the women's position in rural families of northern Ghana, characterized by the Dagomba people in a patriarchal Islamic society.

In the first step, the analysis in Chapter III explored the characteristics of intra-household resource allocation with special attention to the cultural backgrounds of northern Ghana: patriarchy, Islamic religion, and the Dagomba ethnicity. Findings revealed that a patriarchal society influences the system of land allocation and inheritance. Especially women in study areas are substantially constrained to the access and availability to the resources than men. Moreover, by difference in household structure and the wife's seniority attributed to the social backgrounds, intra-household allocation is significantly varied among women. Aligned with gender and woman's family position, woman's labor allocation also differs both for on- and off-farm work activities. Results indicate woman's traditional status of the Dagomba ethnic context – cooking wife – has a significant meaning for intra-household resource allocation. Cooking wife tends to get more farmland and participate off-farm work more than that who is not a cooking wife. The findings of this study are consistent with a number of studies pointing out that rural

women are comparatively constrained to accessibility and availability over resource than men.

In addition, the results in Chapter III highlight a difference in cropping pattern between men and women. The analysis gave an interesting insight into the gender role embedded in rural society of northern Ghana. Previous literature (Padmanabhan, 2007) proposed the linking concept between gendered responsibility and access to the specific crops with ideological implication of who has contributed to the meal at home. It emphasized that men are in charge of preparing staple food material while women serve a soup ingredient crop by her agriculture. Consistent with the previous literature, most women in study areas grow groundnut and okra as a soup ingredient, while almost all men cultivate maize for Tuo Zaffi (see Appendix). The cropping pattern is deeply disaggregated by sex in the northern context and the women's crops are consistent irrespective of the household structure and women's status.

As a second approach, in Chapter IV, regression analysis was implemented to estimate the determinants of off-farm labor allocation in Northern Ghana. As a result, significant difference has been confirmed by gender and women's position. For men's off-farm work participation, the number of female labor member in household has a significant effect while women are influenced by the number of their daughter and small children. Compared to the results in Chapter II, women's productive asset allocation has no significant effect on their participation rate in off-farm labor in study areas. These results can be attributed to the mechanism of asset acquisition; surveyed men have a substantial power over asset allocation within household, while women cannot stress out their rights regarding the resources. For example, a woman's right to farmland is a tentative usufruct because she can only access it if her husband has temporarily assigned.

Thus, woman's asset allocation may be less likely to represent their bargaining power due to the social institutions. The impact of the determinants for off-farm labor allocation diversifies when estimated by the type of women's work; a striking heterogeneity is confirmed by village. Each village has a different locational condition such as distance from the main road, access to the market, and the land size in the community (see Appendix). Intra-household labor allocation might be affected by these background features of community. In the context of the Dagomba ethnicity, the traditional family status for woman of "cooking wife" is more likely to have both land and labor allocation compared to that who is not a cooking wife.

Regarding women's labor exchange in groundnut harvesting, polygamous women are less likely to be a labor recipient. Previous literature mentions that polygamous marriage itself is a living strategy by providing a rich workforce in agricultural production (Boserup, 1970). Moreover, risk diversification can be accomplished within household through allocating farmland to multiple wives. Hayami (2000) interprets that sharing the work and output from farm can greatly reduce the risk where the production risks are high. Peasants who are susceptible to the risk and shock are more likely to participate in labor exchange. Thus, polygamous women may have a small incentive to share the crop with other household wives, while monogamous wives are more active probably for sharing the risk with other household. However, the results of bivariate probit model suggest that labor exchange in groundnut harvest is asymmetric over recipient and provider in study areas; no significant coefficient is observed in labor recipient and provider. Women might have ambiguous contracts based on anticipation that recipient would get reward for labor acceptance one day in the future when their crop yield is scarce. Indeed, the previous study in folklore targeting the Dagomba ethnicity reports the complex mechanism of labor

exchange (Tomomatsu, 2019); to harvest on women's groundnut farm requires the invitation from the cultivator for the participants. Such system is not observed on men's farmland and men should host all women to harvest. In the cultural beliefs, men should share their crops for helping women with low crop productivity. Thus, further estimation for the determinants of labor exchange work in study areas should consider the relationship between the host and the harvest workers.

In the last approach, the study in Chapter V analyzed the gender role and explored the power relationship between men and women by women's family position attributed to the different household structures, wife's seniority, and the women's status in the Dagomba tradition. It confirms that lots of women greatly contribute to household food security and child education through their agricultural crop and cash income, irrespective of their status in study areas. Especially, women's income derived from on-farm work tends to contribute to family, while a part of earnings from off-farm work is allocated to her own business capital. Results also prove a striking difference in decision-making power between men and women in many aspects, such as income use rights, domestic violence, family planning, and attitudes toward spouse. Since the social norms in study areas inhibit women's rights for land inheritance and resource availability, women's ability is severely limited. The results provided an interesting finding on junior wives in polygamy; regardless of their poor accessibility to farmland, they have more independent rights to use their income than other women. Further analysis requires to explore the mechanism that the junior wife has more economic decision-making power over her income use. According to the folklore literature (Tomomatsu, 2019), junior wife can stay closer to the household head than senior wife by staying in his room until she becomes pregnant. In addition, the literature also reports that junior wife recognizes herself in a

better position the husband takes care of her well, compared to senior wife. Thus, it will be important to examine the relationship between wives for further analysis.

Findings related to contraception propose a shocking difference between men and women. The majority of women's wish for contraception do not reach the outcome in reality, irrespective of women's different position. Hence man is a breadwinner of household agricultural production, he might strongly aspire women to give birth to children for strengthening family workforce. However, from the woman's side, giving birth to a lot of children may be heavy burden because she has to feed and care for them as an additional housework (Hill, R. V., and M. Vigneri. 2009). There might be a hidden huge gap in preference of family planning between men and women. However, due to women's weak decision-making power to men, implementing contraception as women wish may be difficult. Referring to the previous literature, marriage are more stable among patrilineal groups because of the highly dependent position of women (Leach, 1957).

The results related to household decision-making and the attitudes toward spouse also connote women's lower status within family. Most answers give a picture of that women are basically obedient to household heads. Both in monogamous and polygamous homes, or, for both of the cooking and the non-cooking wives, the majority of women responded that they will accept punishment; beaten by husbands for keeping family peace, and withholding her money or slapped by him when she refuses sex. These results strongly suggest the existence of absolute power disparity between men and women. Previous literature claims that economic factors leading to the dependence of women on men are a major reason for women's lack of control over their sexuality (Awusabo-Asare et al, 1993). Under a patriarchy, because women's asset allocation is based on men's

decision, women have to rely on the means via men. For men, as previous literature reported (Boserup, 1970), wife is regarded as a labor resource. Especially the northern Ghana has harsh environment and the human resources are indispensable for maintaining agricultural production for the rural poor. Therefore, the husband may differently assign his wife the farmland to maximize household productivity. However, women's top priority for survival in rural society may be childbirth and childcare due to their poor access to resources under patrilineage. Thus, women's labor allocation in off-farm work is largely affected by their conditions concerned with children. The research found that though the intra-household asset allocation is varied among women in study areas, such difference does not affect women's decision-making power regarding family planning, spousal attitudes, and her income use rights. Hence the surveyed women's off-farm work is mostly agricultural off-farm work, woman's capacity in study areas is important through vocational training based in the community. If women can work independently of men's asset allocation, they may become more financially independent and improve their wellbeing.

For the summary of this study, the results confirm a distinct gender gap in intra-household resource allocation and decision-making power in rural society of northern Ghana. Among women, resource allocation varied for women within household by their position and household structure. However, the research revealed that the women's decision-making power to their husbands are substantially weak regardless of women's family position. Given a cultural context that women are not allowed to inherit resources from their father under patriarchy, resource accumulation is difficult for rural women. This study strengthen the importance of background setting affecting women's intra-household resource allocation. An innovative indicator "WEAI" designed by IFPRI

contains five domains to measure women's empowerment in agriculture, including access to and decision-making power over productive resources, as well as control over income use. However, in specific setting like in rural society of northern Ghana, women's empowerment may less relate to such domains. This thesis highlights the importance of capturing the environment around women at the local level paying attention to the embedded social structure.

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APPENDIX

Details of Cultural and Social Characteristics of Northern Ghana

(1) The Dagomba Ethnicity

The Dagomba ethnicity occupies a considerable portion of the Northern Region, including all research areas. It belongs to the Mole-Dagbon ethnic family, which is the second largest family group across the country. Across three study communities, the Dagomba people mainly engage in agrarian activities such as farming crop and caring livestock. It is a noteworthy fact of that the Dagomba is renowned for a chieftaincy tradition with a profound history since the 15th century (Awedoba, 2006). The related study explained that chieftaincy has spread to the north either by persuasion as the ancestor welcomed immigrant princes fleeing from dynastic disputes or by imposition. There are still established royal families living in each Dagomba community and the chief is qualified to represent his community. Commonly observed in three study villages, the chief lives on the grounds of his huge palace compound. His family is usually very large consisting of many wives and children. In general, Muslim men can marry up to four wives, however, the preliminary survey found that the chiefs in three villages have more than four wives. He has a great authority over the land that his community covers. Each regular household head is assigned a usufruct over a small portion of chief's land only for agricultural purpose. At household level, male head is representatively entitled a primary decision-making over farmland. In case a regular household wants to build a new construction or obtain a new agricultural plot, family head firstly has to visit the chief and ask for his approval. Note that the community chiefs in all villages were excluded from dataset because it was not allowed to interview him in the survey.

Apart from the chieftaincy, the Dagomba ethnicity has unique traditions. A

Dagomba woman joins her husband's family after marriage. Newly married wife supports her husband's agricultural work and engage in domestic chore at home. The household survey found that when a woman bears a baby, she will return to her natal home and stay there until her baby grows to some extent. During this period, woman can take a maternity leave with the help of her own family members. After her maternity leave for her second baby, she will become "cooking wife" in the context of the Dagomba tradition (Warner, et al, 1997; Padmanabhan, 2007). The cooking wife is defined as a woman who has more than one child. Such woman is regarded in a higher position by her family members, and the amount of her home duty will be reduced compared to that of a single or a married woman with less than two children. According to the literature, for example, a cooking wife will have the right to rest on cooking while other women who are not the cooking wives have to cook or assist cooking on her behalf. In that sense, a woman's fertility has a great impact on her status in the Dagomba's society as it defines her role and her social esteem. Moreover, according to the literature, cooking wives are more likely to be able to spend their time on income generating activities such as on- and off-farm work. Marital status and concepts of seniority may be important to determine a gender role of women in rural African society. Having a child in the Dagomba culture is not only a way to improve family labor for household, but also a way to empower a married woman. Moreover, it was found that contraceptive action between spouses during a sexual intercourse was rarely reported in survey areas. Thus, taking a maternity leave at her own home may work as an alternative contraception by means of the mobility of woman away from her husband.

Another tradition concerned with the northern women including the Dagomba is called "*kayayo*", that is woman's migrant labor in the south (Opare, 2003). Woman moves

with her baby or infant to Kumasi where is the second big city in the southern Ghana. Engaging in the head porterage of goods in Kumasi for a few years, she will return to the north. While a woman is not at home during her *kayayo*, other household members have to perform a series of domestic burdens on her behalf. Therefore, wives in polygamous household can more easily engage in the migrant labor than those in monogamous household. Through *kayayo*, woman earns her small income to take care of her infant by herself in the south. The survey found that only wives with infant are involved in *kayayo* in sampled villages, while male household heads do not leave home for work.

(2) Muslim Culture and Household Structure

The majority of the northern Ghanaian are Muslim. Indeed, most people in the study areas worship Islamic religion. The Islamic religious culture strongly influences their lifestyle. For example, each community has a Islamic mosque and the people pray five times in a day. In particular, polygamous marriage is widely adopted in rural households, where men marry multiple wives in the household. After marriage, women will belong to husband's family staying in the same residence. Thus, multiple wives live together in each room in the same premises. A typical residence in study areas which are made of mud and grass is shown in the Photo 3 and 4. There are multiple buildings within house grounds. Household head and wives separately stay in each building and the children live in mother's house.

Photo 3 House made of mud and grass

Photo 4 Multiple buildings within house grounds

The regular rule of housework by polygamous wife is that each wife carries out a series of home duties every two days such as cleaning, washing, and preparing meals for all family members. Women also fetch water from the water source with a bucket on their heads for family. When rainy season, community wells (shown in Photo 5) supply water, however, they dry up during a dry period, Thus, women have to walk to rivers and canals that are really far away from the villages. Because fetching water is regarded as women's work in study areas, men basically do not engage in this work. The survey found that each family has a water tank in front of house (shown in Photo 6). When women return from the water station, they pour water into a water tank so that the whole family can use it daily. In a polygamous home, multiple wives have no blood tie with each other. Even so, family members share consumption together, regardless of kinship.

Photo 5 Community well

Photo 6 Shared water tank in compound

(3) Patriarchy

A patriarchal society is prevalent in northern Ghana and the structure of inheritance is strongly affected by patrilineage, which creates severe cultural inhibitions to the aspirations and productive capacity for women. For instance, land ownership belongs to a male household head. When he passes away, only male family members have a right to take over the land. To the contrary, women are not allowed to attain land property rights. Only in case household heads assign farmland to their wives, they will be able to manage a small portion of farmland. However, consistent with the number of literature, women under patriarchy and Muslim culture have small power on asset ownership and accessibility in study areas. For this reason, there is a possibility of that women may desire to give birth to boys because her son qualifies for inheritance of farmland from his father in the future.

(4) Agriculture and Life Style

Agriculture in the Northern Region of Ghana is rainfed. Apart from a few villages with irrigation system, most northern communities including study areas suffer from water shortage. As briefly mentioned, people can grow crops only during a rainy

season from May to October, and they do not farm in dry season from November to March in the north. There is a hot and dry dusty trade wind coming from the Sahara Desert in dry season, called “Harmattan”. This seasonal dry wind, in addition to a poor precipitation, hinders agriculture of the northern people. Under this harsh environment, northern people have to concentrate on farming maize, sorghum, and groundnut within rainy season.

As reported in many studies in African countries, in the study areas, men and women have a separate faming plot within household. In all three villages, the use of machinery at individual level was not observed in agricultural production. However, certain process for agricultural production, such as land preparation, applies machine rental by operators in many households. Other than that, agricultural work is carried out by human workforce consisting of family labor and employment labor. The type of agricultural crop grown in the north is comparatively limited due to a small rainfall: maize, groundnut, rice, pepper, yam, cassava, sorghum, beans, okra, tomato, and garden egg. Unlike in the south, cacao and plantain cannot grow due to the dry environment in the north.

Thus, the food culture in the north is different from those in the south. In the north, primary staple crop is maize, and rural people use its flour for various dishes, while the southern rural people rarely consume maize. For example, as shown in picture (Photo 7) , Tuo Zaafi (usually called TZ ; dumpling made from maize flour) is one of the most popular foods among the northern people. People eat TZ served with a variety of vegetable soup, such as groundnut soup and okra stew. The home kitchen is placed on the center of home grounds without roof, as seen in photo (Photo 8). Whole family members share the same meals prepared by female member. For cooking, women use the firewood collected by themselves in the bush. After burning firewood, woman puts the ash on fresh

okra and dries them under the sun for making dried one. Preparing preserved food during rainy season is important in northern Ghana because fresh vegetables are not available during a dry season.

Photo 7 Tuo Zaffi served with soup

Photo 8 Kitchen placed in the center of the house

Questionnaire of Original Survey

Section A. Demographic Profile of the Household members (If necessary, write an extra sheet for this section.)

Person ID	Name	Sex	Age	Relationship to head	Marital Status	Married person	Person ID of your father	Person ID of your mother	Education	
		1=M **2**=F	**1**=0-4 **2**=5-14 **3**=15-24 **4**=25-34 **5**=35-44 **6**=45-54 **7**=55-64 **8**=65-	**0**=Head **1**=Wife **2**=Son/Daughter **3**=Son/Daughter-in-aw **4**=Adopted/Foster child **5**=Father/Mother **6**=Father/Mother-in-law **7**=Brother/Sister **8**=Brother/Sister-in law **9**=Grandparent **10**=Grandparent-in-law **11**=Grandson/Daughter **12**=Uncle/Aunt **13**=Uncle/Aunt-in-law **14**=Cousin/Nephew **15**=Other relative, **16**=Other non-relative **17**=Worker	**1**=Single **2**=Married **3**=Widowed **4**=Separated **5**=Divorced **6**=Other, specify	**Person ID** of your spouse (**99**=died)	(**77**=Not-household member **88**=No father **99**=Died)	(**77**=Not-household member **88**=No mother **99**=Died)	The highest grade completed **1**=None **2**=Pre-school **3**=Primary school **4**=Secondary school **5**=Other, specify	Still in school? **1**=Yes **2**=No **3**=Not started yet
ID	**Name**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

➢ *Section B. Household Head & Spouse Information*

	Person ID	Origin 1=In this village 2=Not in this village	How long have you been married with her? (X=Not remember)	Ethnicity 1=Dagomba 2=Other, specify	Betrothal money		For the household head in polygamy	
					Type 1=Money 2=Livestock 3=Betrothal to promote friendship 4=Other, specify	Amount (GHC, number) (X=Not remember)	Do you have preferred wives? 1=Yes 2=No (If so, write the order)	The reason why you have preference to your specific wife. 1=Most beautiful 2=Most caring for you 3=Cooking special meal 4=Other, specify
	ID	B1	B2	B3	B4	B5	B6	B7
HH			—		—	—		—
W1								
W2								
W3								
W4								

(B8) Have you ever had a divorce before? 1=Yes 2=No>>Move to (B9)

(B8.1) How many times have you had a divorce? Answer _____

(B8.2) How long have you been divorced? (×=Not remember, if you forgot) Answer _____

(B8.3) Write the reason why you got divorced Answer _____

(B9) Do you have any wife who has already passed away? 1=Yes 2=No

(B10) Will you get married to another wife in future ? Also answer the reason. 1=Yes 2=No 3=Don't know
Reason for your answer ( )

➢*Section C-1. Plot and crop information*

(C1-1) Are you an owner of whole plots in your household? 1=Yes 2=No (specify the owner_____)

(C1-2) How many plots in total do you own as a household? Upland:_____(acre) Lowland:_____(acre)

(C1-3) How did you get the plot? (also specify acre for each plot type)

1=Inherit from own father (up_____acre low_____acre) 2=Stumped farm by yourself (up_____acre low_____acre)

3=Gift from a friend (up_____acre low_____acre) 4=Other, specify (up_____acre low_____acre)

(C1-4) How many plots do you manage by yourself? Upland:_____(acre) Lowland: _____(acre)

(C1-5) How many plots did you distribute to other household member? Write Person ID and (acres)

Upland (Person ID)____(acre)____ (Person ID)____(acre)____ (Person ID)____(acre)____ (Person ID)____(acre)____

Lowland (Person ID)____(acre)____ (Person ID)____(acre)____ (Person ID)____(acre)____ (Person ID)____(acre)____

Fill out the crop information of your own managed plot

Plot type	Crop name(acres)	Yield/acre	Cropping system 1=Pure stand 2=Intercrop	Main use of products 1=Home consumption 2=For sale 3=Other, specify	If you answer 2=for sale in C1-8,	
					Who is the most responsible for using income? Person ID	Main use of income 1=Buying food for home consumption 2=Crop production 3=Education for children 4=Family health 5=Other, specify
	Name	C1-6	C1-7	C1-8	C1-9	C1-10
Up	1. ( )					
	2. ( )					
	3. ( )					
Low	4. ( )					

(Continued)

	Crop name	Who engages in work? **1**=Head **2**=Female member **3**=Male member **4**=Hired machinery and operator **5**=Entire household **6**=Hired labor **7**=Other				
		Land preparation	Planting	Weeding	Harvesting	Threshing/shelling
	Name	**C1-11a**	**C1-11b**	**C1-11c**	**C1-11d**	**C1-11e**
Up	1.					
	2.					
	3.					
Low	4.					

➢ *Section C-2. Crop expenditure and profit*

COST in the last 12 months									
Crop	Total cost of seed (GHC) If you use **Own Seed**, write **OS as well**	Total cost of fertilizer (GHC)	Total cost of herbicide (GHC)	Total cost of pesticide (GHC)	Total cost of hired machinery/labor (GHC) (If use **Household Labor**, write **HL** as well.)				
					Land preparation	Planting	Spraying	Weeding	Harvesting
Name	**C2-1**	**C2-2**	**C2-3**	**C2-4**	**C2-5a**	**C2-5b**	**C2-5c**	**C2-5d**	**C2-5e**
1									
2									
3									
4									

INCOME in the last 12 months				
Crop	Total yield in bags (100kg jute sack)	Unit price **GHC** (/100kg jute sack)	Amount for sale (%)	Amount for home consumption (%)
Name	**C2-8**	**C2-9**	**C2-10**	**C2-12**
1				
2				
3				
4				

➢*Section D. Livestock information*

(Filtering question) Do you manage any livestock? **1**=Yes **2**=No>>Move to *Section E.*

Livestock Type **1**=Cattle **2**=Goats **3**=Sheep **4**=Chicken **5**=Guinea fowls **6**=Ducks **7**=Turkeys **8**=Donkeys **9**=Other, specify	Who is the owner of the livestock? Record **Person ID** (also fill out **the number of owned livestock** in ( ) following each Person ID)	How did the owner get the livestock? **1**=Inherit from your father **2**=Purchase with your money **3**=Other, specify	Who mostly takes care for livestock? **1**=Owner **2**=Fulani **3**=Son **4**=Grandson **5**=Other, specify	Total value **GHC**	Change in number in the last 12 months			Main motivation to own the livestock **1**=Sale for financial security **2**=Home consumption **3**=For festival **4**=For funeral **5**=Welcoming important visitors **6**=Other, specify
					Number consumed at home	Number bought	Number sold	
Name	**D1**	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**

(D9-1) If the chicken or guinea fowls produce eggs, who has the responsibility for using that production? Also write the **main use**.

1=Owner of livestock **2**=The person mostly caring for the livestock **3**=Other, specify

(Main use) **1**=Home consumption **2**=For sale **3**=Reproduction 4=Other, specify

(D9-2) If the cattle produce milk, who has the responsibility for using that production? Also write the **main use**.

1=Owner of livestock **2**=The person mostly caring for the livestock **3**=Other, specify

(Main use) **1**=Home consumption **2**=For sale **3**=Other, specify

➢*Section E. Self-employment and Hired labor in the 12 months*

(Filtering question) Have you engaged in self-employment or hired labor apart from farming on your plot in the last 12 months? **1**=Yes **2**=No>>*Section F.*

If so, which activity do you work for? **1.**_____ **2.**_____ **3.**_____ **4.**_____

	BIZ code **See code below**	If you answer **1 or 2 in BIZ**		If you answer **3-5 as BIZ,**			If you get cash through this activity, what do you use? **1**=Buying ingredients for home consumption **2**=Crop production **3**=Education for children **4**=Business **5**=Other, specify	Who is the most responsible for the income from this activity? **1**=Yourself **2**=Head **3**=Other, specify
		Quantity of harvest / threshing as an earned income	Main use of products **1**=Home consumption **2**=For sale at the market **3**=Make snack/meals for sale **4**=Other, specify	Name of main food material	How to get material? **1**=Produce on your own plot **2**=Purchase from farmer **3**=Purchase at the market **4**=Purchase from the trader **5**=Produce from your own livestock **6**=Other, specify	If you answer **Purchase**, what was the source of money? **1**=Income of the crop production on your plot **2**=Income of your own livestock sale **3**=Allowance from your husband **4**=Other, specify		
	BIZ	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**
1								
2								
3								
4								

《BIZ》
1=Groundnuts harvesting on other household's plot
2=Rice threshing
3=Food processing
4=Food selling (e.g. Kurikuri, Koushi, Wagashi, Soya, etc.)
5=Food trading
6=Trading livestock
7=Butcher
8=Taylor
9=Shea butter maker
10=Walking seller (soap, ingredients, etc.)
11=Teacher
12=Construction
13=Driver
14=General kiosk owner
15=Miller
16=Other, specify

(CONTINUED)

	How many years of experience?	Business type **1**=Self-employment **2**=Wage/Hired labor	Operational type **1**=Permanent job **2**=Casual/seasonal job **3**=Occasional job **4**=Other, specify	Earning/sales in each month of the last 12 months (GHC)											
				RAINY SEASON						DRY SEASON					
	E8	**E9**	**E10**	May	June	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1															
2															
3															
4															

➢*Section F. Non-labor Income: Susu, remittance and other service*

(Filtering question1) Have you received a remittance, credit, pension or food aid in the last 12 months? **1**=Yes **2**=No

(Filtering question2) Have you joined SUSU in the last 12 months? **1**=Yes **2**=No>>*Section G.*

	Type **1**=Susu **2**=Remittance/Cash assistance **3**=Other, specify	**Major source** **1**=Commercial bank **2**=Micro Finance Institute **3**=Local organization (communal) **4**=Friends / Community group **5**=Son/daughter **6**=Other relatives **7**=Money lender **8**=Other, specify	**Main purpose of use** **1**=Education for children **2**=Medical fee **3**=Funeral **4**=Wedding **5**=Crop production **6**=Business of off-farm **7**=Alcohol/Tobacco **8**=Other, specify
No	**F1**	**F2**	**F3**
1			
2			
3			
4			

(CONTINUED)

	Frequency **1**=Monthly **2**=Not regularly (specify the situation)	Amount (**GHC**) in the last 12 months											
		RAINY SEASON						DRY SEASON					
No	**F4**	**May**	**June**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**
1													
2													
3													
4													

➢ *Section G-1. Consumption and Expenditure*

《Question for head》

(G-head-1) Do you smoke tobacco? **1**=Yes **2**=No>>Move to **(G-head-1)**

(G-head-1.1) How do you get the tobacco? **1**=Purchase with the income of your crop production **2**=Other, specify

(G-head-2) Do you drink any alcohol? **1**=Yes **2**=No>>Move to **(G-head-3)**

(G-head-2.1) How do you get the alcohol? **1**=Purchase with the income of your crop production **2**=Other, specify

(G-head-3) Do you consume any special meal which your wife has prepared only for you? **1**=Yes **2**=No>>Move to **(G2-1)**

(G-head-3.1) From which wife do you get special meal? Also write the frequency of consumption. **(Polygamous only)**

Answer_____

➢ *Section G-2. Expenditure: Crop and cash distribution, Money lending*

(G2-1) Do you provide your wife (wives) with any cash? **1**=Yes **2**=No>>Move to **(G2-2)**

(G2-1.1) If so, how often do you provide with the cash? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-1.2) If so, how much do you provide with cash in total for each wife? **Answer**_____

(G2-1.3) What is your motivation to provide your wife with cash? **Answer**_____

(G2-2) Do you provide your wife (wives) with any crop? **1**=Yes **2**=No>>Move to **(G2-3)**

(G2-2.1) If so, what kind of crop do you provide? **Answer**_____

(G2-2.2) If so, how often do you provide with the crop? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-2.3) What is your motivation to provide with the crop?
1=Home consumption for all household member **2**=Selling at market **3**=Other, specify

(G2-3) Do you provided your wife (wives) with any fertilizer for her own farming? **1**=Yes **2**=No>>Move to **(G2-4)**

(G2-3.1) If so, how often do you provide with the fertilizer? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-4) Do you provide your wife (wives) with pesticide for her farming? **1**=Yes **2**=No>>Move to **(G2-5)**

(G2-4.1) If so, how often do you provide with the pesticide? **Answer**_____

(G2-5) Do you borrow cash from wives (in the last 12 months)? **1**=Yes **2**=No>>Move to **(G2-6)**

(G2-5.1) Amount of money you are borrowing currently (also specify the person from whom) **Answer**_____

(G2-5.2) The purpose you borrow money **Answer**_____

(G2-6) Do you lend wives the cash (in the last 12 months)? **1**=Yes **2**=No>>Move to **(G2-7)**

(G2-6.1) Amount of money you are lending currently (also specify the person to whom). **Answer** _____

(G2-7) What do you do for a wife you preferred most? **(Polygamous only)** **Answer**_____

➢*Section H-1. Working role and time use*

(H1-1) Do you spend time **collecting firewood**? **1**=Yes **2**=No>>Move to **(H1-2)**

(H1-1.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-1.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-1.3) Who uses the firewood which you have collected? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-2) Do you spend time **fetching water**? **1**=Yes **2**=No>>Move to **(H1-3)**

(H1-2.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-2.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-2.3) Who uses the water which you have fetched? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-3) Do you spend time **washing clothes**? **1**=Yes **2**=No>>Move to **(H1-4)**

(H1-3.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-3.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-3.3) For whom do you wash clothes? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-4) Do you spend time **washing dishes**? **1**=Yes **2**=No>>Move to **(H1-5)**

(H1-4.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-4.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-4.3) For whom do you wash dishes? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-5) Do you spend time **going to the market**? **1**=Yes (Purpose) **2**=No>>Move to **(H1-6)**

(H1-5.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-5.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-5.3) For whom do you go to the market? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-6) Do you spend time on **general cleaning in the house**? **1**=Yes **2**=No>>Move to **(H1-7)**

(H1-6.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-6.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-6.3) For whom do you clean in the house? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-6.4) In which wife's room do you clean? **(Polygamous only)** **1**=Yes **2**=No

(H1-7) Do you spend time on **general cleaning around house** ? **1**=Yes **2**=No>>Move to **(H1-8)**

(H1-7.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-7.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-8) Do you spend time **caring for kids**? **1**=Yes **2**=No>>Move to **Section H-2.**

(H1-8.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-8.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-8.3) For which wife's children do you take care? **(Polygamous only)**

Answer _____

➢*Section H-2. Working role: Agricultural work*

In a typical daily schedule during RAINY and DRY season

	Activity code	
	1=Farming	**6**=Praying
	2=Cooking	**7**=Chatting/Playing a game with friends
	3=Working for off-farm business	**8**=Sleeping/Taking a nap
	4=Fetching the water	**9**=Cleaning/Sweeping/Washing clothes or dishes
	5=Collecting firewood	**10**=Other, specify
Time grouping	**RAINY season**	**DRY season**
5am - 9am		
9am - 0pm		
0pm - 3pm		
3pm - 6pm		
6pm - 9pm		

➢***Section I. Power Relationship***

(I-1) In the last 30 days, has there been any physical violence in your household? **1**=Yes **2**=No>>Move to **(I-2)**

(I-1.1) If so, who was involved with the violence? **1**=Husband and wife **2**=Wife and wife **3**=Other, specify

(I-2) In the last 30 days, has there been any quarrel in your household? **1**=Yes **2**=No>>Move to **(I-3)**

(I-2.1) If so, who was involved with the quarrel? **1**=Husband and wife **2**=Wife and wife **3**=Other, specify

(I-3) Have you ever provided a gift or money in exchange for sex? **1**=Yes **2**=No

(I-4) Do you have birth control? **1**=Yes>>Move to **(I-5)** **2**=No

(I-4.1) If not so, why don't you have birth control? **Answer**_____

(I-5) As for contraception, what do you think about that? **1**=Not needed **2**=Needed **3**=Neutral

(I-6) The important decisions in the family should be made only by the man of the family? **1**=Agree **2**=Disagree **3**=Neutral

(I-7) A wife has a right to express her opinion even when she disagree with what her husband is saying? **1**=Agree **2**=Disagree **3**=Neutral

(I-8) A wife should tolerate being beaten by her husband in order to keep the family together? **1**=Agree **2**=Disagree **3**=Neutral

(I-9) It is better to send a son to school than it is to send a daughter? **1**=Agree **2**=Disagree **3**=Neutral

(I-10) A wife should stay at home for working housework rather than working out of house. **1**=Agree **2**=Disagree **3**=Neutral

(I-11) When a wife has earned some money, she has the right to spend it on herself or her children without asking her husband? **1**=Agree **2**=Disagree **3**=Neutral

(I-12) A wife is correct in refusing to have sex with her husband when she knows her husband has sex with other women? **1**=Agree **2**=Disagree **3**=Neutral

(I-13) If a wife refuses sex, is it correct for her husband to withhold money from her? **1**=Agree **2**=Disagree **3**=Neutral

(I-14) If a wife refuses sex, is it correct for her husband to beat her? **1**=Agree **2**=Disagree **3**=Neutral

*Questionnaire for wife Name of respondent*_____ DATE ___ / ___ /2017 HHID____

➢*Section C-1. Plot and crop information*

(C1-1) Do you have plot allocation for your own farming? **1**=Yes **2**=No>>Move to **Section D.**

(C1-2) How many plots do you manage by yourself ? **Upland:**_____**(acre)** **Lowland:**_____**(acre)**

(C1-3) How did you get your own managed plot? **1**=Husband allocated to you from his plot **2**=Other, specify

Fill out the crop information of your own managed plot

Plot type	Crop name (acres)	Yield/acre (100kg jute sack)	Cropping system **1**=Pure stand **2**=Intercrop	Main use of products **1**=Home consumption **2**=For sale **3**=Other, specify	If you answer **2=for sale in C1-6**,	
					Who is the most responsible for using income? **1**=Yourself **2**=Husband **3**=Other, specify	Main use of income **1**=Buying ingredients for home consumption **2**=Crop production **3**=Education for children **4**=Other, specify
	Name	**C1-4**	**C1-5**	**C1-6**	**C1-7**	**C1-8**
Up	1. ( )					
	2. ( )					
	3. ( )					
Low	4. ( )					

	Crop name	Who mainly engages in work on your plot? **1**=Head **2**=Yourself **3**=Female member **4**=Male member **5**=Entire household **6**=Hired machinery and operator **7**=Hired labor **8**=Other, specify				
		Land preparation	Planting	Weeding	Harvesting	Threshing/shelling
	Name	**C1-9a**	**C1-9b**	**C1-9c**	**C1-9d**	**C1-9e**
Up	1.					
	2.					
	3.					
Low	4.					

➢*Section C-2. Crop expenditure and profit*

COST in the last 12 months									
Crop	Total cost of seed (**GHC**) If you use **Own Seed**, write **OS** as well	Total cost of fertilizer (**GHC**)	Total cost of herbicide (**GHC**)	Total cost of pesticide (**GHC**)	Total cost of hired machinery/labor (**GHC**) (If you use **Household Labor**, write **HL** as well)				
					Land preparation	Planting	Spraying	Weeding	Harvesting
Name	**C2-1**	**C2-2**	**C2-3**	**C2-4**	**C2-5a**	**C2-5b**	**C2-5c**	**C2-5d**	**C2-5e**
1									
2									
3									
4									

INCOME in the last 12 months				
Crop	Total yield in bags (100kg jute sack)	Unit price (/100kg jute sack) **GHC**	Amount for sale (%)	Amount for home consumption (%)
Name	**C2-6**	**C2-7**	**C2-8**	**C2-9**
1				
2				
3				
4				

➢ *Section D. Livestock information*

(Filtering question) Do you manage any livestock? **1**=Yes **2**=No>>Move to ***Section E.***

Livestock Type **1**=Cattle **2**=Goats **3**=Sheep **4**=Chicken **5**=Guinea fowls **6**=Ducks **7**=Turkeys **8**=Donkeys **9**=Other, specify (Write owned number)	Who is most responsible for the livestock? **1**=Yourself **2**=Head **3**=Other, specify	How did you get the livestock? **1**=Inherit from your father **2**=Purchase with your money **3**=Gift from your husband **4**=Other, specify	Who mostly takes care for livestock? **1**=Head **2**=Fulani **3**=Son **4**=Grandson **5**=Yourself **6**=Other, specify	Total value **GHC**	Change in number in the last 12 months			Main motivation to own the livestock **1**=Sale for financial security **2**=Home consumption **3**=For festival **4**=For funeral **5**=Welcoming important visitors **6**=Other, specify
					Number consumed at home	Number bought	Number sold	
Name	**D1**	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**
( )								
( )								
( )								

《Question for the holder of chicken or guinea fowls》

(D9) If the chicken or guinea fowls produce eggs, who has the responsibility for using that production?

1=Owner of livestock **2**=The person mostly caring for the livestock **3**=Other, specify

(Main use) **1**=Home consumption **2**=For sale **3**=Reproduction **4**=Other, specify

➢ *Section E. Self-employment and Hired labor in the 12 months*

(Filtering question) Have you engaged in self-employment or hired labor apart from farming on your plot in the last 12 months?
*Including **Shea butter making** **1**=Yes **2**=No>>***Section F.***

If so, which activity do you work for? 1._____ 2._____ 3._____ 4._____

	BIZ code **See code below**	If you answer **1 or 2 in BIZ**		If you answer **3-5 as BIZ,**			If you get cash through this activity, what do you use? **1**=Buying ingredients for home consumption **2**=Crop production **3**=Education for children **4**=Business **5**=Other, specify	Who is the most responsible for the income from this activity? **1**=Yourself **2**=Head **3**=Other, specify
		Quantity of harvest / threshing as an earned income	Main use of products 1=Home consumption 2=For sale at the market**(GHC)** 3=Make snack/meals for sale**(GHC)** 4=Other, specify	Name of main food material	How to get material? **1**=Produce on your own plot **2**=Purchase from farmer **3**=Purchase at the market **4**=Purchase from the trader **5**=Produce from your own livestock **6**=Other, specify	If you answer **Purchase**, what was the source of money? **1**=Income of the crop production on your plot **2**=Income of your own livestock sale **3**=Allowance from your husband **4**=Other, specify		
	BIZ	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**
1								
2								
3								

《BIZ》 **1**=Groundnuts harvesting on other household's plot **2**=Rice threshing **3**=Food processing **4**=Food selling (e.g. Kurikuri, Koushi, Wagashi, Soya, etc.) **5**=Food trading **6**=Shea butter maker **7**=Taylor **8**=Miller **9**=Walking seller (soap, ingredients, etc.) **10**=Making natural soap **11**=General kiosk owner **12**=Other, specify

(CONTINUED)

	How many years of experience?	Business type **1**=Self-employment **2**=Wage/Hired labor	Operational type **1**=Permanent job **2**=Casual/seasonal job **3**=Occasional job **4**=Other, specify	Earning/sales in each month of the last 12 months (GHC)											
				RAINY SEASON						DRY SEASON					
	E8	**E9**	**E10**	May	June	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1															
2															
3															

(E10) Do you use cash, which you get through your self-employment or hired labor, without husband's permission?

1=Yes **2**=No **3**=Depending on the amount of price

➢*Section F. Non-labor Income: Susu, remittance and other service*

(Filtering question1) Have you received a remittance, credit, pension or food aid in the last 12 months? **1**=Yes **2**=No

(Filtering question2) Have you joined SUSU in the last 12 months? **1**=Yes **2**=No>>***Section G.***

	Type **1**=Susu **2**=Remittance/Cash assistance **3**=Other, specify	**Major source** **1**=Commercial bank **2**=Micro Finance Institute **3**=Local organization (communal) **4**=Friends / Community group **5**=Son/daughter **6**=Other relatives **7**=Money lender **8**=Other, specify	Who has the most decision-making of use? **1**=Yourself **2**=Husband **3**=Other, specify	**Main purpose of use** **1**=Education for children **2**=Medical fee **3**=Funeral **4**=Wedding **5**=Crop production **6**=Business of off-farm **7**=Alcohol/Tobacco **8**=Other, specify
No	**F1**	**F2**	**F3**	**F4**
1				
2				
3				

(CONTINUED)

	Frequency **1**=Monthly **2**=Weekly **3**=Not regularly (specify the situation)	Amount (**GHC**) in the last 12 months											
		RAINY SEASON						DRY SEASON					
No	**F3**	**May**	**June**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**
1													
2													
3													

➢ *Section G-1. Consumption and Expenditure*

Home consumption	**Frequency** **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Yearly **7**=None		**Home consumption**	**Frequency** **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Yearly **7**=None	
ITEM	**RAINY SEASON**	**DRY SEASON**	ITEN	**RAINY SEASON**	**DRY SEASON**
1. Maize			**13. Tomato**		
2. Millet/Sorghum			**14. Onion**		
3. Yam			**15. Garden egg**		
4. Rice			**16. Pepper**		
5. Cassava (Dried)			**17. Ayoyo**		
6. Sweet potatoes			**18.Bra (Fresh)**		
7. Soy beans			**19. Bra (Dried)**		
8. Other beans			**20. Tukari**		
9. Bread			**21. Meat (any)**		
10. Okra (Fresh)			**22. Fish (big)**		
11. Okra (Dried)			**23. Eggs**		
12. Groundnuts			**24. Milk**		
			25. Fruit (any)		

(G-wife-1) Do all of the household members (apart from babies) consume the same daily three meal? **1**=Yes **2**=No

(G-wife-2) How do you mainly get the cereals/vegetable/seasoning needed for cooking?
1=Husband provides the crops produced on his plot **2**=You provide the crops produced on your plot
3=Husband provides cash to buy **4**=You provide cash to buy by yourself **5**=Other, specify

(CEREALS)_____ (VEGETABLE)_____ (SEASONING)_____

➢ *Section G-2. Expenditure: Crop and cash distribution*

(G2-1) Do you receive any **cash** from your husband? **1**=Yes **2**=No>>Move to **(G2-2)**

(G2-1.1) If so, how often do you receive cash? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-1.2) If so, how much do you receive cash in total in the last 12 months? **Answer**_____

(G2-1.3) What is the use of provided cash? **1**=Buying ingredients for home consumption **2**=Other, specify

(G2-2) Do you receive any **crop** from your husband? **1**=Yes **2**=No>>Move to **(G2-3)**

(G2-2.1) If so, what kind of crop do you receive? **Answer**_____

(G2-2.2) If so, how often do you receive the crop? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-2.3) What is the use of provided crop?
1=Home consumption for all household member **2**=Selling at market **3**=Other, specify

(G2-3) Do you receive any **fertilizer** from your husband for your own farming? **1**=Yes **2**=No>>Move to **(G2-4)**

(G2-3.1) If so, how often do you receive the fertilizer? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-4) Do you receive **herbicides** from your husband for your own farming? **1**=Yes **2**=No>>Move to **(G2-5)**

(G2-4.1) If so, how often do you receive the herbicides? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Other, specify

(G2-5) Have you **borrowed cash** from husband or other wife in the last 12 months? **1**=Yes **2**=No>>Move to **(G2-6)**

(G2-5.1) Amount of money and the person whom you are borrowing currently **Answer**_____

(G2-5.2) The purpose you borrow money **Answer**_____

(G2-6) Have you **lent your husband or other wife the cash** in the last 12 months? **1**=Yes **2**=No>>Move to ***Section H-1.***

(G2-6.1) Amount of money and the person whom you are lending currently **Answer** _____

➢ *Section H-1. Working role and time use* ***Note: Answer of 1=Yourself** can include **own children** or **husband**, if necessary

(H1-1) Do you spend time **collecting firewood**? **1**=Yes **2**=No>>Move to **(H1-2)**

(H1-1.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-1.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-1.3) Who uses the firewood which you have collected? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-2) Do you spend time **fetching water**? **1**=Yes **2**=No>>Move to **(H1-3)**

(H1-2.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-2.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-2.3) Who uses the water which you have fetched? **1**=Yourself **2**=Whole household **3**=Other, specify

(H-1-3) Do you spend time **washing clothes**? **1**=Yes **2**=No>>Move to **(H1-4)**

(H1-3.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-3.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-3.3) For whom do you wash clothes? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-4) Do you spend time **washing dishes**? **1**=Yes **2**=No>>Move to **(H1-5)**

(H1-4.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-4.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-4.3) For whom do you wash dishes? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-5) Do you spend time **going to market**? **1**=Yes **2**=No>>Move to **(H1-6)**

(H1-5.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-5.2) For whom do you go to the market? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-6) Do you spend time on **general cleaning in the house**? **1**=Yes **2**=No>>Move to **(H1-7)**

(H1-6.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-6.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-6.3) For whom do you clean in the house? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-6.4) Do you clean in other wife's room? **(Polygamous only)** **1**=Yes **2**=No

(H1-7) Do you spend time on **general cleaning around house** ? **1**=Yes **2**=No>>Move to **(H1-8)**

(H1-7.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-7.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

(H1-7.3) For whom do you clean around house? **1**=Yourself **2**=Whole household **3**=Other, specify

(H1-8) Do you spend time **caring for kids**? **1**=Yes **2**=No>>Move to **(H1-9)**

(H1-8.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-8.2) Do you care for other wife's children when she asks for caring? **(Polygamous only)** **1**=Yes **2**=No>>Move to **(H1-9)**

(H1-8.3) How often do you care for other wife's children? **(Polygamous only)**

1=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally **6**=Other, specify

(H1-9) Do you spend time **cooking daily three meals for whole household members**? **1**=Yes **2**=No>>Move to *Section H-2*

(H1-9.1) How often do you do? **1**=Daily **2**=2-days shift **3**=Other, specify

(H1-9.2) How much time do you spend doing this activity per day? **Answer** _____ (hour)

➢*Section H-2. Working role: Daily working schedule*

In a typical daily schedule during RAINY and DRY season

	Activity code	
	1=Farming **6**=Praying **2**=Cooking **7**=Chatting/Playing a game with friends **3**=Working for off-farm business **8**=Sleeping/Taking a nap **4**=Fetching the water **9**=Cleaning/ Sweeping/Washing clothes or dishes **5**=Collecting firewood **10**=Other, specify	
Time grouping	**RAINY season**	**DRY season**
5am - 9am		
9am - 0pm		
0pm - 3pm		
3pm - 6pm		
6pm - 9pm		

★If there are any **major differences in a typical daily schedule between Rainy and Dry season**, please record below.
(e.g. condition of fetching the water, off-farm business hour)

➢*Section I. Power Relationship*

(I-1) In the last 30 days, has there been any physical violence in your household? **1**=Yes **2**=No>>Move to **(I-2)**

(I-1.1) If so, who was involved with the violence? **1**=Husband and wife **2**=Wife and wife **3**=Other, specify

(I-2) In the last 30 days, has there been any quarrel in your household? **1**=Yes **2**=No>>Move to **(I-2)**

(I-2.1) If so, who was involved with the quarrel? **1**=Husband and wife **2**=Wife and wife **3**=Other, specify

(I-3) Have you ever received a gift or money in exchange for sex from your husband? **1**=Yes **2**=No

(I-4) Do you have birth control? **1**=Yes>>Move to **(I-5)** **2**=No

(I-4.1) If not so, why don't you have birth control? **Answer**_____

(I-5) As for contraception, what do you think about that? **1**=Not needed **2**=Needed **3**=Neutral

(I-6) The important decisions in the family should be made only by the man of the family? **1**=Agree **2**=Disagree **3**=Neutral

(I-7) A wife has a right to express her opinion even when she disagree with what her husband is saying?
1=Agree **2**=Disagree **3**=Neutral

(I-8) A wife should tolerate being beaten by her husband in order to keep the family together? **1**=Agree **2**=Disagree **3**=Neutral

(I-9) It is better to send a son to school than it is to send a daughter? **1**=Agree **2**=Disagree **3**=Neutral

(I-10) Will you accept it if your husband wants you to stay at home for housework not to engage in business out of house?
1=Yes **2**=No **3**=Don't know

(I-11) When a wife has earned some money, she has the right to spend it on herself or her children without asking her husband?
1=Agree **2**=Disagree **3**=Neutral

(I-12) A wife is correct in refusing to have sex with her husband when she knows her husband has sex with other women?
1=Agree **2**=Disagree **3**=Neutral

(I-13) If a wife refuses sex, is it correct for her husband to withhold money from her? **1**=Agree **2**=Disagree **3**=Neutral

(I-14) If a wife refuses sex, is it correct for her husband to beat her? **1**=Agree **2**=Disagree **3**=Neutral

(I-15) Can you refuse to have sex when your husband demands against your wishes? **1**=Yes **2**=No

《Question for wife》 Special attitude to your husband

(Q-wife-1) Do you cook any special meal apart from daily meals only for your husband? **1**=Yes **2**=No>>Move to **(Q-wife-2)**

(Q-wife-1.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally

(Q-wife-2) Do you wash your husband's clothes? **1**=Yes **2**=No>>Move to **(Q-wife-3)**

(Q-wife-2.1) How often do you do? **1**=Daily **2**=Weekly **3**=Bi-weekly **4**=Monthly **5**=Occasionally

(Q-wife-3) Do you have any other attitude to your husband for expressing your love? **Answer**_____

(Q-wife-4) When do you sleep with your husband? **(Polygamous only)** **Answer**_____

(Q-wife-5) Do you think you get along with other wife in the same household? **(Polygamous only)** **1**=Yes **2**=No

(If not, give a reason for your answer) _____