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Women's position, dietary nutrient adequacy and nutritional status of children in rural Northern Ghana



**Women's position, dietary nutrient adequacy and nutritional status of
children in rural Northern Ghana**

MSc thesis

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Abstract

Background: The prevalence of malnutrition in terms of stunting, wasting and micronutrient deficiencies is high in rural Northern Ghana. It is questioned how the different domains of maternal empowerment and maternal health status relate to the nutrient adequacy of the diet and nutritional status of children in rural Northern Ghana. **Methods:** pre-existing data of the GAIN-study on child and maternal anthropometry and maternal socio-economic characteristics was elaborated with fieldwork in Karaga district in Northern Ghana. Within 51 households, mothers of children 6-23 months old were interviewed determining their level of empowerment regarding decision-making power in terms of household decisions, child care and finances, mobility, attitude towards and freedom from domestic violence. Also interviews were held with key persons in the area. **Results:** Different aspects of the position of women seem to relate differently to child nutrition. Whereas some domains do not affect children nutritional outcomes, others seem to benefit or harm children's diet. Findings revealed that 1) stunted children are more likely to have mothers who do not experience domestic violence, do not experience physical mobility constraints and with a higher age 2) wasted children are more likely to have mothers with an impaired health status and 3) educated mothers and mothers who do not experience domestic violence have a higher chance of having a child whose diet is nutrient inadequate. **Conclusion:** Policies and interventions need to consider the different impacts of domains of mother's position on children's nutritional outcomes and hence be sensitive to the context and culture.

Keywords: Women's position, maternal empowerment, maternal health status, dietary nutrient adequacy, nutritional status, children 6-23 months, rural Northern Ghana, agricultural and nutrition intervention.

Preface

From when I was a little girl, I was always on the hunt for (nice) food, and nutrition – and its effects – remained one of my passions ever since. During my study I have had the opportunity to study this topic from multiple perspectives; from a biological point of view during my bachelor Nutrition and Health and a psychological and sociological focus during my master programme Health and Society. However during this period, one thing remained on my wish list; studying nutrition in a cultural setting abroad. Already I learned a lot during courses and my first thesis and internship, but I felt I wanted to challenge myself even more both at an educational level as well as on a personal level. Therefore, I decided to follow this wish and conduct an additional research abroad. This led me to current project in rural Northern Ghana. Ghana has been a true adventure to me; challenging at moments but most of all a rewarding experience. I am grateful I got the opportunity to meet new people and got to know Ghanaian traditions and culture.

I would like to express my special thanks to all women who cooperated with this research and their willingness to answer personal questions. I would also like to thank Nasira, my research assistant and translator in the field for all her hard work and ability to comfort the women, Hassan and Hassan, the guide and driver in the field and Sofia for joining me in this adventure and supporting me during the two intense weeks of data collection. I enjoyed working with this team when visiting the 51 household in Karaga district. Also I would like to thank Hilde, Ilse and Inge for their guidance and feedback. I would like to thank Razak for his help with arranging the field work. Last, I would like to thank the Van Dam Foundation for making the field work in Ghana possible.



"Change the way you look at things and the things you look at change" – Wayne W. Dyer

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Abbreviations and Acronyms

BMI	Body Mass Index
FAO	Food and Agriculture Organization
GAIN	Global Alliance for Improved Nutrition
GDHS	Ghana Demographic Health Survey
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HAZ	Height-for-age Z-score
IDDS	Individual dietary diversity score
IYCF	Infant and young child feeding
SES	Socio-economic status
UNICEF	United Nations International Children Emergency Fund
WAZ	Weight-for-age Z-score
WHO	World Health Organization
WHZ	Weight-for-height Z-score

1. Introduction

In children, malnutrition appears to be a worldwide problem. On the one hand, a worldwide obesity epidemic is rising; on the other hand, in many parts of the world children are still experiencing undernutrition. Among children under the age of 5 years old, almost half (45%) of the deaths is attributable to undernutrition (Black et al., 2013). In contrast to other areas, Sub-Saharan Africa is falling behind in achieving a 50 percent reduction in the underweight prevalence goal set by the Millennium Development Goals (UNICEF, 2014). In Northern Ghana, incidences of poverty, food insecurity and malnutrition remain high, even though Ghana's overall wealth has increased the past years (WFP, 2012). In 2014, 24 percent of Ghanaian children under the age of five were stunted (i.e. low height for age), 13 percent were underweight (i.e. low weight for age) and 6 percent were wasted (i.e. low weight for height), as illustrated in Table 1. In Ghana, childhood malnutrition in terms of stunting, wasting and underweight, is worst in rural areas. Rates of malnutrition are particularly high in the predominantly rural Northern region of Ghana (GSS & GHS, 2015). As well, the prevalence of micronutrient deficiencies is high in Ghana (FAO, 2009). These deficiencies have implications for the quality of diets and in turn a healthy nutritional status (Arimond & Ruel, 2004; Dangour et al., 2012). A study analysing Demographic and Health Surveys held between 2010 and 2013 in ten Sub-Saharan countries, revealed that less than 35% of children between 6-23 months of age met the criterion of minimal dietary diversity (Na, Jennings, Talegawkar, & Ahmed, 2015). In the Northern region of Ghana, 10% of households are either severely or moderately food insecure (WFP, 2012). In Ghana, children's malnutrition is found to be related to poverty, maternal education, health care, family planning and regional characteristics (Van de Poel, Hosseinpoor, Jehu-Appiah, Vega, & Speybroeck, 2007). Also particular for the Sub-Saharan region is a higher prevalence of malnutrition among boys than girls (Garenne, 2003; GSS & GHS, 2015).

Table 1 Nutritional status of children (6-23 months) in Ghana (adapted from GSS & GHS, 2015).

	Stunting (%<-2 SD)	Wasting (%<-2 SD)	Underweight (%<-2 SD)
Ghana	24.0	6.0	13.0
Rural Ghana	29.1	6.4	14.5
Northern Ghana	43.8	7.9	23.6

Childhood malnutrition results from diets, which do not meet energy and nutrient requirements to support the rapid growth of infants and young (Brouwer et al., 2015). This can be the result of for instance food insecurity, maternal care practices and the quality of the health environment (Barrios, 2012). Maternal care can affect children's nutritional status both via maternal care practices (e.g. feeding and hygiene practices and the selection of an appropriate feeding context) and maternal resources for giving care (e.g. knowledge, physical and mental health, autonomy, low availability to health services, availability of time and social support) (Engle, Menon, & Haddad, 1997). When children are malnourished in early childhood, this hinders children's development, reduces (economic) productivity and human capital in adulthood, and is likely to be transmitted to following generations being poor and malnourished (Black et al., 2013; Ruel, 2010). Targeting children in the first two years of life is beneficial in terms of growth and recovery from malnutrition (Ruel, 2010). According to Ruel (2010), it is a window of opportunity to expose children between the age of 6 to 24 months old to nutrition intervention as they are very vulnerable and improving nutrition at a young age is positively associated with adult physical status, schooling, cognitive skills and productivity later in life.

1.1. Agricultural projects to improve nutrition

As malnutrition rates are high in rural areas, agriculture plays an important role to access food. Hence, interventions to improve agricultural production are developed, aiming to contribute to better diets and health. Ghana's population is predominantly rural and involved in agriculture (FAO, 2012). In the Northern region, 88% of households rely on agricultural production as their main livelihood activity (WFP, 2012). Typically, the farms are small, leading to limited market-oriented activities and a high percentage of subsistence farming; 77 percent of farmers are involved in subsistence farming (FAO, 2012). Therefore farmers have great difficulty, especially in the Northern rural areas, to transform their labour into more secure incomes. Especially rural Ghanaian women face difficulties finding employment and secure incomes (FAO, 2012). Households with smaller farms and which are poorer, and female-headed are found to be more food insecure than other households (WFP, 2012).

1.2. The pathways linking agriculture to nutritional status

To alleviate hunger and reduce food insecurity worldwide the green revolution was aimed at agriculture by maximizing food production (Godfray et al., 2010). Better developed agricultural systems may increase women's time available for caregiving practices of young children, improve the nutritional status of women, increase women's power in household decision-making, and benefit in this way particularly the poorest in society (Dangour et al., 2012).

However, increasing agricultural production does not automatically lead to improved nutrition (World Bank, 2007) or a reduction in the prevalence of malnutrition (Masset, Haddad, Cornelius, & Isaza-Castro, 2012). The link between improving agricultural production and improving nutrition is more complex, as production influences the whole food system through changes in prices, income, food availability and consumption (Dangour et al., 2012). Improving agricultural production does not always translate directly into more nutritious foods. Therefore it is important to address ways in which agriculture impacts nutritional outcomes (World Bank, 2007). Several pathways are identified explaining the relationship between food production and better nutrition and health (Masset et al., 2012; World Bank, 2007).

First, food production might influence health and nutrition by increasing the production of more (nutritious) food for the household's own consumption. Second, improved agricultural production indirectly affects health through improved employment and income. Increasing income-oriented production might translate into better child nutrition, although it is dependent on intra-household factors, like women's status, education, knowledge and decision-making power. For instance, when a woman is educated and has the ability to (partly) control resources like the income flow, she has the opportunity to determine how the food is distributed within the household, in turn affecting children's nutritional status. Third, adopting new production technologies might either stimulate a better income or a better diet through improvement and preservation of the nutritional content of foods. Fourth, empowering women might benefit children's health outcome. Agricultural interventions that empower women are particularly effective in improving nutritional outcomes, because women are more likely to invest in their children's health (World Bank, 2007). When women participate in agriculture, generating their own income, this enhances their control over resources; time allocation (i.e. balance between activities generating income and domestic chores); decision-making power regarding intra-household allocation of food, health and care; and women's own physical health (Ruel & Alderman, 2013).

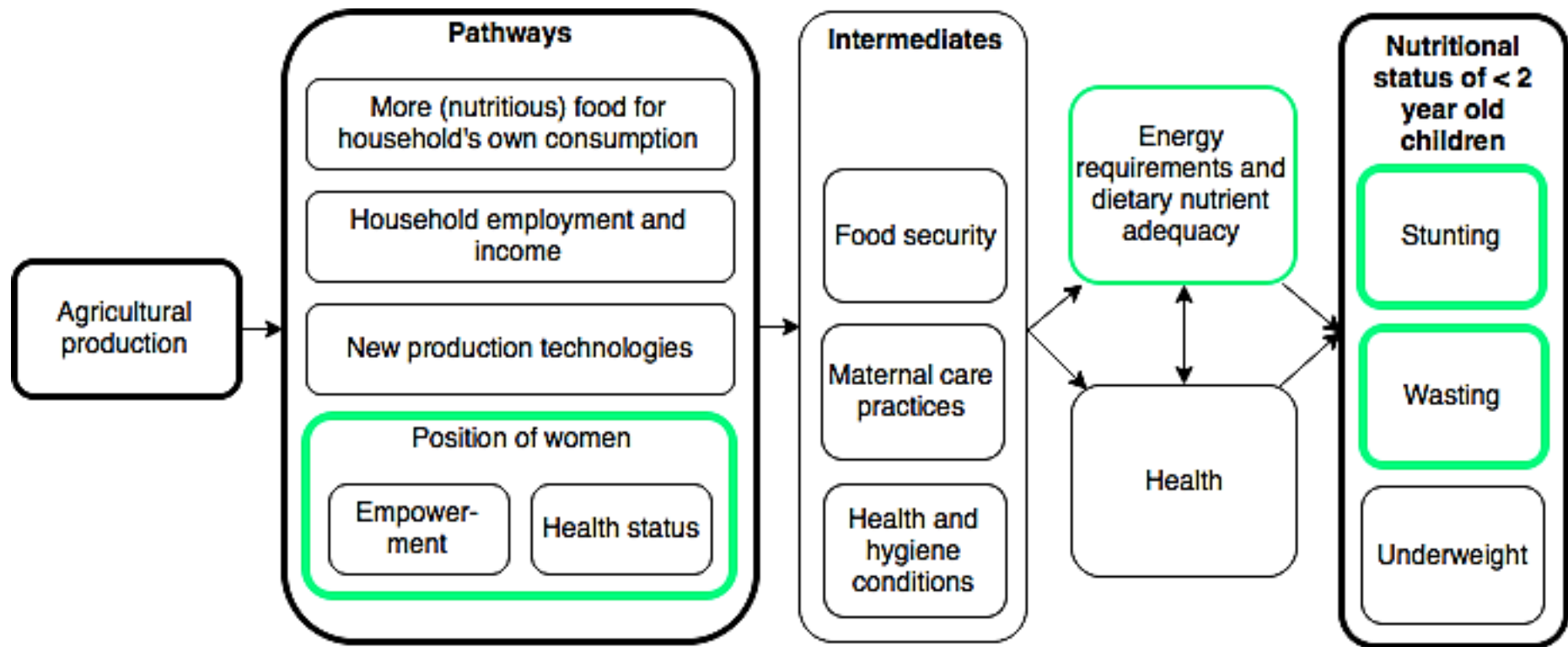


Figure 1 Pathways linking agricultural production to children's nutritional status. The highlighted boxes is the pathway of interest in the current research (adapted from UNICEF, 1990; World Bank, 2007)

Figure 1 represents the broader scope through which different pathways mediate the link between improvements in agricultural production and the nutritional status of children younger than two years old. The current research focuses on the role of women in efforts to increase the nutritional status of children (see boxes highlighted in green).

1.3. The pathway via women in the agriculture – nutrition link

The context of interventions seems to affect the effectiveness of the intervention. One of the proposed pathways in which agricultural production influences nutritional and health outcomes of children includes the position of women. This appears to be a characteristic moderating the effect of interventions targeting malnutrition by improving agricultural production. In Ghana, most men and women work in agriculture (FAO, 2012). According to Boserup (1989) families are organized as age-sex hierarchies; women and younger members of the same sex should be submissive to men and older members of the family. Men decide on the division of labor, in which men are the producers of cash crops and control mechanized equipment. Often women have a lower access to and use of land (FAO, 2012) and are the producers of subsistence crops (Boserup, 1989). To increase family income, men often assign as much domestic and manual agricultural work to women. In men's effort to improve productivity, the food crops grown by women are likely to be neglected, with serious effects on nutrition and family welfare in many countries. In this sense, agricultural interventions might indirectly benefit women (and children) by an increase of family income, but the benefits of many agricultural interventions (improved technology, training) are accrued to men (Boserup, 1989). In this sense, addressing improvements in agricultural production might not always lead to more resources for women to provide adequate care and nutrition, and in turn result in improved nutritional status of their children. Moreover, agricultural participation might affect women's health status through agriculture-associated diseases and increased energy expenditure, impairing their own health (Ruel & Alderman, 2013). In turn, maternal undernutrition impedes women's ability to take care of their children (Engle et al., 1997) and contributes to fetal growth restriction, which increases the risk of neonatal death and stunting by the age of two years old when children survive (Black et al., 2013). Moreover, interventions that increase women's participation in agriculture may also lead to negative nutritional outcomes of their children, because employment may decrease the time spent on caregiving practices (Barrios, 2012; Cunningham, Ruel, Ferguson, & Uauy, 2015). Hence, improving agricultural production, does not automatically translate into better health outcomes (World Bank, 2007) or better position of women (Boserup, 1989).

According to the FAO (2012) there is a lack of comprehensive information in labour markets on the multiple dimensions of social and gender inequalities in rural areas and in particular the Northern regions of Ghana. According to Malapit et al. (2014) West-African countries have the lowest scores of women's empowerment measured in an agricultural setting within Africa. More specifically, in Ghana women are more than three times as disempowered as men, where access to and decisions on credit and workload appear to be the big constraints on women's empowerment (Malapit et al., 2014).

A recent review suggests there is a need for additional research evaluating the impact of women's empowerment on child nutritional status (Cunningham et al., 2015). Despite the focus on women in many programs, only few studies measure women's empowerment in this pathway of stimulating agricultural production in order to improve nutrition (Ruel & Alderman, 2013). Cunningham et al. (2015) argue that agricultural interventions have shown to improve women's empowerment, but researchers did not specifically look whether improvement in women's empowerment translated

into improved child nutrition outcomes. As definitions of empowerment are not consistent in the literature, it is possible that different concepts of women's empowerment relate differently to child nutritional status (Cunningham et al., 2015) and nutrient adequacy of the diet (Na et al., 2015). Knowledge on the effect that different dimensions of empowerment have on nutrition is limited (Malapit & Quisumbing, 2015).

Malapit & Quisumbing (2015) argue the lack of knowledge is the result of the difficulty of measuring empowerment and because empowerment is culture- and context-specific. To stimulate a mother's ability to ensure optimal health of her children, it is important to understand women's control over household resources (Brunson, Shell-Duncan, & Steele, 2009). Cunningham et al. (2015) suggest that women's workload and time available, control over food and freedom of movement are aspects or dimensions of empowerment in need of urgent research.

Addressing women's position in this pathway generates insight in how agricultural production translates (or fails to translate) into better nutrition outcomes. This might benefit agricultural interventions, as this may increase understanding of the mediating role of women's empowerment on children's nutritional status and as suggestions will be made to improve the translation between agricultural production and children's nutritional status. It is questioned how the position of rural Northern-Ghanaian women within the household can stimulate the translation of agricultural production into better nutritional and health outcomes of children under the age of two years old.

2. Objective

The objective of this study is to understand the link between mother's position, including maternal empowerment and maternal health status, with the nutrient adequacy of the diet and nutritional status of infants and young children (6-23 months). Ultimately, of course the goal is to unravel how mother's position mediates the link between agricultural production and nutrition and health outcomes of children under the age of two years old. However, in this study we are only able to study how women's position relates to child nutritional status. The main objective in this study is how women's position - and its various dimensions or domains - relates to children's nutritional status and what underlying processes, mechanisms or forces drive these links. This brings me to the following research question:

Is the position of women in terms of women's empowerment and maternal health status related to the dietary nutrient adequacy and nutritional status of infants and young children in rural Northern Ghana?

Sub-questions

- Are the different domains of maternal empowerment related to the nutrient adequacy of the diet and nutritional status of children in rural Northern Ghana?
- Is the maternal health status related to the nutrient adequacy of the diet and nutritional status of children in rural Northern Ghana?
- What could be advised for future policy and/or agricultural interventions based on the findings of this study with regard to the empowerment, decision-making power and the health status of rural Northern Ghanaian women?

3. Theoretical background

3.1. Household

This research addresses the mother's position and nutritional status of children within the setting of a household. A household is viewed as a cohesive unit where daily activities are situated, decisions are made and resources are allocated (Schultz, 1974). In this research the following definition of a household is used: "all people who sleep under the same roof and share food from a common cooking pot" (Brouwer et al., 2015).

3.2. Dietary nutrient adequacy and nutritional status

Childhood malnutrition, in terms of fetal growth restriction, suboptimal breastfeeding, stunting, wasting and deficiencies of vitamin A and zinc, results in 3.1 million deaths among children annually (Black et al., 2013). When a diet is lacking micronutrients, this contributes to poor health (Dangour et al., 2012). From conception to the age of 24 months old it is critical to child growth and mental development to meet micronutrient requirements in the diet (The World Bank, n.d.). In Ghana, the diversity of diets is low and the prevalence of micronutrient deficiencies high (FAO, 2009). To address micronutrient requirements of diets, it is important to consider it as a potential outcome of agriculture. In turn, the micronutrient requirement of diets may contribute to the nutritional status (UNICEF, 1990), but literature is indecisive regarding this link. The nutrient adequacy of the diet in young children among 6 to 23 months old is reflected by the individual dietary diversity score (IDDS) (Arimond & Ruel, 2004; FAO, 2010). Infants and children between the age of 6 to 23 months are considered to have a diverse diet when they consumed products from at least 4 out of 7 food groups during the previous day (WHO et al., 2008). These food groups include: grains, roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables and other fruits and vegetables.

Stunting, wasting and underweight represent the main indicators of nutritional status (GSS & GHS, 2015). Children are regarded malnourished or severely malnourished when indices are below two or three standard deviations respectively from the median scores for the reference groups (GSS & GHS, 2015; WHO, 1997). A child is considered stunted when he or she is too short for his or her age (i.e. height-for-age score or HAZ); a condition reflecting a cumulative effect of chronic malnutrition. A child is considered wasted when being too thin for his or her height (i.e. weight-for-height or WHZ); a condition reflecting acute or recent deficits. Lastly, a child is underweight when being thin for his or her age (i.e. weight-for-age or WAZ). Underweight is an overall indicator of a population's nutritional health and does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). The current study focuses on stunting (chronic) and wasting (acute) as indicators for children's nutritional status.

3.3. Women's position in relation to child nutritional status

Childhood disadvantage with regard to health often stems from parental disadvantage (Graham & Power, 2004). Key factors that affect children's health, including a low household income, low maternal education, large family size, mother's early marital age, short birth intervals (i.e. the time between the births of children), limited (exclusive) breastfeeding, parental care practices and low maternal decision-making power (Barrera, 1990; De Schutter, 2013; Engle et al., 1997; Heaton, Forste, Hoffmann, & Flake, 2005).

Generally, women's status appears to affect child nutritional outcomes in three main ways, through food security, caring practices for women and children and the quality of the health environment (Barrios, 2012; Smith, Ramakrishanan, Ndiaye, Haddad, & Martorell, 2003). Food security is defined by secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life (FAO, 2011). Care is defined as the provision in the household and the community of time, attention, and support to meet the physical, mental, and social needs of growing children and other household members (Engle et al., 1997). The position of women might determines children's health, because women often appear to be the primary caregiver and most important health worker (Appoh & Krekling, 2005; Barrera, 1990). Women's main priority is to care for current offspring (offspring quality), as women are dependent upon their children for help in old age, whereas men mainly focus on producing additional offspring (offspring quantity), as children are likely to contribute more to family production of goods and services than they consume, if not sent to school (Boserup, 1989; Brunson et al., 2009).

UNICEF developed a conceptual framework identifying three levels of causes of undernutrition. The first level included basic causes regarding the political, economic and ideological structure of societies. Secondly, the framework identified the factors care, household food security, and a healthy environment, as determinants of the nutrient intake and health of children. The nutrient intake and health of children in turn represented the third level of immediate causes of maternal and child undernutrition. Malnutrition can be the result of diets which do not meet nutrient requirements or diseases preventing the body from absorbing the nutrients (UNICEF, 1990). Engle et al. (1997) expanded this framework and stressed the importance of both care practices and maternal resources for care as determinants of child nutrition (see Figure 2). Care practices include complementary feeding and psychosocial care; feeding practices; responsiveness of the caregiver to the child's cues; and the selection of appropriate feeding context (Engle et al., 1997). Resources for caregiving include education, knowledge and beliefs; physical health and nutritional status; mental health and self-confidence; autonomy and control of resources; reasonable workload and availability of time; and family and community social support.

When women's status is higher, they have a stronger control over household resources, less time constraints, more access to information and health services, better mental and physical health. This enables women to provide higher quality care to their children, positively influencing the nutritional status of her children (Smith et al., 2003).

In the next section, two aspects of women's position are considered affecting the nutritional status of children. First, it is explained what maternal empowerment comprises and how it relates to children's nutritional status. A distinction is made between different empowerment dimensions or domains, which may relate differently to children's nutritional status, including decision-making power (household decisions, child care decisions, financial decisions), mobility, attitude towards domestic violence, freedom from domestic violence, maternal socio-economic status (i.e. education, occupation, earnings) and marriage characteristics (i.e. spousal age gap, age at marriage, polygamy). Second, the maternal health status is included as a determinant for children's nutritional status.

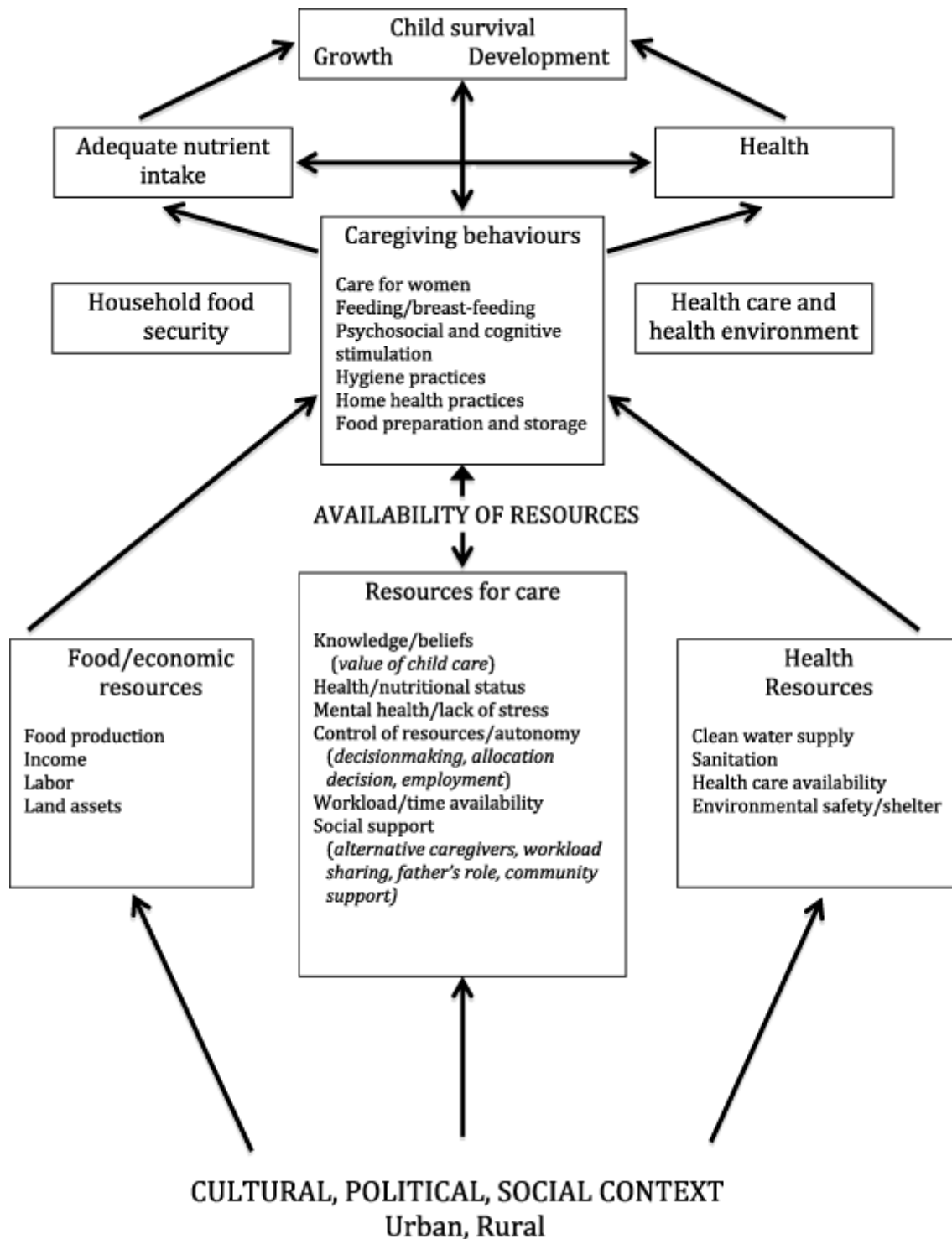


Figure 2 Key aspects of women's empowerment important for child care practices and nutritional status. Adapted from (Engle et al., 1997).

3.4. Empowerment and maternal decision-making power

This research considers *empowerment* in relation to children's health status. Empowerment is becoming more prevalent in research addressing children's malnutrition (Barrios, 2012; Brunson et al., 2009). As women are more likely to invest in the basic food and health needs of their children than men (Engle et al., 1997), an empowered woman, able to control household resources, has the opportunity to provide a better diet for her children.

Empowerment often refers to notions of power, autonomy, agency, control and decision-making power (Cunningham et al., 2015). However, literature does not render a consistent definition of empowerment (Brunson et al., 2009), but often captures aspects of control over (household and social) resources, household power relations (bargaining power, decision-making power or conjugal power), access to knowledge and information, physical mobility (are they allowed to leave the house), workload and time, education and social support. For instance, the often-cited definition of Dyson and Moore (1983) refers to autonomy as the capacity to manipulate one's personal environment. "*Autonomy indicates the ability – technical, social, and psychological – to obtain information and to use it as the basis for decisions about one's private concerns and those of one's intimates*" (Dyson & Moore, 1983). More specifically, empowerment consists of two components needed to exercise life choices, including agency and resources (Lee-Rife, 2010; Upadhyay et al., 2014). Agency is the ability to define and act upon goals and resources is the ability to exercise agency (Lee-Rife, 2010).

Researchers studying the effect of maternal autonomy on children's health status show mixed results (Barrios, 2012; Cunningham et al., 2015). A study conducted in sub-Saharan Africa showed mixed results for the effect of maternal empowerment on young child feeding practices; in Mali, Rwanda and Sierra Leone it was positively associated, in Benin and Niger it was negatively associated and in some countries the study did not show an effect (Na et al., 2015).

Several studies show that women with more autonomy or more bargaining power relative to their husbands have children with better nutritional status (Coffey, Khere, & Spears, 2013; De Schutter, 2013; Lépine & Strobl, 2013). In Northern Ghana, Malapit and Quisumbing (2015) argue women's empowerment is more strongly associated with the quality of infant and young child feeding practices, and only weakly child nutritional status. It is argued that younger children are more likely to benefit from empowered mothers, because they are more dependent on their mother regarding feeding, care and healthcare seeking (Cunningham et al., 2015). In contrast, Brunson et al. (2009) show that addressing women's empowerment as a tool to target children's nutritional status is not effective for children under the age of two years old, but is for children under five. They argue children under the age of two years old are breastfed, serving as a buffer against changes in food availability, whereas older children are not. When increasing mothers' autonomy, this could have large effects on children's early-life human capital accumulation (Coffey et al., 2013).

On the other hand, some articles do not find an effect of higher levels of maternal autonomy on child nutritional status in terms of stunting, wasting or underweight (Begum & Sen, 2009; Bose, 2011; Malapit et al., 2014) and nutrient adequacy of the diet in terms of a dietary diversity score (Na et al., 2015). For instance, Malapit et al. (2014) do not find a relationship between women's empowerment and children's nutritional status in a study conducted in thirteen countries including Ghana.

3.4.1. Domains of empowerment

As these mixed results implicate, the level of empowerment can differ between contexts, domains of empowerment (Lee-Rife, 2010; Upadhyay et al., 2014), and countries (Na et al., 2015). Many studies demonstrate that women may be empowered in one domain but not in others (Lee-rife 2010). Women's empowerment is often measured by the decision-making power of women relative to their husbands (Gwako, 1997; Upadhyay et al., 2014). Together with mobility and attitude towards domestic violence, decision-making power is regarded as a direct measure of empowerment (Cunningham et al., 2015; Lee-Rife, 2010). However, quantitative research focused on women's empowerment often include empowerment resources, like education, family structure, age at marriage, spousal age gap, as constructs either confounding the effect on nutritional status or as indirect indicators of empowerment (Coffey et al., 2013; Cunningham et al., 2015; Lee-Rife, 2010). Because of the complexity of measuring empowerment directly, studies have included these variables as indirect proxies for empowerment as these also shape empowerment (Cunningham et al., 2015). In the following section, the domains for empowerment are distinguished between direct and indirect indicators of empowerment.

Direct indicators of empowerment

Decision-making power

Empowerment is often measured by the level of decision-making power of women relative to their husbands (Cunningham et al., 2015; Upadhyay et al., 2014). Their level of empowerment is indicated by the extent to which women have a say in decisions with regard to for instance the household, child care or finances.

In general women's decision-making power seems to positively affect weight-for-age (HAZ), weight-for-height (WHZ) and weight-for-age (WAZ) scores in Sub-Saharan Africa (Smith et al., 2003). More specific, Shroff et al. (2011) show decision-making power with regard to household decisions is associated with WHZ and WAZ, but not with HAZ. Furthermore, they show that decision-making power in terms of child care is positively related to HAZ. With regard to financial decision-making, it is shown that women with higher financial autonomy, have a lower chance to have a child which is stunted (Shroff, Griffiths, Adair, Suchindran, & Bentley, 2009) and a higher chance that a child meets the minimum recommended dietary diversity score (Na et al., 2015). It is suggested that women with higher financial autonomy, have better access to food and food distribution to children (Na et al., 2015).

Mobility

Several recent studies on women's empowerment included mobility as indicator of empowerment (Coffey et al., 2013; Shroff et al., 2011; Shroff et al., 2009). However, Cunningham et al. (2015) argue that in the empowerment literature the domain of mobility is lacking. Mobility is a measure of empowerment comprising of the freedom of movement outside the house. Constraints on women's physical mobility restricts their ability to make independent decisions (Desai & Johnson, 2005). Therefore, women who are less empowered, tend to be less mobile outside the home (Coffey 2013). Women with the freedom to move are less likely to have a stunted child (Shroff et al., 2011; Shroff et al., 2009).

Domestic violence

In some studies, the attitude towards domestic violence and freedom from domestic violence, together with decision-making power, and mobility, are used as concepts to determine maternal empowerment (Johnson & Rogers, 1993; Na et al., 2015; Shroff et al., 2011; Shroff et al., 2009). This dimension of domestic violence considers whether women accept domestic violence under unjustified situations and whether they experience domestic violence (Upadhyay et al., 2014). Domestic violence may represent women's empowerment as it can constrain women's freedom to exercise choice (Lee-Rife, 2010). Women may avoid participation in decision-making, as they might believe that defiance may lead to domestic violence (Hindin, 2000). Women with lower empowerment have a higher chance of domestic violence (Ludermir, Lewis, Valongueiro, de Araújo, & Araya, 2010; Na et al., 2015). However, this indicator might better predict behavior stimulating women's own welfare rather than children's welfare (Na et al., 2015).

Indirect indicators of empowerment

Workload

Women's workload may be an overlooked domain of empowerment, which may relate to a mother's ability to provide good care for her children (Cunningham et al., 2015). When women have less power compared to men, they are likely to have tighter time constraints (Smith et al., 2003). Compared to men, women spend more time on domestic activities (FAO, 2012). Women with a higher workload have children with poorer weight-for-age Z-scores (Cunningham et al., 2015).

Socio-economic status

Maternal socio-economic status is captured by variables such as maternal education, occupation and earnings (Darak et al., 2015). The socio-economic circumstances under which children grow up, appear to be related to compromised health in adult life (Graham & Power, 2004). Thus the socio-economic status (SES) and health are related and carry over across generations. The socio-economic status and household food security is associated with an increased dietary diversity (FAO, 2010). Because mother's education and earnings are also related to children's nutritional status, it is likely that the link between empowerment and nutritional status is confounded by SES (Coffey et al., 2013). Socio-economic determinants influence children's health, because women often appear to be the primary caregiver and most important health worker (Appoh & Krekling, 2005; Barrera, 1990).

Socio-demographic status – maternal education & occupation

Education is seen both as a determinant mediating the link between empowerment and nutritional outcomes (and thus, confounding the effect of maternal autonomy on child nutritional status) as well as indirect indicator of empowerment. Children of more educated mothers have better height-for-age scores (Appoh & Krekling, 2005; Barrera, 1990; Barrios, 2012; Coffey et al., 2013). Maternal education might benefit children's nutritional status, because it might 1) increase the ability to earn an income, 2) increase the value they attach to and the time willing to commit to care-giving, and because it 3) stimulates egalitarian decision-making processes (Barrios, 2012; Engle et al., 1997; Gwako, 1997).

First, education increases the chance of the ability to provide their own income. This can either increase or decrease the risk of malnutrition. On the one hand, maternal employment might increase earnings, stimulating decision-making power. This in turn might decrease the risk of children's malnutrition as the mother is better able to control resources. When women have more control over household income, she may direct larger amounts of food to children (Engle et al., 1997). On the

other hand, employment might increase the risk of children's malnutrition, when mothers leave the home for employment (Barrios, 2012). Second, an educated woman is better able to appreciate the importance of care-giving. Therefore they are more likely to commit more time to child care, seek help if children fall sick and to participate in programs targeted at health and nutrition than less educated women (Engle et al., 1997). Third, an educated woman has a higher chance of joining modern wage employment, which she can use to bargain for more power in household decisions. The more power a woman has, the more her concerns are reflected in the household's final decisions (Gwako, 1997). Likewise to the first pathway with the intermediate of maternal employment, higher maternal decision-making power, allow mothers to gain control over household resources needed for good care, which enables her to provide effective child nutrition and larger amounts of food going to children, ultimately likely to impact child growth (Barrios, 2012; Engle et al., 1997)

Age

The age of women can be used as a proxy for empowerment. As women age, their say in decision-making tends to increase (DeRose & Ezeh, 2009; Lee-Rife, 2010). Especially, when she transforms from mother to mother-in-law women's empowerment tend to increase (Lee-Rife, 2010).

Marriage characteristics

Some marriage characteristics may also shape empowerment, including age at marriage, spousal age gap and monogamy vs polygamy (Upadhyay et al., 2014). For instance, as power increases with age (DeRose & Ezeh, 2009), spousal age gap also represents differences in power between spouses (Upadhyay & Hindin, 2005). When spousal age differences are smaller, mobility restrictions tend to be lower (Lee-Rife, 2010). Also, in polygynous households children have significantly lower height-for-age Z-scores (Wagner & Rieger, 2014) and higher infant mortality rates (Smith-Greenaway & Trinitapoli, 2014) compared to children from monogamous mothers. Moreover, Wagner & Rieger (2015) show that lower-ranking wives and a bigger ratio of married women to men negatively affects child height. However in communities with many polygamous families, decision-making patterns do not appear to be different between monogamous and polygynous unions (DeRose & Ezeh, 2009) and children's nutritional status might even be higher in polygamous households compared to monogamous household within the same community (Lawson et al., 2015).

Number of children

In many societies, women's status is tied to number of children women bear (Hindin 2000). When women are subordinated to men, this is conducive to larger family sizes, because they are dependent upon their children in their old age (Boserup, 1989). On the other hand, when women are more empowered, the mean of the number of children is lower and birth intervals longer, because an empowered women's opinion is more reflected in final decisions regarding family planning compared to women with less power (Gwako, 1997; Upadhyay, 2014). The amount of children and the birth order affects children's nutritional status. A child with more (older) siblings has a higher chance of being stunted, because the competition for food increases (Barrios, 2012).

3.4.2. Life course Perspective

The level of empowerment is a product of prior empowerment (Lee-Rife, 2010; Upadhyay et al., 2014). A shortcoming of many studies on women's empowerment is that it does not acknowledge the accumulation of experiences on the level of empowerment over one's life course (Lee-Rife, 2010). The life course perspective addresses individuals with regard to various past life stages and experiences and the impact of changing societies and social networks on these developing lives

(Elder, 1994). With regard to women's autonomy and health outcomes, Das Gupta (1995) argues that women's empowerment changes over different stages of her life course; in some societies it evolves as a woman grows older and in some societies, women's autonomy falls over her life cycle. Women spend part of their life subordinated to men and older women in many societies, affecting health outcomes of both women and their children. In what Gupta refers to as 'pattern-two societies', such as South Asia, women's autonomy increases with age, in which the couple typically lives with the husband's parents, independent financial means lack and bonds between and within different generations tend to be strong. The focus in this kind of society is on the joint household rather than the conjugal unit. As a consequence of low autonomy, women's needs are neglected, resulting in higher death rates in stages with lower power. Usually these stages include childhood and reproductive years (Das Gupta, 1995).

3.5. Maternal health status

Besides empowerment, maternal health status is included in this study as a determinant of the position of women. Maternal health status refers to the Body Mass Index (BMI) of the mother herself. Addressing women's nutritional outcomes and physical health, is seen as an opportunity to boost nutrition interventions for infants and young children (Ruel & Alderman, 2013). Also in agricultural interventions addressing children's nutritional status, it might be important to consider women's health status. Women's health status is affected by agricultural participation. For instance, agricultural production diversity is benefits maternal and children's nutritional status and diversity of the diet (Malapit, Kadiyala, Quisumbing, Cunningham, & Tyagi, 2015). Also, better developed agricultural systems increases the nutritional status of women (Dangour et al., 2012). On the other hand, agriculture might impair women's health and nutrition, via exposure to agriculture-associated diseases and an increased energy expenditure, in turn affecting agricultural productivity and income (Ruel & Alderman, 2013).

According to Engle et al. (1997) the pathway through which poor maternal health status affects children's nutritional status, is via caregiving practices. When the maternal health status is poor, this may affect her caregiving practices (Engle et al., 1997). Maternal health status can hinder caregiving practices in two ways. First, a low maternal health status in terms of BMI, may directly affect productivity and energy levels. In turn, this may affect her ability to care for her children. On the one hand this might result in a lower responsiveness to children. On the other hand, lower energy might also lower her ability to work, increasing her time spent in the home. Second, biological consequences of maternal malnutrition might indirectly affect children's health outcomes through pregnancy and lactation. When the mother is malnourished during pregnancy, this leads to fetal growth restriction, increasing the risk of neonatal deaths and child stunting (Black et al., 2013). In this sense, it is important to target the issue of child malnutrition at the early stage of pregnancy, rather than addressing malnutrition in infants and young children when it is already onset. Ruel (2010) shows targeting pregnant women is more effective than targeting underweight children (Ruel, 2010).

Furthermore, maternal health relates to women's empowerment; when a woman has a higher status, this may positively affect her physical health (Engle et al., 1997; Smith et al., 2003), in turn affecting her ability to take care of children and children's nutritional status, underlining the multidimensional character of empowerment and potential of addressing women's empowerment in targeting children's nutritional status.

3.6. Hypothesis

As mothers typically are the primary caregivers of children, it is assumed that maternal autonomy is an important determinant of the nutrient adequacy of the diet and the nutritional status of children. Since empowerment is a multidimensional concept, different domains of empowerment may relate differently to children’s nutritional outcomes. Regarding the direct indicators of empowerment, it is expected that decision-making power with regard to the household, child care and finances, the freedom to move, non-acceptance and freedom from domestic violence, positively affect children’s dietary nutrient adequacy and nutritional status. Also, it is hypothesized that women with a lower workload, better socio-economic status (e.g. education, occupation, earnings), higher age (at marriage), smaller spousal age gap, monogamous marriage and lower number of children are more empowered, and hence stimulates children’s dietary nutrient adequacy and nutritional status. With regard to maternal health status, it is expected that women with a higher BMI are better able to take care of their children, in turn affecting their health and nutritional outcomes. Altogether, it is hypothesized that empowered mothers and mothers with a better health status have a lower chance of having a stunted or wasted child or a child whose diet is not nutrient adequate.

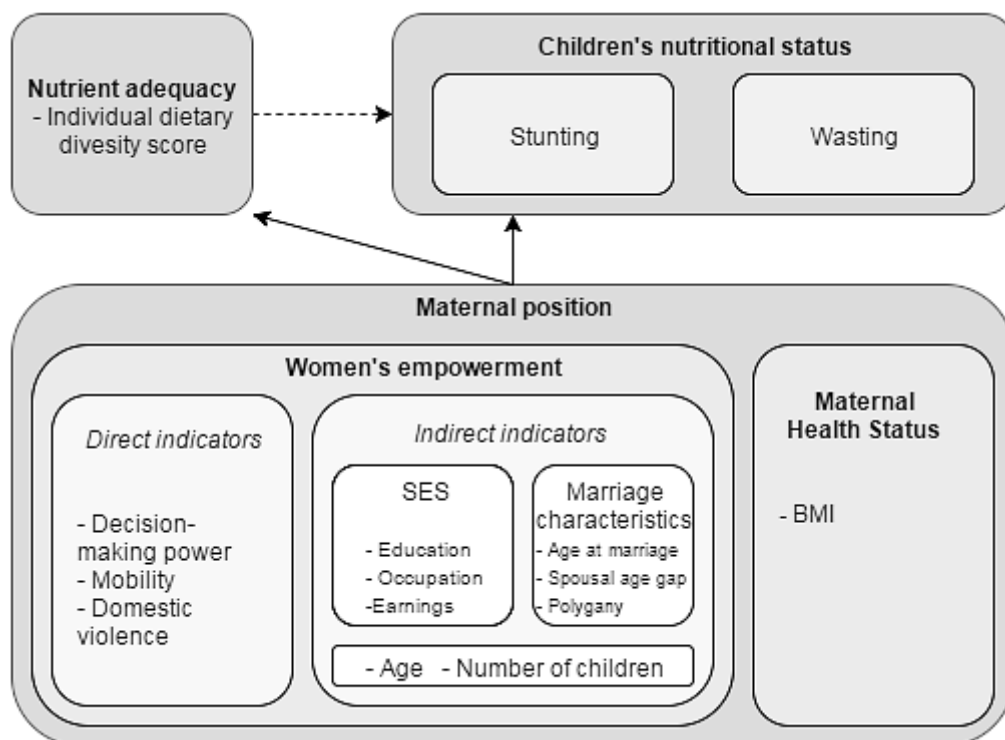


Figure 3 The hypothesized role of different aspect of women's position in children's nutritional status and measured mechanism of current research.

4. Methodology

The current study was part of a larger research called the Global Alliance for Improved Nutrition (GAIN) Study (Brouwer et al., 2015). This study aims to improve the nutritional status of young children in farming communities in both Northern and Southern Ghana. By improving infant and young child feeding (IYCF) practices, linkages between agriculture and nutrition are strengthened. Strategies are identified to improve the nutritional quality of diets using locally available foods. One of the objectives is to create understanding about the cultural, social and economic contexts of infant and young child feeding and how the acquisition of infant child food practices is facilitated and hampered. A Food Consumption Survey of infants and young children (6-23 months) was conducted to develop a set of evidence-based, population-specific, food-based recommendations (FBRs).

24-hour recalls were conducted to provide dietary data of infants and children 6 - 23 months old. First, demographic and socio-economic characteristics were determined using a semi-structured questionnaire. Data included, age, sex, education, occupation, marital status, household assets and landownership. Second, data on household security using the household hunger scale was assessed. Third, quantitative dietary intake data was collected of children 6-23 months old. Last, anthropometric measures (height, weight, mid-upper arm circumference) were done of both the mother as the index child.

4.1 Study design and procedure

To answer the research question *“Is the position of women in terms of women’s empowerment and maternal health status related to the dietary nutrient adequacy and nutritional status of infants and young children in rural Northern Ghana?”* two cross-sectional study designs were utilized. To gain insight into the pathway in which agriculture relates to IYCF practices and children’s nutritional status, this research elaborates on the GAIN study (first cross-sectional study) by collecting additional data on women’s empowerment (second cross-sectional study). To study the link between maternal position and children’s nutrition outcomes a method called triangulation was used, which combines different research methods (Ebrahim & Bowling, 2005). Interviews were conducted with a sub-sample of the GAIN study, including mother of 51 households in rural Northern Ghana. The interview comprised of structured questions and a semi-structured part. Moreover, three semi-structured interviews were held with key persons.

Fieldwork was carried out in November 2015 and lasted for two weeks. Per day, three to five households were visited. Prior to the start of the interview, the consent of the head of the household was acquired for the interview (see appendix I). To ensure mother’s presence during the visit, households were informed prior to the field work. At the start of the interview women were informed about the topic and confidentiality of the research, and were given the opportunity to ask questions if something was unclear. The interviews were conducted with the help of a research assistant who translated the questionnaire from English into Dagbani, the local language in the Karaga district. The answers were translated back into English and documented. Based on recommendations of previous studies within the larger study (Van Roekel, 2015) a woman was selected for translating, because mothers might feel more comfortable to speak about personal things with a woman. When the mother was not the primary caregiver (e.g. because she deceased), the interview was conducted with the primary caregiver, like the grandmother or the aunt. A back-up list was created based on children from the same age group, IDDS and community. One household of the initial list was replaced by the back-up, as the mother had travelled. As the data collection was

carried out in November 2015, it must be noted that the children from the study population did not fall in the 6 – 23 months range anymore compared to the first data collection wave in May 2014 part of the larger research. After completing the interview, the households received a bar of soap to thank them for participating. After the fieldwork in Karaga district, three semi-structured interviews were held with key persons.

4.2. Study area



Figure 4 Map of Ghana indicating Karaga District (red) in Northern Ghana (National Geospatial Intelligence Agency, 2014).

In line with the larger GAIN study, the Karaga district in Northern Ghana was selected. Karaga is within the Guinea Savannah vegetation zone and typically has an uni-modal rainy season from April to September (Brouwer et al., 2015). Karaga district is relatively young. Therefore there is not a lot data (e.g. nutritional status of children 6-23 months old) for this district within the Northern region. However the Ghana Demographic Health Survey (GDHS) indicated that malnutrition rates among young children are high, implying suboptimal IYCF practices. The district has a population of 77,706, with 48% men and 80% of people live in a rural area. Households comprised on average of 10 people. The district’s administrative capital is Karaga (GSS, 2012). In Karaga district 17.8 % of households are food insecure and 34.7 % of households live in the two poorest wealth quintiles (WFP, 2012).

4.3. Study population

During the first data collection wave of the larger research, parents of children (6-23 months) were interviewed. Data of 337 households in the Karaga district were collected in May 2014. The study population was divided into infants aged 6-8 months old (breastfed), infants aged 9-11 months old (breastfed) and children between 12- 23 months (breastfed and non-breastfed) (Brouwer et al., 2015). Data was collected concerning children’s dietary data. Based on sample size calculations, the study included 100 children per age group (400 in total). Per age group, 100 households were randomly selected. However, there were not enough children between 12-23 months old which were not breastfed; only 37 cases were selected in non-breastfed children 12-23 months. The final sample comprised of 337 children.

4.3.1. Primary study population

The current research narrowed the study population further down. Due to practical considerations, 51 cases were selected from the 337 household selected in the larger research. These 51 households were considered the primary study population of the current study.

The selection of households was adopted from another sub-study of the larger GAIN-project (Van Roekel, 2015). Based on different levels of IDDS, total child food expenditure, household total land use and hunger presence she selected 51 households. Households were first allocated to one out

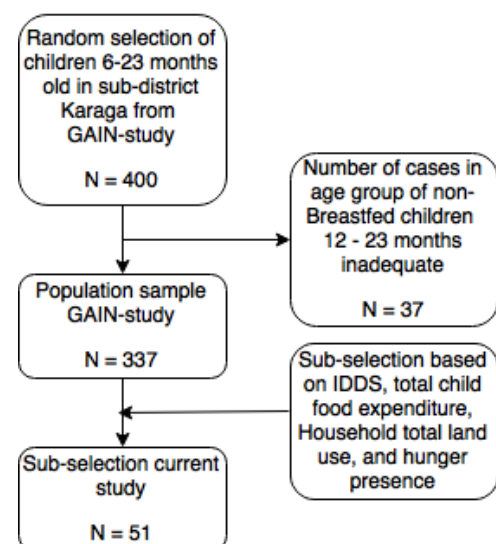


Figure 5 Flowchart of sample selection.

of three levels (high, average or low) of the selection characteristics IDDS, total child food expenditure and total land use. Hunger presence was categorized by the presence or absence of hunger. A grid was created in which all households were allocated to either low, average, or high levels of IDDS, expenditure and land use; and the absence or presence of hunger. From each group, two households were randomly selected. However, not all groups contained households satisfying the criteria (e.g. none of the households met the criteria of IDDS 0, 1 or 2 good groups, high expenditure, high land use and hunger presence) and hence it was not possible to select two household from all the categories within the grid. Therefore, the final sample included 51 households, representing different levels of IDDS, total child food expenditure, total land use and hunger presence.

To be able to provide stronger data on this smaller sub-sample, it was chosen to adopt this selection. With regard to socio-economic variables (proxy for women's empowerment), it was tested whether the study population represented different levels of education, occupation and earnings. However the population was not varied with regard to these variables; the majority of women was not educated, farmer and earned between 1 and 3 GHC per week.

4.3.2. Secondary study population

Additional to the interviews with households, three semi-structured questionnaires were conducted with persons knowledgeable about women's empowerment in rural Northern Ghana. An interview was held with the head of the Community Nutrition department of the University of Development Studies in Tamale, a health promotion officer in the Karaga district and an independent researcher on post-harvest loss selling mobile storage bins, which could empower women by enabling them to control their own yield.

4.4. Data collection

4.4.1. Direct measures of empowerment

Semi-structured questionnaire

Autonomy and decision-making power was measured using a semi-structured questionnaire (see Appendix II). Many studies measuring women's autonomy include household decision-making, child care and mobility (Begum & Sen, 2009; Hindin, 2000; Monal Shroff et al., 2009). Women might be empowered in one domain, but not in another (Lee-Rife, 2010) and these different domains or dimensions of women's empowerment might relate differently to child nutritional status (Cunningham et al., 2015; Malapit & Quisumbing, 2015). Therefore, different aspects of empowerment were included. Based on Shroff's (2011) questionnaire, domains measuring autonomy included household decision-making autonomy, child care decision making autonomy, financial autonomy, mobility autonomy and non-acceptance of domestic violence. First, household decision-making autonomy was tested with twelve questions measuring whether the participant had a role in decisions regarding small and large household purchases or decisions. Respondents were asked to indicate whether 'others in the household', 'jointly with others in the household' or the 'respondent' herself decided upon the 12 statements. In case 'others' (jointly) decided, it was asked who this other person(s) is. For instance, participants were asked "what food to buy for family meals?". Second, child care decision-making autonomy was measured by four questions regarding the feeding of colostrum, exclusive breastfeeding, child immunization and sickness of the child. Again the respondent was requested to indicate whether 'other in the household', 'jointly with others in the

household' or the 'respondent' decided upon these issues. Third, financial autonomy was measured by using eight statements regarding control over finances. The first three questions comprised whether the respondent felt free to buy herself a dress, a small item of jewelry, or a small gift, where she could answer 'yes' or 'no'. The remaining five questions included five situations where the respondent was asked to indicate if this was true 'never', 'some of the time' or 'all the time'. Fourth, women's freedom of movement was charted. Respondents were asked to indicate whether they needed to ask permission to her husband or senior family members in case she wished to go to seven different places, for instance the local market or fields outside the village. Women could answer 'always', 'some of the time' or 'never'. Fifth, women's attitude towards domestic violence was tested. Women were requested to indicate whether they felt it was justified for a man to beat his wife in six different situations. For instance, when he suspects her of being unfaithful or if she doesn't cook food properly. The answering options ranged from 'always', 'some of the time' to 'never'. Lastly, women's freedom from domestic violence was measured. Women were asked if her husband ever hit or beat her. The majority of responses were made on a 3 point Likert scale, where answers represented high to low levels of autonomy. For instance, women could indicate they never, some of the time or always had to ask permission to go someplace, represented high, average and low levels of autonomy respectively.

Interview

Subsequent to the questionnaire, a semi-structured interview was conducted with the mother of the index child. A semi-structured interview ensures topics and themes relevant to the research questions to be covered, but allows the respondent to expand on topics she feels are important as well (Ebrahim & Bowling, 2005). Prior to the interview, the consent of respondents was asked to record the interview. The research assistant conducted the interviews in Dagbani. Interviews lasted between five and fifteen minutes. After data collection, the research assistant transcribed the interviews and translated them back into English. All interviews were checked for patterns in the relationship between mother's position and children's malnutrition.

The interview contained questions regarding general decision-making power, domain-specific decision-making power, and decision-making power from a life course perspective, gender and age differences, workload and programs addressing empowerment, agriculture and nutritional status implemented in the area (see appendix II part 2). The interview included different aspect of autonomy which are suggested to be in need of urgent research, including women's workload and time available, control over food and lack of freedom of movement (Cunningham et al., 2015).

4.4.2. Indirect measures of empowerment

Several proxies for empowerment were included in this study (i.e. maternal education, occupation, earnings, the age of the mother at marriage, spousal age gap, polygamy, number of children). The larger study collected data on demographic and socio-economic characteristics, including maternal education, occupation, earnings, landownership. This data was used for current study as indirect measures for empowerment and shown to affect children's nutritional status (Barrios, 2012; Coffey et al., 2013; Heaton et al., 2005).

Other indirect measures for empowerment were determined as part of the semi-structured questionnaire (See appendix II), including marriage characteristics (i.e. age at marriage, spousal age gap, polygamy) and the number of boys and girls of the same mother and within the total household.

The age of mothers and fathers (to calculate the spousal age gap) was determined by using health cards or voting cards. When health cards or voting cards were not available, it was attempted to determine ages by utilizing an event calendar.

A family composition table was included to determine the parity and number of children from the same mother and in the household. The table comprised of all men living in the household, all women and their order of marriage and the number and parity of the children. Research suggests birth order affects malnutrition, as children with more (older) siblings are more likely to be stunted, because there is an increased competition for food (Barrios, 2012). Also the order of marriage was included, as a lower-order wife is expected to be submissive to older household members (Boserup, 1989), lowering autonomy, indirectly affecting her child's dietary diversity or nutritional status (Barrios, 2012). The parity is measured per gender, as research suggests boys are worse off than girls in terms of nutritional status in Sub-Saharan countries (GSS & GHS, 2015).

4.4.3. Anthropometry and 24 hour recall

Both children's nutritional status (HAZ, WHZ) and nutrient adequacy of the diet (IDDS) as the maternal health status was adopted from the dataset of the larger study (Brouwer et al., 2015). In the larger study, the recumbent length and weight of children and mothers were measured. The GAIN-study followed standard procedures to assess anthropometric measures:

“Recumbent length was measured with an infantometer to the nearest 0.1 cm. Body weight was measured precisely to 0.1 kg with an electronic scale (UNIScale; Seca GmbH, Hamburg, Germany). Weight was measured by first having the mother stand on the scale; then resetting the scale to zero whilst the mother stood on it and the child given to the mother on the scale and the reading thereof recorded. A known weight was used to calibrate the scale on each measurement day. (.....) All measurements were duplicated and averaged to reduce random measurement error. Where there were differences of more than 0.2 cm or 0.2 kg (length & weight respectively) in duplicate measures, the measurement was retaken for the third time and the two closest values used.” (Brouwer et al., 2015)

The diversity of children's diets were assessed using a 24-hour recall. In the presence of the index child, primary caregivers were asked to recall all the foods and drinks the child consumed during the preceding day in and outside the home and to describe ingredients and cooking methods of any mixed dishes. The volume of dishes and the amounts of all ingredients children consumed were measured or estimated (Brouwer et al., 2015).

Children were considered stunted or wasted when the Z-scores was of <-2 SD (WHO, 1997). Diets were considered to be diverse when children consumed at least 4 out of 7 food groups during the past 24 hours (WHO et al., 2008). The health status of women was reflected by the BMI (kg/m²).

4.4.4. Community context

Measures of the community context were included in the semi-structured questionnaire. Different models addressing health behaviors suggest it should be studied within an environmental context (Engle et al., 1997). The community context is addressed by including village public health infrastructure, economic development and social cohesion, following Shroff (2009). Public health infrastructure was measured as the distance to a health facility, presence of an all-weather road,

presence of school and village electrification. Social cohesion was measured as the presence of a women's group in the community (Shroff et al., 2009).

4.4.5. Key person's interview

To validate findings from the questionnaire and interview with women, semi-structured interviews were conducted with key persons in the area (see Appendix III). As mentioned, an interview was held with the head of the community nutrition department of the University of Development Studies in Tamale, a health promotion officer in the Karaga district and an independent researcher on post-harvest loss. Similarly to the interviews with women, the interview with the key persons covered different domains of empowerment (direct indicators of empowerment). The interview also included empowerment from a life course perspective, to capture changes in the empowerment over the course of women's life (Das Gupta, 1995), and local programs targeting women's empowerment.

4.5. Data processing and analysis

4.5.1. Dependent variable

After data collection, data was entered into Excel. To check the correctness of the data entry, a random sample was compared to original questionnaires. Because this check did not reveal any inconsistencies, it was assumed the data was correctly entered into Excel. To study whether the socio-demographic characteristics (indirect indicators of empowerment), empowerment of mothers and maternal health status were related to children's nutritional status and IDDS of the 51 households in Karaga district, a multiple regression analysis was conducted in SPSS. The dependent variables included height-for-age Z-scores (HAZ), weight-for-height Z-scores (WHZ) and individual dietary diversity score (IDDS). For these three variables, binary variables were created to define stunting, wasting, and a diverse diet used to describe the study population. Based on the WHO guidelines (WHO, 1997) a child was considered moderately or severely stunted with a Z-score less than -2 SD (binary variable = 1) and not stunted when the Z-score was equal or greater than -2 SD (binary variable = 0). Similarly, a dummy variable was created for wasting with a cut-off point of -2 SD from the median score. To define the nutrient adequacy of the diet a binary score for IDDS was created based on the World Health Organisations (WHO) guidelines (2008). Children were classified to either have a 'diverse diet' (IDDS equal or higher than 4 out of 7 food groups) or a 'non-diverse diet' (IDDS lower than 4 out of 7 food groups).

4.5.2. Independent variables

Variables directly representing women's empowerment included: decision-making power (e.g. say in 1) household decisions, 2) child care and 3) finances), mobility (i.e. does the woman need permission to move outside the home), attitude towards domestic violence (i.e. whether the woman feels it is justified for men in certain situations to beat women), and the freedom from domestic violence. Values were assigned to answering options in such way, that a higher value represented higher maternal autonomy. Using Cronbach's alpha, mean scores for each autonomy domain were created when $\alpha > 0.6-0.7$.

Hence, the final analysis contained scores for each domain of empowerment composed of a few items (see appendix II for all items) representing that domain. First, the overall score for household decision-making comprised the items: "3. What gifts to give when relatives marry?", "8. Whether to purchase major goods for the household such as a TV?", "9. Whether to purchase or sell animals?" and "11. How your earnings are spent?". Second, the child care decision making autonomy domain

was composed combining the items: 2. Who decided upon exclusive breast feed new born for 6 months? and 3. Who decided upon immunization of the infant?. Third, the score of financial autonomy was created by utilizing: “1. If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?” and “2. If you wanted to buy yourself a small item of jewellery, such as a pair of earrings or bangle, would you feel free to do it?”. Fourth, the score of mobility autonomy comprised the following items: 1. Whether the woman needs to ask permission to go to any place outside the house or compound, 2. Whether the woman needs to ask permission to go to the local market and 3. Whether the woman needs to ask permission to go to the local health centre. Last, the attitude towards domestic violence domain was created by comprising items, responding whether it was justified to beat a woman in the following situations: “1. If he suspects her of being unfaithful?”, “3. If she shows disrespect for in-laws?”, “4. If she goes out without telling him?”, “5. If she neglects the house or children?” and “6. If she doesn’t cook food properly?”.

Independent variables referred to women’s empowerment (direct and indirect) and maternal health status. Variables indirectly representing women’s empowerment included: socio-economic status (i.e. education, occupation and earnings), marriage characteristics (e.g. age at marriage, spousal age gap, polygamous/monogamous). Landownership, characterized by the size of household plots, and earnings of the head of household, were included as control variables measuring household SES, because higher family socio-economic is thought to stimulate egalitarian decision-making processes (Gwako, 1997). Also, religion was included as a control variable, following Lee-Rife (2010). Dummy variables were created for education (no education, literate, primary school, J.H.S. or higher and S.H.S. or higher), occupation (trader, farmer, housewife, none), earnings (none, 1 -3 GHC, 3 - 7 GHC, > 3 GHC). The biggest category within each variable was used as a reference category, i.e. Muslim (religion), no education (education), farmer (occupation) and 1-3 GHS per week (amount earnings). The other categories were grouped. For instance, for the education variable, no education represented the reference category, and the categories literacy, primary school, J.H.S or higher and S.H.S. or higher were combined into one category.

The maternal health status was reflected by the BMI of mothers. Also, characteristics concerning the infant were included. The gender of the children was included, as well as the birth order (e.g. parity of both boys and girls, number of both boys and girls from the same mother and within the complete household). Last, the community context variables were included (i.e. distance to a health facility, presence of an all-weather road, presence of school, presence of village electrification and the presence of a women’s group in the community).

4.5.3. Binomial logistic regression model

To test whether the independent variables were significantly related to the nutritional status (wasting and stunting) and diet quality of young children a logistic regression analysis was conducted. The dependent variable comprised of the dichotomous variable for stunting, wasting and IDDS, rather than the continuous Z-scores of the indices for nutritional status and division into 7 food groups for the nutrient adequacy of the diet. A logistic regression calculates how big the chance of either one of two categories of a dichotomous variables is (i.e. stunted vs non-stunted, wasted vs. non-wasted, diverse diet vs. non diverse diet) using multiple independent variables (Vocht, 2006).

The basic model used for this analysis includes:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip}.$$

β_0 is the intercept of the model. Within this model, every value of the independent variables X are associated with dependent variable Y. It was hypothesized that maternal autonomy, socio-demographic variables and maternal health status influence the nutritional status and nutrient adequacy of the diet of children. When applying this to the basic model, the dependent variable Y was the nutritional status (HAZ, WHZ) or nutrient adequacy of the diet (IDDS). The independent variables X comprised of the maternal socio-demographic variables and health status.

To build a logistic regression model, first it was checked which variables were significantly associated with the outcome variables. To test categorical variables, a chi-square was conducted. When assumptions were violated (i.e. more than 20% of the contingency cells had an expected value of <5), Fisher's exact test was used instead. To test continuous independent variables, the independent t-test was utilized. It was checked whether assumptions were violated. Levene's test was used for checking the assumption for equality of variances. Data was assumed to be normally distributed. When variables were not normally distributed, a Mann-Witney U test was used.

Next a model was built with first the domains of empowerment (i.e. household decision-making, child care decision-making, financial autonomy, mobility, domestic violence attitude and freedom from domestic violence and maternal health status in terms of BMI. Second, the control variables significantly associated with the outcome measures were included in the model. The data was checked for multicollinearity; when the correlation coefficients exceeded a value of 0.9, either one of the variables was removed. A significance level of <0.1 was used. All commands in SPSS were tracked using a syntax.

5. Results

The different dimensions of women's empowerment were assessed on its link to children's nutritional status in terms of height-for-age Z-scores, weight-for-height Z-scores and weight-for-age Z-scores and nutrient adequacy of the diet in terms of IDDS to be able to answer the research question: *Is the position of women in terms of women's empowerment and maternal health status related to the dietary nutrient adequacy and nutritional status of infants and young children in rural Northern Ghana?*

5.1. Descriptives

For the independent variables, characteristics of subjects were assessed (see Table 2). The primary study sample consisted of 51 households. Family plots distributed a median of 23.00 acres. The majority of the head of the households earned 3-7 GHC per week (33%). On average the father of the index child was 40 years old and the mother of the index child 30 years old, whereas the spousal age gap had a median score of 8 years. The average age of women when they got married was 20 years. Considering maternal health status, the BMI of mothers in this sample displayed a median score of 21.5 (a healthy BMI ranges from 18.5 to 25 according to WHO standards (WHO, 1995)). Most of the mothers were in a polygamous marriage (60%). Regarding child feeding practices, 45 percent of women fed the child colostrum and 22 percent practiced exclusive breastfeeding during the first six months.

The maternal socio-demographic characteristics were not varied across the study sample, although there was some variation. The vast majority of women (86%) was not educated and farmed for a living (59%). More than half (57%) of women earned her money from farm income and most women earned between 1 and 3 GHC per week (39%). The main religion of people in this sample is Muslim (88%).

The gender of children was nearly equally distributed; the sample comprised of 45 percent of boys versus 55 percent of girls. Both the number of boys and girls within the nuclear unit displayed a median of 2, whereas the number of boys and girls within the total household displayed a median of 5 and 4 respectively. The median score of the total number of children in the household was 9.

Next, the majority of the communities had a school (84%). The presence or absence of an all-weather road, electricity, toilets and a women's group were nearly equally distributed. Within the communities 55%, 51%, 45% and 55% of the facilities was present respectively. Last, most household were located within 2 kilometers distance to the closest health facility.

5.1.1. Nutritional status and dietary adequacy of children

As illustrated in Table 3, the mean Height-for-Age Z-score (HAZ) was -1.66 and the mean Weight-for-Height Z-score (WHZ). This corresponds with 29 percent stunting and 18% wasting. In terms of children's nutrient adequacy of the diet, 35% of children did not meet the nutrient requirements of the diet, with a mean individual dietary diversity score of 3.53. Among boys in this sample, 26% was stunted, 22% was wasted and 46% had diets which were not diverse. Regarding girls in this sample, 32% was stunted, 14 % was wasted and 29% had diets which did not meet nutrient requirements.

Table 2 Background characteristics of mothers and children 6-23 months of 51 households in Karaga district, Ghana.

Variables	Number (%)
Household SES	
Family plot size (mdn)	23.00
Household head earnings (%)	
None	4 (7.8)
1-3 GHC	14 (27.5)
3-7 GHC	17 (33.3)
>7 GHC	16 (31.4)
Spousal and marriage characteristics	
Father's age (M±SD)	40.0±13.6
Mother's age (M±SD)	30.3±7.1
Age at marriage (M±SD)	20.6±5.2
Spousal age gap (mdn)	8.0
Polygamous, n (%)	30 (60)
Maternal characteristics	
Maternal Socio-economic characteristics	
Education, n (%)	
Educated (Literate, primary school, J.H.S or S.H.S.)	7 (13.7)
None	44 (86.3)
Occupation, n (%)	
Non-farmer (trader, housewife or none)	21 (41.2)
Farmer	30 (58.8)
Earnings, n (%)	
None	8 (15.7)
1-3 GHC	20 (39.2)
3-7 GHC	12 (23.5)
>7 GHC	11 (21.3)
Religion, n (%)	
Christian	6 (11.8)
Muslim	45 (88.2)
Maternal Health Status	
BMI (mdn)	21.5
Child feeding practices	
Colostrum, n (%)	23 (45.1)
Exclusive breastfeeding, n (%)	11 (21.6)
Infant's characteristics	
Gender child, n (%)	
Boys	23 (45.1)
Girls	28 (54.9)
Birth order	
Number of boys of mother (mdn)	2.0
Number of girls of mother (mdn)	2.0
Number of boys within household (mdn)	5.0
Number of girls within household (mdn)	4.0
Number of children within household (mdn)	9.0
Community context, n (%)	
Distance to health centre, n (%)	
<2 km	23 (45.1)
2-5 km	19 (37.3)
>5 km	9 (17.6)
Presence all-weather road, n (%)	28 (54.9)
Presence School, n (%)	43 (84.3)
Electricity, n (%)	26 (51.0)
Toilets, n (%)	23 (45.1)
Women's group, n (%)	28 (54.9)

Table 3 The nutritional status and nutrient adequacy of the diet of children 6-23 months of 51 households in Karaga district, Ghana.

Child characteristic	N	Height-for-age		Weight-for-height		Individual dietary diversity score	
		% <-2 SD	Mean z-score ± SD	% <-2 SD	Mean z-score ± SD	% <4 food groups	Mean score ± SD
All	51	29.4	-1.34±1.23	17.6	-0.95 ± 1.09	35.3	3.53 ±1.78
Gender							
Boys	23	26.1	-1.48±1.26	21.7	-1.15±1.13	45.5	3.09 ±1.95
Girls	28	32.1	-1.23 ± 1.22	14.3	-0.79±1.04	28.6	3.89 ± 1.57

Table 4 Background characteristics of mothers and children 6-23 months of 51 households in Karaga district, Ghana, per group of stunting, wasting and IDDS.

	Stunting		Wasting		Individual dietary diversity score	
	No	Yes	No	Yes	Not diverse	Diverse diet
Household SES						
Family plot size (mdn)	22.0	26.0	22.0	31.0	20.0	28.5
Household head earnings (%)						
No	5.9	2.0	5.9	2.0	1.0	7.8
Yes	64.7	27.5	76.5	15.7	37.3	54.9
Marriage characteristics						
Maternal age at marriage (M±SD)	20.5±5.1	20.8±5.6	21.1±4.7	17.7±6.9	19.5±5.2	21.17±5.2
Spousal age gap (mdn)	8.0	7.5	8.0	20.0	8.0	7.5
Polygamous (%)						
No	28.0	12.0	36.0	4.0	18.0	22.0
Yes	44.0	16.0	48.0	12.0	18.0	42.0
Maternal characteristics						
Mother's age (M±SD)	31.5±7.3	27.3±5.7*	30.5±6.9	39.1±8.2	29.5±7.7	30.7±6.7
BMI of mother (mdn)	21.70	20.90	21.8	18.9 ****	22.20	20.60
Religion (%)						
Christian	9.8	2.0	11.8	0.0	5.9	5.9
Muslim	60.8	27.5	70.6	17.6	31.4	56.9
Maternal Socio-economic characteristics						
Education (%)						
Literate + primary school or higher	7.8	5.9	11.8	2.0	9.8	3.9
None	62.7	23.5	70.6	15.7	27.5	58.8
Occupation (%)						
Farmer	45.1	13.7	51.0	7.8	23.5	35.3
Non-farmer	25.5	15.7	31.4	9.8	13.7	27.5
Earnings (%)						
None	13.7	2.0	9.8	5.9	5.9	9.8
Yes	56.9	27.5	72.5	11.8	31.4	52.9
Infant's characteristics						
Gender child (%)						
Boy	33.3	11.8	35.3	9.8	21.6	23.5
Girl	37.3	17.6	47.1	7.8	15.7	39.2
Birth order						
Number of boys of mother (mdn)	2.0	2.0	2.0	1.0	1.0	2.0
Number of girls of mother (mdn)	2.0	2.0	2.0	1.0	1.0	2.0
Number of boys within household (mdn)	4.5	5.0 ***	4.0	5.0	4.0	5.0
Number of girls within household (mdn)	4.0	5.0	4.0	6.0	4.0	4.5
Number of children within household (mdn)	8.0	11.0 ***	8.5	12.0	8.0	10.5
Community context						
Distance to health centre (%)						
<2 km	31.4	13.7	35.3	9.8	19.6	25.5
2-5 km	29.4	7.8	31.4	5.9	13.7	23.5
>5 km	9.8	7.8	15.7	2.0	3.9	13.7
Presence all-weather road (%)						
No	31.4	13.7	39.2	5.9	13.7	31.4
Yes	39.2	15.7	43.1	11.8	23.5	31.4
Presence School (%)						
No	13.7	2.0	15.7	0.0	5.9	9.8
Yes	56.9	27.5	66.7	17.6	31.4	52.9
Electricity (%)						
No	33.3	15.7	45.1	3.9	13.7	35.3
Yes	37.3	13.7	37.3	13.7	23.5	27.5
Toilets (%)						
No	41.2	13.7	45.1	9.8	19.6	35.3
Yes	29.4	15.7	37.3	7.8	17.6	27.5
Women's group (%)						
No	35.3	9.8	39.2	5.9	13.7	31.4
Yes	35.3	19.6	43.1	11.8	23.5	31.4

*Significant at 0.1 level (independent t-test), ** Significant at 0.1 level (Fisher's exact test), *** Significant at 0.1 level (Mann-Whitney U test), **** Significant at 0.05 level (Mann-Whitney U test).

Table 5 Percentage of mothers answering questions regarding empowerment in 51 household in Karaga district, Ghana, along with the reliability statistics.

HOUSEHOLD DECISION-MAKING AUTONOMY ($\alpha=0.714$)					
Who in your family decides the following:	Others in the household	Jointly with others in the household	Respondent (woman)	Item-total correlation	α if item deleted
1. What food to buy for family meals?	19.6	74.5	5.9	-	-
2. Whether to purchase small household items such as a table, utensils?	8.2	53.1	38.8	-	-
3. What gifts to give when relatives marry?	5.9	74.5	19.6	0.532	0.638
4. Whether or not you should work outside the home?	4.0	94.0	2.0	-	-
5. Inviting guests to your home?	3.9	94.1	2.0	-	-
6. Your going and staying with parents or siblings?	3.9	96.1	0.0	-	-
7. Obtaining health care for yourself?	2.0	96.1	2.0	-	-
8. Whether to purchase major goods for the household such as a TV?	20.0	76.0	4.0	0.467	0.672
9. Whether to purchase or sell animals?	40.0	60.0	0.0	0.463	0.674
10. Whether to purchase or sell jewellery?	0.0	28.0	72.0	-	-
11. How your earnings are spent?	20.5	59.1	20.5	0.577	0.611
12. Whether money can be spent on health care for the child?	28.6	69.4	2.0	-	-
CHILD CARE DECISION MAKING AUTONOMY ($\alpha=0.615$)					
Who is your household decides the following:	Others in the household	Jointly with others in the household	Respondent	Item- total correlation	α if item deleted
1. Not feeding the new born baby colostrum?	25.5	2.0	72.5	-	-
2. Exclusive breast feed new born for 6 months?	7.8	0.0	90.2	0.479	.
3. Immunization of the infant?	2.0	7.8	90.2	0.479	.
4. What to do if the child falls sick?	9.8	82.4	7.8	-	-
FINANCIAL AUTONOMY: CONTROL OVER FINANCES ($\alpha=0.885$)					
		No	Yes	Item- total correlation	α if item deleted
1. If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?		3.9	96.1	0.808	.
2. If you wanted to buy yourself a small item of jewellery, such as a pair of earrings or bangle, would you feel free to do it?		5.9	94.1	0.808	.
3. If you wanted to buy a small gift for your parents or other family members, would you feel free to do it?		25.5	74.5	-	-
	Never	Some of the time	All the time		
4. Are you allowed to have some money set aside that you can use as you wish?	22.4	40.8	36.7	-	-
5. When you earn money, do you usually give all of it to your husband?	35.7	45.2	19.0	-	-
6. Do you and your husband ever talk alone with each other about what to spend money on?	2.0	82.4	15.7	-	-
7. Do you have a say in how the household's overall income is spent?	31.4	49.0	19.6	-	-
8. Do you get any cash in hand to spend on household expenditure?	61.2	28.6	10.2	-	-
MOBILITY AUTONOMY ($\alpha=0.664$)					
Do you have to ask your husband or senior family members for permission to go to	Always	Some of the time	Never	Item- total correlation	α if item deleted
1. Any place outside your house or compound?	39.2	39.2	21.6	0.463	0.610
2. To the local market?	66.7	23.5	9.8	0.523	0.501
3. To the local health centre?	80.4	15.7	3.9	0.480	0.591
4. Fields outside the village?	35.0	27.5	37.5	-	-
5. Community centre in the village?	75.0	25.0	0.0	-	-
6. Home of relatives or friends in the village?	82.4	17.6	0.0	-	-
7. The next village?	88.0	12.0	0.0	-	-
NON-ACCEPTANCE OF DOMESTIC VIOLENCE ($\alpha=0.732$)					
Sometimes a wife can do something that bothers her husband. Please tell me if you think that a husband is justified in beating his wife in the following situations:	Always	Some of the time	Never	Item- total correlation	α if item deleted
1. If he suspects her of being unfaithful?	47.1	35.3	17.6	0.470	0.694
2. If her natal family does not give expected money, jewellery, or other items?	0.0	11.8	88.2	-	-
3. If she shows disrespect for in-laws?	74.5	7.8	17.6	0.507	0.680
4. If she goes out without telling him?	35.3	39.2	25.5	0.495	0.685
5. If she neglects the house or children?	39.2	43.1	17.6	0.593	0.646
6. If she doesn't cook food properly?	23.5	60.8	15.7	0.402	0.717
FREEDOM FROM DOMESTIC VIOLENCE					
Does your husband ever beat or hit you?		Yes 41.2	No 58.8	-	-

5.1.2. Associations control variables with outcome variables

Table 4 illustrates indicators or control variables of empowerment that are significantly associated with anthropometric indices or child IDDS, along with the average scores or percentages for each group. First, results showed that women with stunted children were significantly younger than mother with non-stunted children (with $M \pm SD$ non-stunted = 31.5 ± 7.3 vs. $M \pm SD$ stunted = 27.3 ± 5.7 , $p=0.055$). Second, the findings showed that maternal health status was inversely associated with child wasting (with mdn non-wasted = 21.8 vs. mdn wasted = 18.9, $p=0.010$), implying that mothers with wasted children had lower BMI scores than mothers with non-wasted children. Third, the results showed that maternal education was associated with children's individual dietary diversity score (with 9.8% in non-diverse diet group vs. 3.9% in diverse diet group, $p=0.087$), suggesting that children whose diets are not diverse are more likely to have an educated mothers. Fourth, the total number of boys (with mdn non-stunted = 4.5 vs. mdn stunted = 5.0, $p=0.094$) and children (with mdn non-stunted = 8.0 vs. mdn stunted = 11.0, $p=0.071$) within the household appeared to be significantly related to child stunting. This implies that stunted children come from households with larger numbers of boys and children.

5.1.3. Domains of empowerment

The descriptive statistics for each of the empowerment questions are presented in Table 5. The answering options represent lower level of autonomy (left) to higher levels of autonomy (right). Regarding household decision-making power, the majority of women indicated average levels of autonomy (i.e. they answered that family decisions were made jointly with others in the household). For three out of four items representing child care autonomy, women indicated high levels of autonomy. For instance, 90% of women indicated that she decided upon exclusive breastfeeding and immunization. With regard to financial autonomy, the first three questions indicated high levels of maternal empowerment, whereas the remaining items implicated more mixed result. Concerning mobility, most items implicated that women felt restricted to go to different places outside the home. For instance, 80% of women indicated she always had to ask permission to go the local market. The attitude towards domestic violence revealed mixed results regarding women's opinion whether they felt a man was justified in beating a woman in certain situations.

Also reliability statistics are presented; the bold answers represent the items that are included in the overall score for each dimensions, based on Cronbach's alpha. These scores representative for each of the empowerment domains, displayed median scores of 2, 3, 2, 1.3, 1.6 for household decisions-making, child care decision-making, financial decision-making, mobility and attitudes towards domestic violence respectively (see Table 6). For household decision-making, child care decision-making, mobility autonomy and domestic violence, a score of 1 represented low maternal autonomy ranging to 3 representing high maternal autonomy. Regarding financial autonomy, 1 represented low autonomy and 2 represented high maternal autonomy. In other words, women's decision-making power regarding child care is relatively higher than maternal autonomy with regard to the other domains. The domain of mobility revealed the lowest scores of maternal autonomy, followed by the attitudes towards domestic violence. The freedom of domestic violence is represented by a single-item measure, revealing nearly half of all women (41.2%) indicated that her husband had ever beaten her. Furthermore, all domains of maternal empowerment were not related to children's nutritional outcomes in terms of stunting, wasting or IDDS, except for the domain of freedom from domestic violence. Results implicated that mothers who did not experience domestic violence are less likely to have a stunted child ($p=0.003$) and a child whose diet is diverse ($p=0.100$).

Table 6 Background characteristics of domains of empowerment, per group of stunting, wasting and IDDS.

	All	Stunting		Wasting		Individual dietary diversity score	
		No	Yes	No	Yes	Not diverse	Diverse diet
Household decision-making power	2.0	2.0	2.0	2.0	2.0	2.0	1.8
Child care decision-making power	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Financial autonomy	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Mobility autonomy	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Domestic violence attitude	1.6	1.6	1.6	1.6	1.6	1.6	1.8
Freedom from domestic violence (%)							
Yes	58.8	51.0	7.8	51.0	7.8	27.5	31.4
No	41.2	19.6	21.6	31.4	9.8	9.8	31.4

NOTE: empowerment scores are expressed in medians, unless stated otherwise.

*Significant at 0.10 level, **Significant at 0.05 level, *** Significant 0.01 level.

Table 7 Determinants of women's position on stunting, wasting and IDDS of children 6-23 months in Karaga district, Ghana

	Stunting			Wasting			IDDS		
	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI
Direct indicators empowerment									
Household decision-making power	2.08	8.01	(0.51-125.94)	-0.11	0.90	(0.07-12.40)	-1.21	0.30	(0.04-2.26)
Child care decision-making power	-0.51	1.67	(0.15-18.44)	-0.22	0.80	(0.07-9.23)	-0.97	0.38	(0.05-3.21)
Financial autonomy	0.38	1.47	(0.02-137.37)	-1.02	0.36	(0.01-25.44)	2.55	12.80	(0.11-1434.79)
Mobility autonomy	-1.70	0.18*	(0.03-1.24)	0.48	1.62	(0.26-10.18)	-0.86	0.42	(0.09-1.98)
Domestic violence attitude	-0.24	0.78	(0.12-5.11)	0.23	1.26	(0.16-9.86)	0.26	1.29	(0.27-6.09)
Freedom from domestic violence	-2.64	0.07***	(0.02-0.43)	-0.43	0.65	(0.11-3.98)	-1.85	0.16**	(0.03-0.89)
Maternal Health status									
BMI of the mother	-0.06	0.94	(0.71-1.25)	-0.55	0.58*	(0.33-1.02)	-0.11	0.90	(0.72-1.11)
Control variables									
Maternal education	-0.62	0.54	(0.04-8.02)	0.01	1.01	(0.06-17.47)	-2.42	0.09**	(0.01-0.98)
Age of the mother	-0.16	0.86*	(0.73-1.01)	0.02	1.02	(0.87-1.19)	0.04	1.04	(0.92-1.16)
Number of children in total household	0.08	1.08	(0.93-1.25)	0.12	1.12	(0.96-1.31)	-0.02	0.98	(0.86-1.11)
Intercept		-0.847			-1.516			0.490	
N		50			50			50	
R ²		0.483			0.323			0.325	

NOTE: Significant at 0.1 level, ** Significant at 0.05 level, *** Significant at 0.01 level.

5.1.4. Main effects

A logistic regression model was made to assess the association between malnutrition indices and indicators for empowerment and maternal health status. Correlation coefficients were between $-0.23 < r < 0.40$, except for total amount of boys and total amount of children in the household. Therefore total amount of boys was removed from the model to avoid multicollinearity. The final model for the logistic regression comprised of household decision-making, child care decision-making, financial autonomy, mobility autonomy, attitudes towards domestic violence, freedom from domestic violence, the BMI of mothers, the education of mothers (literacy + primary school + J.H.S + S.H.S), the age of mothers, and the total number of children in the household.

Regarding direct indicators of empowerment, the analysis showed a significant effect of mobility on child stunting ($p = 0.082$). When women are free to move outside the home without having to ask permission, the chance of having a stunted child is significantly lower, compared to restricted women. Also, a significant effect of freedom from domestic violence on child stunting ($p=0.002$) and IDDS ($p = 0.036$) was observed. A woman who does not experience domestic violence, has a significantly lower chance of having a stunted child or a child whose diet is nutrient adequate, than a woman who suffers from domestic violence. Concerning the maternal health status, the analysis revealed a negative effect between mother's BMI and child wasting ($p=0.058$). This implies that when mother's health status is better, their children have lower chances of being wasted. Also, the analysis showed a significant effect of maternal education on children individual dietary diversity scores ($p=0.048$), suggesting that literate or educated mother have a lower chance of having a child whose diet is nutrient inadequate compared to a mother who is not educated. Last, results revealed a significant effect of the age of mothers on child stunting ($p= 0.058$), implying older women have a lower chance of having a stunted child.

5.2. Interviews with mothers

Additionally to the quantitative analysis, qualitative data was collected on maternal autonomy to gain deeper insight into the link between maternal autonomy and children's nutritional status and the aspects important for strengthening maternal empowerment. Mothers of 51 households were interviewed. Transcripts were excluded from analysis, when the mothers struggled with speaking in Dagbani (N= 2) or did not feel comfortable being interviewed (N= 1). Therefore 48 transcripts were included in the analysis.

5.2.1. General decision-making power

With regard to decision-making power women indicated either their decision-making power is not strong or indicated at first instance they are able to make decisions for themselves. However the latter statement was often followed by a certain footnote, such as they are not able to decide for other members in the household. This implies that women need permission for their decisions.

"In general I make decisions, but only if the decisions are good. " (woman, 28 years)

5.2.2. Decision-making power in relation to other household members

Husband

Most women were not able to make decisions on their own. Only four women said they were able to make decisions without their husband. More than half of the women indicated they make decisions in consultation with their husband or are not allowed to make decisions on their own. Also a lot of women said her husband decides and typically she does not have a say in decisions.

"As for a married woman you can never have your own say or way in your husband's house, because you do not own yourself, he owns you, so whatever he wants is what you will do for him." (Woman, 26 years)

The role of the husband and the spousal age gap seemed to affect women's decision-making power. For instance, when the husband is the head of household or chief of the community, often women have less decision-making power. Also, when the husband is much older than the woman, this negatively influences her decision-making power.

Family in-law

Typically women move to their husband's home when they get married. Only a few mothers lived with their own family. In relation to family in law, women's decision-making power often was low and did not change over time. However, some women did indicate that the mother in-law did allow them to have a say in decisions.

"The only person I can say I am able to make decision in relation to is my mother in law. My mother in law has always allowed me to make decisions in relation to her." (Woman, 35 years)

Sometimes women indicated as well that decisions were in consultation with both the husband and family in-law or the husband decides jointly with family in-law for the wife without her having a say in the decision.

"With regard to my husband and my mother in law, each time I am to make a decision I do it with them." (Woman, 25 years)

Other wives

Roughly half of the women indicated that her decision-making power is equal to the other wives and they make decisions together. For instance, the husband and all the wives sit together and discuss issues. Also some of these women indicated that their husband decides for both or all of his wives, hence implying decision-making power of both/all wives is low. The other half indicates that the first wife had more decision-making power, both from the perspective of the first wife as from the perspective from younger wives.

“Because I am the first wife, I am able to make decisions in this house. If there is anything I can call the other wife, talk to her and she will listen to me.” (Woman, 39 years)

Baby boys versus baby girls

The vast majority of women indicated that decision-making patterns were different for boys versus girls. Most women argued the needs of both sexes were different, hence choices regarding upbringing for them were different as well. In general boys were seen as louder and easier to handle, whereas girls need more attention. Also it was argued that decision-making for girls is faster, and fathers mainly decide upon boys, suggesting women’s decision-making power for girls is higher.

“Making decisions for boys and girls is not the same. Boys are for the farm and girls are for the home.” (Woman, 26 years)

“It is difficult to make decisions for boys because fathers tend to concentrate more on them and does not allow me to make most of the decisions for them.” (Woman, 20 years)

5.2.3. Domain-specific decision-making power

Food preparation

Typically, the men in the household provided the maize to prepare T.Z. (main starch source in Northern Ghana). Women knew what was expected from them and then prepared the soup. The soups could vary between a few sorts. In extended families, often the women with the highest level of power decided upon the soup, either the mother in-law, wives of older brothers or uncle’s in law, or the first wife from a polygamous family. Some households also shifted turns in who prepared the soup. In that case, it was the woman who cooked, who decided upon the ingredients.

Most women indicated decision-making regarding food preparation did not change over time. Almost half of the women did argue food preparation changed in terms of quantity. As the family expanded, it becomes financially challenging to feed all these children. With regards to ingredients, this may lead to different choices, compared to when it was just the conjugal unit. However, as families have fixed routines in food preparation and everybody knows what is expected from them, there might not be a lot of decision-making involved in food preparation.

“I decide what to prepare even in the past my husband only provides the maize and I make the decision. In the village what else do we eat apart from T.Z. so there is not much to decide on. The only decision has to do with the soup how you can vary the soups, if not there is nothing.” (Woman, 28 years)

Child care

Women typically did most of the child care. Often other women in the house, like other wives or the mother (in-law) helped with taking care of the children. Also older girls, helped with chores and the care of younger siblings. Over time, women indicated decision-making power in terms of child care

became easier. Men did not seem to be involved in most decisions regarding child care. However, the final decision might still be in the hands of men.

"I decide what I give to my children. I together with my husband decide what is good for our children, but the final say lays in the hands of my husband." (Woman, 36 years)

Mobility

Except for one woman, all women indicated they were restricted in their movement. As soon as women got married, it became harder to leave the home. Most of them said they needed permission before they could leave the home. Also children were often mentioned as restricting their ability to move outside the home. Mobility only seemed to change over time due to practical reasons, such as children growing up and being able to take care of themselves or other members that could take care of children whilst away. Levels of autonomy with regard to mobility appeared to be low for most women.

"I have never been able to go anywhere without informing my husband. If I inform him and he tells me to go I go and if he doesn't I do not go." (Woman, 35 years)

Domestic Violence

The vast majority of women indicated they did not have a say in whether they are beaten by their husband or not. Roughly half of the women indicated they were free from domestic violence. However, even if they indicated that their husband did not beat them, often it was suggested this was the result of their obedience, not because of their level of empowerment. To avoid being abused, they made sure they agreed with their husband's opinion. Some of the older women said they were not beaten because their husband's did not have the strength for it anymore. One woman said she believed she was not beaten, because her husband was educated.

"Him not abusing me is not because I have a say in, but because I try not to offend him." Woman, 25 years)

"I think because I do not have a say that's why he beats and treats me bad, because even if I decide to leave him my mother will bring me back." (Woman, 26 years)

5.2.4. Workload

Women mostly did both domestic work as farm work. Women's days typically had a fixed routine: they woke up early, prayed and started on their domestic work. This domestic work could include sweeping, washing clothes, washing dishes, fetch water and prepare food. Then they took care of children and in some cases of older family in-law. Caregiving activities included bathing children or older family in law, feeding the small children and prepare the older children for school. Then they could leave for the farm. In the evening women returned and prepared diner.

A lot of women mentioned they worked fast or got up early in the morning, in order to make sure they could finish all their tasks and have enough time for child care or farming. The majority of women indicated the workload was high. Some indicated, the workload was sometimes tiring or too much for them. Also some women said the help of older girls or their mother (in-law) lowered their workload. For instance, girls helped with taking care of younger children or domestic chores and the mother in-law looked after the children while the mother was at the farm. Only a few women indicated their workload was not high, because they did not have a job during the day.

"I sometimes get tired because I have to do everything myself. In the morning I cook both breakfast and lunch, then make sure the old lady (her mother in-law) has everything before I go to the farm." (Woman, 25 years)

5.2.5. Autonomy from a life course perspective

Most women indicated they were not allowed to make their own decisions as a young girl. Usually parents, and in some cases older brothers or other family members, made decisions for them. Five women indicated they did have a say in decisions as a child. Typically, the decision-making power increased as girls entered adolescence. Still, more than half of women indicated their parents decided for them. However, more women were able to take initiative, in for instance ways to earn some money and in general adolescents were allowed to decide more on their own. When women get married, they move into their husband's home. In this setting women appeared to have less control over decisions being made. The majority of women (roughly two-third) indicated they needed their husbands consent before being able to act. As a newly-wed woman, most decisions are made by the husband. Some women said her husband is responsible for her and she does not have a say, because he owns her. Around one-third of women said she made decisions in consultation with her husband. For most women autonomy seemed to decrease during this phase in comparison to adolescence. However, when parents were strict, some women felt they gained decision-making power when they got married. Having children was often seen as a major turning point in terms of decision-making. The vast majority of women indicated they had to make decisions for her children, whereas she didn't have to make decisions before. Because now they were responsible for their children, they made decisions more often than before, although often restricted to decisions regarding the children. Only five women indicated the husband still made all decision regarding child care.

"As a girl, (...) I'm sure it was my parents who took decisions for me. As an adolescent, I was very much on my own. I was very quick in thinking of things I could sell to make money. As a newlywed I think I lost much of the decision making power because my husband now made certain decisions for me. When I had children I still make little decisions concerning them, because a lot came from their father. The only thing I make decisions on is their food and what they wear." (Woman, 33 years)

"When I had children I realised that it was time I started taking some decisions in the house with regard to the children, because I realised that if I do not start doing something, things will go wrong. I told my husband that he should help me get a plot so that I could also farm and get something for the children if they needed it. I believe having children has changed the way I think and make decisions. Initially my husband making decisions for me was ok but I cannot sit and watch him take decisions for me and the children every time; I had to also take part." (Woman, 37 years)

During child-bearing age, women's empowerment seemed to be relatively stable. Women did not mention any changes during this period. However, in the post-menopause stage, women's decision-making power might increase again as their husband became weaker. In some cases women indicated that the oldest son took over, in some cases the woman took most of the decisions or even became the head of household.

"In general my decision making power is strong, because I'm more or less the head of this household. This is because my husband is old and weak and most of the decisions are made by me and our son. In the past it was my husband as I said earlier, but now it is me and my son who usually make the decisions." (Woman, -age unknown-)

Among women, age seemed to be a big factor concerning the decision-making power. Differences in decision-making power among different female household members was often implicitly attributed to age. If women were older, they should be respected.

"I can't make decisions in relation to her (husband's aunt) because she is the head of this house and besides she is way older than me and my husband" (Woman, 25 years)

5.2.6. Programs addressing empowerment

The responses of women with regard to programs in the area addressing empowerment, child nutrition and agriculture were mixed. Almost half of the women said they were not familiar with such programs. Some women clarified they were rarely home, hence could explain their unawareness. On the contrary, more than half of the women indicated they were aware of such programs. Roughly two third of these women stated these programs were focused on child care, either in terms of child nutrition or hygiene. The rest of women, indicated to be familiar with programs addressing agriculture and how they could increase their yield.

"I think such programmes have improved my level of thinking and also helped me to be able to take good care of my children. Some people came to teach us about how we can manage ourselves. I think it has helped me to manage my workload well." (Woman, 46 years)

However, some women indicated these programs did not affect their lives. Even if they had the will to change, they might not always have the means for it.

"Yes there are people who came to talk to us on agriculture and how to take care of our children, but because we don't have much we are not able to give the children what they tell us to." (Woman, 30 years)

5.2.7. Gender differences

Around three-fourth of the women indicated children of differences sexes are treated differently. The main reason women mentioned was that girls are home doing chores and boys work at the farm. Whether boys or girls receive more was rarely touched upon and indecisive; two women said girls get more, one woman said boys get more.

"Boys and girls are treated differently, as for girls they are always around you and the boys follow their father to the farm." (Woman, 26 years)

Also in terms of food allocation, males and females are treated differently. For instance, typically boys and girls received a bowl of food separately per sex i.e. the adults have their own bowl, the boys share a bowl and the girls share a bowl. Food is served according to sex and age. Women indicated the serving order followed a certain hierarchy; the head of the household was served first, followed by either other men in the household or the mother-in-law, then the women were served in order of hierarchy, and last the children were served. Also the type of meat is divided. The head of household and men received the best parts. When eating children or guinea fowl this typically included that men get the thigh, women the back, and children receive the head, legs and wings.

5.3. Interviews with key persons

Additional to the visits to 51 households, three interviews were conducted with people that do work relevant to the topic of agriculture, nutrition and/or women's empowerment. First, an interview was conducted with a health promotion officer in Karaga district. The health promotion officer mainly functioned as an intermediary between the people in the communities and the authorities to advocate health issues. Second, an interview was conducted with the head of the Community Nutritional department of the University for Development Studies. Last, an interview was conducted with a researcher who sold mobile utility storage bins. These bins enabled smallholder farmers to store their own harvest, decreasing post-harvest loss. One of the things he encountered in his job was the low level of empowerment of women.

5.3.1. General decision-making power

The interviewees all mentioned women's empowerment in Northern Ghana, including Karaga district, is low. Women do not have a say in household decisions.

"For Karaga district, you see, women have little power when it comes to decision-making. Cause they believe that, if you are married to a man, the man is fully responsible of making the decision." (Health promotion officer)

5.3.2. Decision-making power in relation to other household members

Husband

With regard to the level of empowerment in comparison to husbands, women ought to be submissive. The husband's say is the final say and control all decisions in most cases.

"For women it's not good, and these men have the upper hand and when they see this easy life of total control being eroded, they can push the woman back, they don't have to feed her, they can divorce her, sent her off, so they have control, it's not a good thing, it's not an equal give and take, ying-yang situation, it's not a marriage." (Researcher post-harvest loss)

Family in-law

For decisions concerning the whole household, all men within the household decide. Also the mother in-law was mentioned by the head of the community nutrition and the researcher as very influential in decision-making. The head of the community nutrition suggested the mother in-law is particularly involved in decisions regarding child care. The research on post-harvest loss mentioned mothers in-law have high levels of power, but mainly help men to remain in this position.

"Most of the time mother in-law are seen as people with a lot of experience. They have gone through what you are going through already. So they are seen as people, ok if she says one thing, I should obey. But generally, if mothers in law live together with women, they tend to be very very influential, especially in the way children are brought up." (Head Community Nutrition department)

Other wives

Also with regard to autonomy in relation to other wives within the household, age is mentioned as a highly influential factor. The first wife has more decision-making power than younger wives. However, the researcher on post-harvest loss adds women might even prefer to be a lower-ranking wife, because the first wife often is pressured to produce offspring, whereas lower-ranking wives get the opportunity to go to school and have job, enabling them to generate their own income.

“I’ve been in discussions with women in Tamale, who say they’re quite happy to be a third wife, because the first wife has to have all the kids and no job.” (Researcher post-harvest loss)

5.3.3. Domain-specific decision-making power

According to the head of the Community Nutrition department, women’s decision-making power is dependent on the domain. Regarding household keeping, food preparation and child care, women know what is expected from them and they are allowed to contribute.

Food preparation

Typically the man provides maize to prepare T.Z. Regarding food preparation women have the autonomy to decide in a sense that they can choose which soup to prepare additionally to the T.Z.

“What to eat is already decided, but she has the autonomy to vary what goes with it, so mostly to be the TZ, but she can decide which sauce or soup goes with the TZ.” (Head Community Nutrition)

Large household purchases

All three interviewees mentioned the man is solely responsible for large household purchases. Women do not have a say in these decisions.

“They can’t go out and buy a new phone or radio to listen to news or to listen to broadcast that help inform women.” (Researcher post-harvest loss)

Child care

Regarding child care, women have higher levels of autonomy. Child care is referred to as the main domain women have the ability to make decisions. Women spend more time with the children than the father usually does, resulting in more decision-making power.

“By raising kids, healthy kids, strong kids, smart kids, the husband gives them more respect.” (Researcher post-harvest loss)

Finances

Men decide upon financial decisions. Women often do not have a say in this domain. However, the health promotion officer did mention this might be different when a woman earns more money. If the couple keep their incomes separately, the woman is allowed to spend her own income on for instance the type of food she prefer. However, in the end he mentioned that the man can decide differently, implying the man still has the final say.

Mobility

Women often need permission when they want to go someplace outside the household. Women’s physical mobility is restricted and they do not have the complete freedom to move as they please. However, the head of the Community Nutrition department mentioned that when a woman wants to move within the community, she is free to do so.

Domestic violence

Women’s empowerment in terms of domestic violence is low. The interviewees mentioned that both physical and mental domestic violence towards occurs in Northern Ghana. The head of Community Nutritional explained that it is inherently to Northern Ghanaian traditions to discipline women. According to the researcher on post-harvest loss, mental violence might be even more threatening

than physical abuse, because it is hidden. He elaborated that this kind of suppression is one of the reasons a product like the storage bins, was not catching on, as it empowers women, but not men.

“if you say something which is not going down well with the man, the man can just start beating you. You can’t say anything. If you say anything, the man say you should pack your things and go” (Health promotion officer)

5.3.4. Gender differences

Men and women are treated differently in the household. In childhood, boys and girls are assigned to different tasks; boys are meant to work on the farm and girls ought to work at the home, either taking care of younger siblings or doing domestic chores. According to the head of the Community Nutrition department, girls are supposed to work more than boys.

The health promotion officer mentioned, men often prefer other men or boys over females. In terms of food allocation, boys often get better parts of meat than girls do. Sometimes food is even denied to females. It is argued that men and boys need to eat well, as they need to work at the farm. Particularly in times of scarcity, women’s needs may be neglected, negatively influencing her health status, and in turn ability to take care of children.

“But I also read about how when the food is scarce, the husband eats and the wife feeds later after the kids and that’s not good. You know on an airplane, the safety discussion, it says in an emergency, when the air pops down and the oxygen mask pops down, you grab it first. The adult should grab the mask first, put it on and then put on the oxygen mask of the kids, because the kids aren’t going to figure out the emergency. You need the adult thinking, so I see keeping a housewife from nutrition and hungry is just a way to control them.” (Researcher post-harvest loss)

5.3.5. Workload

The workload of women in Karaga district was very high according to all interviewees. Women are responsible for domestic chores, caregiving activities and are involved in farming. They spend a lot of energy all day. Compared to women living in an urban setting, they have to spend more energy for daily activities like cooking or bathing (she has to fetch water from the river), resulting in a lower body weight. Even though, the workload is high, the productive seems to be low; more of their labour gets wasted.

“They are involved in household activities, commerce activities, they are involved in taking care of children, taking care of the husband, taking care of the mother in law. So they take care of everybody, except themselves.” (Head Community Nutrition department)

5.3.6. Autonomy from a life course perspective

According to the interviewees autonomy gradually improves over women’s life course. As a child or adolescent females do not have a say in decisions. However, adolescents become more rebellious and want to decide for themselves, creating conflict according to the head of the Community Nutrition department. When women get married, interviewees indicated that sometimes women have little to say. People begin to see a married woman as mature, able to participate in decision-making, increasing her autonomy. Women might even get married young, because they are better off as married women. However typically in households, still the hierarchy determines the head of household, mother in-law, sons may contribute to decision-making more or before the wife does. The older people get, the more they become qualified to join decision-making processes. The head of the Community Nutrition department exemplified, a grandmother ought to be respected, she can

rest and her needs will be provided. A younger woman is perceived as being lazy when she does not work.

"I don't think it (empowerment) changes much. Maybe it changes for different reasons, but they are pretty second class citizens." (Research post-harvest loss)

5.3.7. Programs addressing empowerment

Many NGO in Northern Ghana and Tamale are focused or include women's empowerment. For instance, NGO's aim to improve financial autonomy or self-efficacy, teaching women how to set up their own business or optimize yield. Also programs focused at nutrition (of children) target women's empowerment, because low autonomy hampers good infant and child feeding practices. Some initiatives also enable girls to go to school, as education improves women's empowerment.

"African men are the worst investors this planet has created. You can give an African man more money and he will do less with it to provide for his family than on any other man on the planet.(.....) Women often think to invest in their families, they're thinking ten years down the road, when the daughter and son are finished school or are going to get to school. So women are much better investment than an African man. So the NGO's argue that they're going, that the results of their work is much better than anything than I can do focused on agriculture." (Researcher post-harvest loss)

Finances

Some NGO's in the area address women's empowerment via boosting their financial autonomy. For instance, the women are given micro credits, enabling them to be financially independent. When women have their own money, the chances are higher men involve them in decisions regarding finances.

"The NGO sometimes come there and assist them in one or two things like finances. They sometimes give them money to do some petty petty trading" (Health promotion officer)

Nutrition

In the pathway in which agricultural production is stimulated in order to increase nutrient adequacy of the diet and children's nutritional status, the role of women is central. An educated or well-informed woman is aware of the benefits of colostrum and knows the first breast milk is not poisonous. Women spend more time with children, compared to men, and her level of autonomy is higher in this domain. Hence, an empowered woman is more likely to provide healthy nutrition to their children.

"Most of the time nutrition related decision are better handled by woman than by men. Because it goes back to what we discussed earlier to the type of autonomy a woman has. She has autonomy when it comes to child care. Child care is at the core of nutrition. So two are related, so that why it goes back into nutrition. If you don't have the woman involved, the nutrition program is not likely to succeed (.....) It is only an empowered woman, who can say, even though my culture says this is not supposed to be good for my child, I'm informed well enough to know that this is good, even though my culture does not accept it." (Head Community Nutrition department)

5.3.8. Assets for improving empowerment

Education

It was stressed that education is one of the main strategies for empowering women. Men are more likely to be educated than women. More men enter schools and universities, and men's progress is faster in terms of attaining another qualification.

The majority of women in Karaga district was not educated. Given education, women gain autonomy and women might get a better idea of their rights and gain appreciation of the need to participate in decision-making processes, work and finances. In turn, this increases their ability to take care of their children and families. For instance, an educated women is more likely to oppose the opinion of the mother-in-law and give in to practise what she feels is good or nutritious for her children. When a mother is educated, empowering her to gain control over resources, trickling down into the next generations of girls.

"That cycle of an empowered woman, an empowered woman will translate into the female child, so you have a kind of spiral going on, that is from one generation is transferred to another generation." (Head Community Nutrition department)

Finances

Also financial resources are seen as a way of stimulating women's empowerment. This enables women to set up her own business, giving her the opportunity to control her own money. As women are more likely to invest in a child's health, this might translate into a better health status for children.

"Empowerment can cost a lot, because you can talk of education, when you do that, knowledge is a form of empowerment. When a person is financially sound, it's a form of empowerment (...) With that, you are not solely dependent on the man." (Health promotion officer)

5.3.9. Barriers to improving empowerment

Culture

The culture does not encourage women to be part of decision-making within the household. It is not accepted to give feedback or to contradict someone higher in status (e.g. an older person or men). For instance, adolescents want to be part of decision-making, but the culture does not allow them, triggering conflicts. Also, the culture allows men to discipline their wife when she does not obey him.

"Even those of us who claim we are well educated, we are well educated within a context. You come from a background that has already prescribed what you should think of a woman to do. So it doesn't matter how well you are educated, you already have a woman sitting somewhere in a corner, this is what she should be doing." (Head Community Nutrition department)

Religion

The religion is also viewed as obstructing improvements in women's empowerment, and might be closely related to culture. As the religion prescribes women should respect the husband, women accommodate to men's will.

"The religion says the woman should respect the husband. The people rather emphasize on the woman respecting the husband. For that matter, if they are talking, because of the religion, they will say no, let my husband decide on what we will do" (Health promotion officer)

Poverty

Because of financial restrictions, women may not have access to money. Hence, they have difficulty controlling resources and purchasing food.

Attitude

Women are often not allowed to participate in decision-making. However, because it has been like that over time, women lack interest to participate as well. Women should understand that they can exert influence over the well-being of her children. As women accept their position within the household

Sometimes, a barrier to empowerment, is the woman own lack of understanding of where their position should be. If I just accept that I have no role to play in this decision, when that decision comes up, I will not even attempt to be part of it. (Head Community Nutrition department)

Land ownership

Women are not allowed to own land. This hampers their ability to control their own resources.

"I started to hear how women couldn't own land, they have never owned land by themselves, outright, like weak women can anywhere else and that limits their ability to invest and run a business and become independent. (...) Here in Africa, it's not Africa if people own their land. Their culture, nowhere do they own land is important, everybody owns it. In fact, the chief explained it one day. He said: "this land is owned by the dead, the living and the unborn, it's not ours", which is kind of a wise perspective (Researcher post-harvest loss)

Political environment

Higher political organs may deliberately maintain the current situations, because the ability to control farmers, gives them power and profit. To store the harvest, farmers need to use warehouses in order for them to preserve harvest.

"The stationary warehouse provides protocols, fees and services for the men, politicians and administrators in the area. They control the land in the area where the warehouse is built on. That gives them power over the money the warehouse makes. Because of the bottleneck in the storage, for instance, women have no storage, they have to store, either sell for low prices or store in the warehouse. Those politicians and administrators, MOFA (Ministry of Food and Agriculture) directors, whomever make money." (Researcher post-harvest loss).

6. Discussion

The current study tested whether – and which domains of - maternal empowerment and maternal health status is related to children’s dietary nutrient adequacy and nutritional status in Northern rural Ghana. First, empowerment comprised of direct indicators (i.e. decision-making power regarding the household, child care and finances, mobility, and attitude towards and freedom from domestic violence) and indirect indicators (i.e. marriage characteristics, mother’s age and maternal socio-economic status). Secondly, the maternal health status was represented by mother’s BMI. Furthermore, it is questioned what can be advised regarding policies targeting mother’s empowerment and children’s nutrition based on the findings. After answering the main and sub-questions, strength and limitations and opportunities for future research are discussed.

6.1. Main outcomes

Overall, findings confirm the hypothesis that different concepts of women’s position in the household relate differently to children’s nutrition. For the majority of the significant effects found, concepts of an improved position of women positively link to children’s nutritional outcomes, in line with the hypothesis. A higher position of women in the household regarding some indicators seem to benefit (mobility, BMI, age) children’s nutritional status and the nutrient adequacy of diets, whereas other indicators show mixed results (freedom from domestic violence) or no effect at all (household decision-making, child care decision-making, financial autonomy, attitude towards domestic violence, number of children). One domain (education) showed adverse outcomes, indicating this empowerment domain hampers children’s nutritional outcome. This suggests that improved nutritional status and nutrient adequacy of the diet is not necessarily related with empowerment across all domains, and that these domains may have different impacts on nutritional outcomes, consistent with empowerment literature (Cunningham et al., 2015; Lee-Rife, 2010; Na et al., 2015; Upadhyay et al., 2014).

The level of empowerment for women in Karaga district appears to be different between domains. The direct indicators of maternal empowerment included, household decision-making power, child care decision-making power, financial decision-making power, mobility autonomy, attitude towards domestic violence and the freedom from domestic violence.

First, the findings implicate that maternal autonomy regarding child care is high. The high level of child care decision-making power was confirmed in the interviews with mothers and key persons. Key persons refer to child care as the domain where women do have a say in contrast to other domains where women often do not have a say. However the analysis did not find a significant effect of more decision-making power concerning child care on child malnutrition rates (stunting, wasting, IDDS), implicating that higher child care decision-making power does not affect children’s diets regarding nutrient adequacy and nutritional status.

Second, the results indicated that women’s decision-making power regarding finances was high. However, this finding contradicts qualitative findings, as key persons claim financial autonomy is low and is also not consistent with literature (Malapit & Quisumbing, 2015; Malapit et al., 2014). The analysis did not find an effect of financial autonomy on child stunting, wasting or IDDS, suggesting that more empowered women able to control finances does affect the nutrients adequacy of children’s diet or children’s nutritional status.

Third, autonomy scores for mobility appeared to be the lowest among the direct indicators of empowerment. This is in line with qualitative findings, indicating that all women, except for one

woman, felt restricted in their movement. Before women can leave the home, women have to ask permission to their husbands. After the effects of other significant variables were controlled for, the results showed that when a woman is more empowered with regard to this domain, her child is less likely to be stunted, but does not affect child wasting or IDDS. Consistent with literature, constraints of women's physical mobility restricts women's decision-making power and hence empowerment, in turn affecting children's nutritional outcomes (Coffey et al., 2013; Desai & Johnson, 2005; Shroff et al., 2011; Monal Shroff et al., 2009). When women need to ask permission before they can leave the compound, this limits her ability to take care of children. For instance, if a child falls sick, but the woman needs to wait for her husband, before she can take the child to the hospital, this might negatively influence children's health. In turn, children's compromised health might affect children's nutritional status (UNICEF, 1990). Also, low mobility autonomy restricts her ability to collect resources, like healthy food at local markets. On the contrary, when women have are not restricted in their physical mobility, her ability to control resources is higher, likely to affect dietary requirements of children's diet and children's nutritional status.

Fourth, the quantitative analysis did not show high levels of autonomy regarding household decisions. Also, household autonomy did not appear to be related to children's health outcomes in terms of nutritional status and nutrient adequacy of diets. The qualitative analysis indicated that there might not be much decision-making involved regarding this area. For instance, women know what is expected from them regarding food preparation (i.e. the food being served is somewhat similar every day), and large household purchases are rare (i.e. couples typically live with the husband's family, so they do not need to buy new household items), implying that household decision-making power is not a relevant measure of empowerment for women in the Karaga district, and hence may explain the lack of an effect.

Fifth, women's attitudes towards domestic violence implicated low maternal autonomy. However, when a women is more empowered regarding this area (i.e. women have a lower acceptance of domestic violence), this does not seem to affect child stunting, wasting or IDDS. Furthermore, more than half of all the women interviewed, indicated she did not experience domestic violence. The actual presence of absence of domestic violence did reveal a significant effect on child nutrition; mothers who suffer from domestic violence, are more likely to have a stunted child or a child whose diet is diverse, but does not affect the chance of having a wasted child. The interviews underline the importance of domestic violence concerning empowerment. Women try to avoid domestic violence by being obedient. When women talk too much, this may already trigger the husband to start beating. Therefore they avoid participation in decision-making processes. Hence, when a woman does not experience domestic violence, she might feel more comfortable to participate in decisions. This is consistent with empowerment literature suggesting that domestic violence disempowers women as it restricts women's freedom to exercise choice and participation in decision-making (Hindin, 2000; Lee-Rife, 2010; Ludermit et al., 2010). Consistent with the hypothesis, women's empowerment regarding the freedom from domestic violence decreases the chance of having a stunted child. It is surprising that women who do not experience domestic violence increases the chance of having children whose diets are nutrient inadequate. However, Na et al. (2015) argues that the association between women's empowerment and nutrient adequacy of children's diet is not consistent among sub-Saharan countries. Women's empowerment may not necessarily enhance children's dietary diversity. Also negative, null or mixed results were observed, suggesting that the interaction between maternal empowerment and dietary diversity is domain-, context- and country specific.

Besides direct indicators of empowerment, several control variables were included in the analysis, as these may indirectly shape maternal empowerment, and may contribute to the link between maternal empowerment and children's nutritional status and dietary nutrient adequacy. These variables included maternal education, the age of the mother and the total number of children in the household.

First, maternal education was included. The majority of women in the study sample was not educated. Women who are educated appear to have children with less diversity in their diets, compared to uneducated mothers. Education does not seem to influence child stunting or wasting in the study sample. This finding opposes qualitative findings and this paper's hypothesis. Key persons identified education as one of the main assets for improving women's empowerment, and hence child dietary diversity and nutritional status. An educated woman is likely to appreciate the importance of child care and feeding practices. Also, education is likely to improve women's status, resulting in an improved ability to control resources. Therefore, she is more likely to provide healthy nutrition to her children. Also research suggest maternal education benefits children's nutritional status (Appoh & Krekling, 2005; Barrera, 1990; Barrios, 2012; Coffey et al., 2013; Engle et al., 1997; Gwako, 1997). The proposed pathways in which education may stimulate children nutritional outcomes include the ability to earn money, an enhanced appreciation of and willingness to devote time to child care, and enhanced decision-making power (Barrios, 2012; Engle et al., 1997). However, some authors also claim education may stimulate children's malnutrition, because they are more likely to get a job decreasing the time they spend at home (Barrios, 2012). When women are home less often, they might also devote less time to child care. However, these studies are often limited to the nutritional status of children, and do not address the nutrient adequacy of children's diet. Most women in the study sample were farmers. Women often are the producers of subsistence crops (Boserup, 1989). Thus when women have their own plot, producing their own (more nutritious) crops, this might benefit the variety of the diet of their children, and hence may explain that education (increasing the likelihood they have another occupation than farmer) decreases the variety of their children's diet. Also, education may increase women's workload via increased employment, in turn restricting the ability to take care of children. Women with a higher workload have children with poorer weight-for-age Z-scores (Cunningham et al., 2015). The interviews revealed that most women experience a high workload and they were expected to do both domestic as occupational work. When women are educated, this might tighten time constraints even more.

Second, the age of mothers was included. Results revealed that stunted children had younger mothers. Both the results of interviews with the women as well as the interviews with key persons are in line with the importance of age in terms of empowerment and its effect on children's nutritional outcomes. The older someone is, the more they ought to be respected, implicitly benefitting their decision-making power. Both regarding the husband, as regarding other females in the household, differences in age determine women's decision-making power. This is in line with research, suggesting maternal autonomy increases with age (Das Gupta, 1995; DeRose & Ezeh, 2009; Lee-Rife, 2010), hence explaining older mothers had children with better height-for-age scores.

The final regression model did not show a significant effect of the number of children in the household on child stunting, wasting or IDDS, whereas the initial analysis (i.e. excluding the effect of other domains of empowerment) indicated stunted children have more siblings. This implicates that the effect of the number of children on nutritional outcomes does not persist after controlling for other significant variables and that other variables shaping empowerment mitigate the effect of the number of children in the household on child outcomes. As maternal age is also included in the

regression model, this might account for the lack of an effect of the number of children, as older mothers are more likely to have more children.

The second sub-question of the current study addresses the role of mother's position with regard to maternal health status. It was tested whether maternal health status was related to nutrient adequacy of the child's diet and children's nutritional status. The results revealed that wasted children had mothers with lower BMI's. Stunting and the nutrient inadequacy of the diet, was not related to the maternal health status. The interviews with women and key persons revealed that empowerment was lower during the stages of childhood and during child-bearing stage; girls often have little to say, but their autonomy increases as they become an adolescent. When they marry, autonomy tends to decline again. Having children increases their decision-making power regarding child care, but overall empowerment seems to remain low during this phase. Post child-bearing age, women gradually gain more autonomy within the household. Thus, especially during the stages of childhood and childbearing age, women often have little to say. When food is scarce, women and children appear to be the first to suffer from the lower available of food (Das Gupta, 1995). As they have less power compared to other members in the household during these stages, this might be reflected by the amount of food that is allocated to them. Moreover, a poor maternal health status may affect children's nutritional outcomes as her ability to take care of her children declines (Engle et al., 1997). During seasonal food shortages diets generally do not meet micronutrients requirements (World Bank, 2007). Therefore sudden collapses in food availability, as wasting reflect an acute deficit in nutrition, might therefore be reflected in both mothers as children's health and nutrition outcomes and explain the link between impaired maternal health status and child wasting.

The third sub-question considers what could be advised regarding interventions addressing maternal empowerment. In addressing policies and interventions targeting women's empowerment and children's nutritional outcome, it might be wise to consider culture and context specific characteristics of the area. The interviews with key persons revealed that the religion, culture, attitude and the political environment hamper improvements in women's empowerment in Northern rural Ghana. Most people in Northern Ghana are Muslim. This religion prescribes that women should respect the husband and allows men to discipline their wives. Implicitly, this suggests that the husband decides upon the decision being made and women should respect these decisions, whereas attempts to participate in decision-making processes are not appreciated. Also, the culture does not allow to give feedback. Older people and men are to be respected, whereas standing up to older people and men is seen as disrespectful, hampering participation in decision-making processes. At the same time women's attitude might hinder improvements in autonomy, because they accept their position in the household and do not acknowledge the importance and need to participate in household decisions. However for nutritional interventions it is important to recognize that women play a central role in children's nutrition, as they typically spend more time with the children than men. Also, the political environment in Northern Ghana may complicate further improvements in power of both men and women, as it is suggested that higher organs have more power and the rural community is dependent upon them for (the storage of) their harvest. Therefore it might be important that interventions and/or policies consider the influence of these factors in addressing women's empowerment and nutrition.

Also, in order to create policies aiming to empower women and thereby improving child nutrient adequacy of diets and nutritional status, we need to consider the effect of different domains of empowerment on nutritional outcomes. For instance, maternal autonomy regarding mobility and

domestic violence seem to be low for women and only few women were educated in rural Northern Ghana. In contrast to quantitative data, the interviews indicted that decision-making power regarding finances was low for women in Karaga district as well. However, research indicates that when women are empowered regarding these domains, this may positively contribute to children's nutritional outcome (Appoh & Krekling, 2005; Barrera, 1990; Barrios, 2012; Coffey et al., 2013; Na et al., 2015; Shroff et al., 2011). In an agricultural setting addressing financial autonomy may be an important factor in specific, for instance in terms of control over income and access to and decisions on credit (Malapit & Quisumbing, 2015; Malapit et al., 2014). Key persons identified financial autonomy and education as the main assets to improve women's empowerment. It was mentioned that empowerment regarding these domains may enhance their (bargaining) power and enable women to participate in decision-making processes. However the role of female education is ambiguous. Whereas key persons identified education as a major asset to improve women's empowerment, the quantitative analysis revealed that maternal education does not improve children's nutrient adequacy of diets. In itself female education increases women's autonomy, but it is questionable whether empowerment in this specific domain actually increases children's nutritional status. For instance, the increased workload and time spent away from home might mitigate the effect of higher autonomy regarding this domain on children's nutritional outcomes.

6.2. Strengths and limitations

The current study brings along some strengths and limitations. First the strength are discussed, followed by the limitations.

First, the study utilized a mixed method design. By combining quantitative and qualitative methods, the qualitative analysis (i.e. the interviews) can give meaning to observed associations in the quantitative analysis (i.e. the questionnaire).

Semi-structured interviews were conducted with all women. 48 interviews were included in the analysis. Using semi-structured interviews obtaining a small amount of data per interview question, requires a large number of participants (between 30 to 60 participants) (Morse, 2000). Therefore the sample size of the qualitative part regarding women is adequate.

The research also has some limitations. First, the qualitative results suggest financial autonomy of women in rural Northern Ghana is low, consistent with literature (Malapit & Quisumbing, 2015; Malapit et al., 2014). However the quantitative findings suggest that women's financial autonomy is high in this study sample. This implies that the questionnaire did not include an appropriate measure for financial autonomy for this specific study population. The questionnaire on which this research was based, originates from Asia. In Asia the physical, social, economic, political environment might be organised differently, although both developing and pattern-two countries (Das Gupta, 1995). Even though, questions which did not seem to be relevant prior to the fieldwork were adapted or removed, the questionnaire might not be completely suitable for this area. For instance, women often mentioned in the interviews that they did not keep money in the home. What they harvest is what they eat and besides that they use what is already present in the home. Therefore, even if in fact they did feel free to purchase a certain item, indicating high levels of autonomy, this often did not actually occur as there was no money to begin with. Furthermore, the formulation of the questions might not have been culture-sensitive for this specific population. The items representing financial autonomy included the question whether they felt free to buy a dress or a piece of jewellery if they wanted to, in which the vast majority of women answered yes. Because of the way of communicating in African culture, the questionnaire might not capture the actual level of

empowerment. Giving feedback (i.e. saying no) is seen as disrespectful and is avoided, as mentioned during interviews with key persons. Also, west-African countries are high context cultures (Hall, 1976). In high-context countries the meaning of words is highly determined by the context. The rules of communication are primarily transmitted through the use of contextual elements and not explicitly stated. Therefore the interviews maybe did capture the level of empowerment as it allows women to implicitly say the answer, without literally denying or confirming, whereas the questionnaire may have been too straightforward.

Second, the answers might have been affected by social norms. During the interview, other women, the mother in-law or sometimes the husband were in close proximity and children gathered around, which might have distracted women. Also, the study included a sensitive topic. These factors might have fostered socially desired answers. As people tend to conform to others, the presence of others may have triggered certain social norms, affecting women's answers (Cialdini & Trost, 1998).

Third, anthropometric data of mother and child was collected more than a year before collecting empowerment measures. According to the life course perspective women's empowerment is a dynamic concept and not stable over time (Das Gupta, 1995; Elder, 1994; Lee-Rife, 2010). However, the theory argues women's empowerment changes over different stages of her life course (Das Gupta, 1995). As women were still in the child-bearing stage of life, it was assumed autonomy during the second data collection was comparable to the first data collection wave.

Fourth, to construct overall measures for each of the domains of empowerment several items were combined per domain using Cronbach's alpha. However it is argued that Cronbach's alpha might not be a good measure to estimate internal consistency of several items of a questionnaire and test reliability (Sijtsma, 2009). To test internal consistency it might be better to use factor analysis. A factor analysis tests whether the included items actually measure the construct of interest and reduces a group of interrelated variables to a smaller set of factors by using factor loading (Field, 2009).

Last, the sample size was small for conducting a quantitative analysis. Due to practical and financial reasons, the study consisted of 51 household. When sample sizes are small, the power to detect a true difference is smaller and it is more difficult to distinguish between a real and a random effect (Field, 2009). Therefore, quantitative results are not generalizable. However, results may serve as explorative research as it provides implications for policy, interventions and additional research.

6.3. Future research

The broader scope of this research includes the pathway in which increasing agricultural production may increase children's nutritional status and nutrient adequacy of the diet. Yet, interventions targeting agricultural may not necessarily benefit children's nutritional outcomes (Masset et al., 2012; World Bank, 2007). The current research addresses women's position as a one of the mediators between agricultural production and children's nutritional status and dietary diversity, in order to create understanding of the link between both factors. Many agricultural programs focus on women (Ruel & Alderman, 2013; World Bank, 2007), because women are more likely to prioritize children's health (Appoh & Krekling, 2005; Barrera, 1990; Boserup, 1989; Brunson et al., 2009; World Bank, 2007). A recent review suggests agricultural interventions have shown to improve women's empowerment, but understanding whether a better position of women in turn translate into improved nutritional outcomes is lacking (Cunningham et al., 2015). Hence, the assumption is made agricultural production increases women's empowerment and this research focuses on the link between women's position and children's nutritional status. However it is recommended to study

this link in the context of (improved) agricultural production. The interviews with key persons revealed that in rural Northern Ghana many programs and interventions exist addressing women's empowerment. However, scores of maternal empowerment remain low (Malapit et al., 2014). More understanding is needed about the context- and culture-specific barriers and underlying pathways in which the position of women is affected by agricultural production and affects children. Similar to the finding that domains of empowerment may affect children's nutritional status differently, agricultural production may also affect aspects of women's position differently. For instance, whereas increased production may increase women's workload and impair maternal health status (Ruel & Alderman, 2013) decreasing women's ability for care giving, it may simultaneously increase earnings, employment and decision-making power (Dangour et al., 2012) benefitting women's ability to control resources and take care of their children. The way the position of women is affected by agriculture and affect nutritional status is complex. Additional research is needed to understand the complex interactions between these factors in rural Northern Ghana. As the position of women comprises of different elements and empowerment is a multidimensional concept, it is recommended to study how increased agricultural production affects women's empowerment (regarding different dimensions) and maternal health status, and how this in turn affects children's nutritional status and nutrient adequacy of the diet.

7. Conclusion

The maternal position seems to be related to child nutrition regarding some domains of empowerment and maternal health status, but not regarding all domains. Findings suggest that a better position of women regarding some domains of women's empowerment and maternal health status, is positively related to children nutritional status: empowered women, in terms of no constraints on physical mobility, the freedom from domestic violence and age, have a lower chance of having a stunted child, and mothers with a better health status have a lower chance of having a wasted child. On the other hand, findings suggest women's empowerment negatively relates to the nutrient adequacy of children's diets: the empowerment domains freedom from domestic violence (i.e. a woman does not suffer from domestic violence) and education (i.e. the mother is literate or educated) increases the chance of children whose diet is nutrient inadequate. This implies that different domains and aspects of an enhanced position of women have different impacts on child nutrition. Therefore, it is important to create culture- and context-sensitive policies and programs aiming to empower women in rural Northern Ghana.

8. References

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Appendices

Appendix I: Volunteer agreement

STUDENTS: Sofia Argyropoulou and Froukje Takens, Wageningen University

Volunteer agreement: In the first two weeks of November, two researchers from the Netherlands will be carrying out a study among households within Karaga district. Their aim is to obtain insight on intra-household dynamics and information on crops that are produced per family plot. We would like to ask some questions to the mother of CHILD_INDEX_ID and to the head of household. The first researcher, Sofia, will ask some questions on crop production to the head of household and then possibly join the head of household to visit the family plot. Simultaneously, the second researcher, Froukje, would like to interview the mother of CHILD_INDEX_ID.

I have been given an opportunity to have any questions about the research answered to my satisfaction. Taking part in this research is my choice. I know that I may decide to pull out at any time. I agree to participate as a volunteer.

Date: /11/2016

Name of Respondent

Signature (or thumb print of respondent in the case that respondent cannot sign name)

Signature of witness (if respondent is non-literate)

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual. I have watched them indicate consent to participate in the study with a mark/signature.

Date: /11/2016

Signature of person who obtained consent: _____

Printed name of person who obtained consent: _____

CHILD ID:

Appendix II: Questionnaire and interview

QUESTIONNAIRE AND INTERVIEW MATERNAL POSITION AND DECISION-MAKING POWER

- ✓ What: In addition to the questions about crops and family plot, I would like to ask the mother some questions about family composition and how decisions are made within the household.
- ✓ Confidentiality: The interviews will be anonymous and confidential.
- ✓ The main interest of this research is the view of the mother. Therefore there are no right or wrong answers and we hope the mother feels free to share her story.
- ✓ If the mother has any questions, she can always ask them. Do you have any questions now?
- ✓ Age: If maternal and child age is unknown, ask for the health book.
 - If a health book is not available, use an event calendar.
- ✓ Thank respondents before leaving and give the soap.

PART 1: QUESTIONNAIRE

GENERAL INFORMATION

Index_Child_ID: _____

Date: ____/11/2015

Community: _____

Family name: _____ Age Mother at marriage: _____

First name index child: _____ Age husband: _____

First name Mother: _____

Age Mother: _____

Does your partner have more wives? YES/ NO

If yes, how many wives does your partner have? _____

Number of generations* living in this household: _____

Is the head of the household your husband? YES/NO

If no, how are you related to the head of the household? _____

*Generations: a group of people born and living during the same time (time between the birth of parents and that of their offspring etc.)

CHILD ID:

FAMILY COMPOSITION

Please indicate the names and roles of all household members

Note: a household is defined by all people who sleep under the same roof and share food from a common cooking pot

Head of household:			Gender: Man / Women			
Additional man, if applicable:			Relation to head of household: Son / Father / Brother /			
Additional man, if applicable:			Relation to head of household: Son / Father / Brother /			
Additional man, if applicable:			Relation to head of household: Son / Father / Brother /			
Names of wives		Order of marriage	Children			
Please indicate the names of all wives in the household	If not married to head of the household, please indicate number of husband as stated above.	Please indicate the order of marriage for all women in this household by filling in a '1' after the first wife etc.	Names	Parity per gender		Age child
			Please indicate the children's names of all women living in this household	Please indicate the order of birth for both boys and girls, by giving the first born boy and girl a '1' etc.		
				Boys	Girls	
1. Name of mother of index child			Index child			
2.						
3.						
4.						

HOUSEHOLD DECISIONS

HOUSEHOLD DECISION-MAKING AUTONOMY			
Who in your family decides the following: Please tick the right box and indicate 'others' (e.g. husband, parents (in-law), brothers/sisters (in-law), son/daughter (in-law) etc.)	Others in de household	Jointly with others in the household	Respondent
13. What food to buy for family meals?			
14. Whether to purchase small household items such as a table, utensils?			
15. What gifts to give when relatives marry?			
16. Whether or not you should work outside the home?			
17. Inviting guests to your home?			
18. Your going and staying with parents or siblings?			
19. Obtaining health care for yourself?			
20. Whether to purchase major goods for the household such as a TV?			
21. Whether to purchase or sell animals?			
22. Whether to purchase or sell jewellery?			
23. How your earnings are spent?			
24. Whether money can be spent on health care for the child?			
CHILD CARE DECISION MAKING AUTONOMY			
Who is your household decides the following: Please tick the right box and indicate 'others' (e.g. husband, parents (in-law), brothers/sisters (in-law), son/daughter (in-law) etc.)	Others in the household	Jointly with others	Respondent
1. Not feeding the new born baby colostrums?			
2. Exclusive breast feed new born for 6 months?			
3. Immunization of the infant?			
4. What to do if the child falls sick?			
FINANCIAL AUTONOMY: CONTROL OVER FINANCES			
Please tick the right box		No	Yes
1. If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?			
2. If you wanted to buy yourself a small item of jewellery, such as a pair of earrings or bangle, would you feel free to do it?			
3. If you wanted to buy a small gift for your parents or other family members, would you feel free to do it?			
	Never	Some of the time	All the time
4. Are you allowed to have some money set aside that you can use as you wish?			
5. When you earn money, do you usually give all of it to your husband?			
6. Do you and your husband ever talk alone with each other about what to spend money on?			
7. Do you have a say in how the household's overall income is spent?			
8. Do you get any cash in hand to spend on household expenditure?			

CHILD ID:

MOBILITY AUTONOMY			
Do you have to ask your husband or senior family members for permission to go to	Always	Some of the time	Never
Please tick the right box			
1. Any place outside your house or compound?			
2. To the local market?			
3. To the local health center?			
4. Fields outside the village?			
5. Community center in the village?			
6. Home of relatives or friends in the village?			
7. The next village?			
NON-ACCEPTANCE OF DOMESTIC VIOLENCE			
Sometimes a wife can do something that bothers her husband. Please tell me if you think that a husband is justified in beating his wife in the following situations:	Always	Some of the time	Never
Please tick the right box Note: Please remember that the answers are completely confidential.			
1. If he suspects her of being unfaithful?			
2. If her natal family does not give expected money, jewellery, or other items?			
3. If she shows disrespect for in-laws?			
4. If she goes out without telling him?			
5. If she neglects the house or children?			
6. If she doesn't cook food properly?			
FREEDOM FROM DOMESTIC VIOLENCE			
Does your husband ever beat or hit you?		Yes	No
Please circle the right answer			

COMMUNITY CONTEXT

Distance to health facility (1= <2 km, 2= 2-5 km, 3= >6 km)	
Presence of an all-weather road (Y=YES, N=NO)	
Presence of schools (Y=YES, N=NO)	
Presence of electricity in the village(Y=YES, N=NO)	
Presence of Women's group in the village (Y=YES, N=NO)	
Presence of toilets (Y=YES, N=NO)	
Presence of wells (Y=YES, N=NO)	

PART 2: INTERVIEW

- ✓ For this last part, ask the mother's consent for recording the conversation.
- ✓ Start the interview by asking the main questions
- ✓ Use the additional topics as a guideline to get more information
- ✓ Probe: do they have other examples, relevant situations?

1. In general, how is your decision-making power in relation to other members of the household?
 - Household head
 - If applicable, other wives
 - If applicable, to grandparents, parents (in-law), (children in-law)

2. Describe your decision-making power in the past and describe how your decision-making power has evolved over the different stages of your life.
 - for different life stages
 - a. Girl
 - b. Adolescent
 - c. Newly wed/ between marriage and first child
 - d. With children
 - e. With baby boys compared to baby girls
 - Compared to different household members (and in the past)
 - a. Husband
 - b. Parents (in-law)
 - c. Sisters/brothers (in-law)
 - d. If applicable, to other wives
 - With regard to different areas (and in the past)
 - a. Food preparation
 - b. Large household purchases
 - c. Child care
 - d. Mobility
 - e. Freedom from domestic violence
 - How is your decision-making power affected by programmes (like N2Africa)?

3. How is the food divided in your household?
 - What is the food serving order?
 - Who gets what?
 - who gets most and why?
 - Do men in your household get the main share of the food?

4. Are females of different ages or life stages treated equivalently?

5. Are children of different ages or sexes treated equivalently?

6. How is your workload divided throughout the day?
 - Time available for work
 - Time available for domestic work, like care taking, cooking etc.
 - How is the workload divided for different care taking activities, like taking care of boys, girls and/or elderly?
 - How is your workload affected by programmes (like N2Africa)?

Appendix III: interview guides key persons

Interview guide health promotion officer Karaga district

1. Can you briefly describe your job function?
2. What is your perception of the level of empowerment and decision-making power of women in the Karaga district?
3. How is the decision-making power of women in the Karaga district over different stages of their life?
 - a. Girl
 - b. Adolescent
 - c. Newly-wed
 - d. Children
4. In your perception, how is the decision-making power of women in the Karaga district in relation to different household members?
 - a. Husband
 - b. Parents in law
 - c. Other wives (older and younger wives)
5. How do you think the decision-making power of women in the Karaga district is with regard to different areas?
 - a. Food preparation
 - b. Large household purchases
 - c. Child care
 - d. Finances
 - e. Mobility
 - f. Freedom from domestic violence
6. What is your perception on current programs addressing women's empowerment and workload?
 - a. Some projects address agricultural production in order to improve children's nutritional status. What do you think is the role of women's empowerment in this pathway?
 - b. What are barriers for improving women's empowerment?
 - c. What are assets for improving women's empowerment?
 - d. What in your perception is needed to improve empowerment?
7. In your perception, are females of different ages treated equivalently?
8. In your perception, are children of different sexes treated equivalently?
9. How is the workload of women in the Karaga district?
 - a. Work vs domestic work

Interview guide Professor community nutrition department

10. Can you briefly describe your job function?
11. What is your perception of the level of empowerment and decision-making power of women in rural Northern Ghana?
 - a. Is this the same for the Karaga district specifically?
12. How is the decision-making power of women in rural Northern Ghana over different stages of their life?
 - a. Girl
 - b. Adolescent
 - c. Newly-wed
 - d. Children
13. In your perception, how is the decision-making power of women in rural Northern Ghana in relation to different household members?
 - a. Husband
 - b. Parents in law
 - c. Other wives (older and younger wives)
14. How do you think the decision-making power of women in rural Northern Ghana is with regard to different areas?
 - a. Food preparation
 - b. Large household purchases
 - c. Child care
 - d. Finances
 - e. Mobility
 - f. Freedom from domestic violence
15. In your perception, are females of different ages treated equivalently?
16. In your perception, are children of different sexes treated equivalently?
17. How is the workload of women in rural Northern Ghana?
 - a. Work vs domestic work
18. What kind of projects are currently addressing women's empowerment and workload in rural Northern Ghana?
 - a. Some projects address agricultural production in order to improve children's nutritional status. What do you think is the role of women's empowerment in this pathway?
 - b. Where does the department of community nutrition place women's empowerment in relation to a child's nutrition?
 - c. What are barriers for improving women's empowerment?
 - d. What elements are needed to enable an increase in women's empowerment?
 - e. What would a true difference in terms of women's empowerment entail for the women?

CHILD ID:

Interview guide researcher post-harvest loss

1. Can you briefly describe your job function?
2. What is your perception of the level of empowerment and decision-making power of women in rural Northern Ghana?
3. How is the decision-making power of women in rural Northern Ghana over different stages of their life?
 - a. Girl
 - b. Adolescent
 - c. Newly-wed
 - d. Children
4. In your perception, how is the decision-making power of women in rural Northern Ghana in relation to different household members?
 - a. Husband
 - b. Parents in law
 - c. Other wives (older and younger wives)
5. How do you think the decision-making power of women in rural Northern Ghana is with regard to different areas?
 - a. Food preparation
 - b. Large household purchases
 - c. Child care
 - d. Finances
 - e. Mobility
 - f. (Freedom from) domestic violence
6. In your perception, are females of different ages treated equivalently?
7. In your perception, are children of different sexes treated equivalently?
8. How do you think the workload is of women in rural Northern Ghana?
 - a. Work vs domestic work
9. What is your perception on current programs addressing women's empowerment and workload in this area?
 - a. With your product you address post-harvest loss. Can you briefly explain what a mobile storage facility is?
 - i. How is post-harvest loss and the implementation of mobile storage facilities related to women's empowerment and workload?
 - b. Some programmes address agricultural production in order to improve children's nutritional status. What do you think the role of women's empowerment is in this pathway?
 - c. What are barriers for improving women's empowerment?
 - d. In your perception, what would be a viable strategy to improve women's empowerment in this area?
 - e. In your perception, what would a true difference in terms of women's empowerment entail for women in this area?

Appendix IV: Transcripts interview women

ID 1001

Interviewee: Shaata (Grandmother)

Age: 33 (real mother)

Spousal age gap: 3

Order Wife (total): 1 (1)

Note: Mother lives with her parents, grandmother is primary caregiver.

1. General decision-making power		In general my decision making power is strong, because I'm more or less the head of this household. This is because my husband is old and weak and most of the decisions is made by me and our son.
2. Past decision-making power	Different life stages	In the past I was a very strong woman who took decisions by myself. As a girl I was very troublesome but in a good way. As an adolescent girl I took several decisions on my own e.g. I took the initiative to start a business on my own, I did it without anybody's help. As a newlywed I realised things were different from when I as an adolescent, because if I take a decision to do something I realised I could not do it without my husband's consent and also I did things in a more organized way than when I was an adolescent. When I had children things changed. I can't decide to eat whatever I want without a child taken it from me. Taken decisions for boys and girls is not the same, getting things for boys is a lot easier than girls.
	Other household members	In the past it was my husband as I said earlier, but now it is me and my son who usually make the decisions. I don't have much say towards my husband's brothers and sisters because they are my in laws.
	Different areas	My decision making power towards food preparation has changed, because of the children. In the past I could decide to buy meat and cook for me and my husband, but now I can hardly do that. I used to take the decisions with my husband to make large household purchases, but now that he is not strong, I'm not able to do that anymore. In the past I took decisions for my children but now we do it together for my grandchildren. I am able to go to wherever I want to go. At my age and my husband's age I do not think there will be anything like domestic violence abuse, He does not even the strength to beat me.
	Programmes	I'm even the women's organizer for such programmes. These programmes have helped to shape and improve our lives especially towards sanitation and hygiene.
3. Food division		First the head of the household is served, then his brother, followed by myself and then the children. The head of the household takes the thigh of the meat, I eat the back, the children eat the head, wings and legs of the fowl.
4. Difference females of different ages		No the older, the bigger things your get and the smaller the little things your get.
5. Gender differences		Boys do different things from girls.
6. Workload	Work Domestic work	I try to do things as early as possible.
	Programmes	Sometimes I have to forgo my work to make way for programmes.

CHILD ID:

ID 1013

Interviewee: Saida

Age:27

Spousal age gap:9

Order Wife (total): 1 (2)

1. General decision-making power		My husband's father is the head of this household and since he is my father in law I do not have much decisions in relation to him. As for the other woman my decisions making is relation to her is good, we are like two sisters not two wives of the same man.
2. Past decision-making power	Different life stages	As a girl I couldn't even think of doing such because my parents were there and alive. As a newlywed I could not do that because my husband never allowed that, but now that I have children things are different because I am able to make decisions for my children.
	Other household members	When you have boys you will talk plenty but girls are calm people and boys are always making themselves dirty. I think my husband is better now compared to the past that he used to be difficult and strict that children could not even go closer to him. In the past my relationship with the other wife was good, but now it's even better.
	Different areas	When I was alone, it was just my decision, but now that we are two we have to sit together to know what we can prepare for that day, so it has changed. Taking care of the children now is a lot easier because of the other wife. She helps me with them if am busy or I have somewhere to go and I do the same for her. Yes I go, but my husband has to give the permission to go. In the past it was difficult because there are places I do not want to with children but I have to still go with them because no one is there to take care of them, but now that their other mother is around is a lot better. I make sure I do not do what he hates so to avoid any misunderstands
	Programmes	
3. Food division		When I finish cooking I serve my husband's father, followed by my husband and the two of us and then the children. My husband and his father eat separately and I eat with the other woman and the children together.
4. Difference females of different ages		Girls of different ages should be treated the same because they are the same.
5. Gender differences		Boys and girls are treated the same in this compound. I see no reason why they should be treated differently.
6. Workload	Work Domestic work	When I wake up in the morning I take care of the children, then leave to the farm, come back later to let the child breast feed. Then around 3 pm I start making preparation for evening meal.
	Programmes	

CHILD ID:

ID 1025

Interviewee: Salamatu

Age:25

Spousal age gap:2

Order Wife (total):1(2)

1. General decision-making power		For the sake of peace among the household members, my husband allows me to make decisions even the other wife takes part. Whenever there is something concerning this household my husband calls the two of us including himself to discuss.
2. Past decision-making power	Different life stages	I was the one who took decisions for myself. I will sit and ask myself if I do this would it be good, if yes I do it, if no I don't do it. Children will always change a person's life. When I was alone I just took decisions for myself, but now I have to also make decisions for the children, so that life will be better for them.
	Other household members	As for my husband, nothing has changed between us. The way we are now is the same in the past. As for my husband's mother, she has always been supportive, but unfortunately she is sick now and cannot do much for herself.
	Different areas	Even before I had children I had always prepared food that would be sufficient for us and even keep for the next day because a stranger can come and visit at any time, and is still like that I prepare more food. It happens that some time ago we were living in a bigger house and I had help with the kid, but now that we have moved here it's just me taking care of the children and also the old lady (mother in law).
	Programmes	It is only sanitation officers who come around. I think their visits have affected my life because I always try to keep my compound and the children clean.
3. Food division		I serve my husband and the rest I put in a food container. Everyone gets from there if they are hungry.
4. Difference females of different ages		I treat them the same.
5. Gender differences		Because they are all my children I treat them the same.
6. Workload	Work Domestic work	I sometimes get tired because I have to do everything myself. In the morning I cook both breakfast and lunch, then make sure the old lady has everything before I go to the farm.
	Programmes	

ID 1030

Interviewee: Samata

Age:29

Spousal age gap:9

Order Wife (total):1 (2)

1. General decision-making power		In general my husband allows me to make decisions, but not without him. Whatever decision I have to make if it is a major one he has to be part of it. Since he has now become my mother and father. In relation to the other woman, she allows me since both of us are in the same compound.
2. Past decision-making power	Different life stages	A girl can never make decisions on her own because she does not have that sense at that young age, so my parents took decisions for me. When I became an adolescent I took decisions with my brothers and sisters. When I had children definitely I will start think like a mother and that will also change the way I think and make decisions. Having boys compared with girls changes the way you make decisions because boys are

CHILD ID:

		different from girls. Since I came to this house, I have never been able to make decisions without my husband and it has stayed like this up till now.
	Other household members	My brother in law and sisters in law, my decisions towards them has not changed.
	Different areas	As for food preparation it grows as children increases. Definitely things have changed in terms of the quantity we prepare. I think things are better with regard to child care. As for the village men, they hate not to have money on them, if they are in that situation any little thing they get angry in that case try to avoid them, my husband is not an exception.
	Programmes	
3. Food division		We, the women, serve ourselves first, then our husband and the children. This house we eat together.
4. Difference females of different ages		You won't treat them the same because their minds and senses are not the same.
5. Gender differences		Their treatment depends on what ever thing you want to do for them. If there is the need for you to treat them the same your do so, if there is also a need for your not treat them the same your equally do so.
6. Workload	Work Domestic work	If I have to go to the farm, I wake up early, do all my domestic work. Then leave to the farm. The work load once a while gets tiring.
	Programmes	

ID 1045

Interviewee: Nafisah

Age:40

Spousal age gap:8

Order Wife (total):2 (2)

1. General decision-making power		I am able to make decisions in this house, because my husband allows me to take part.
2. Past decision-making power	Different life stages	When I was a girl it was my parents who took decisions for me until I got married. My decision making with my husband has changed because when we got married we were not as matured, so our decisions were childish but now we make matured decisions.
	Other household members	
	Different areas	Since I came to this house I decide what to cook because the maize is there and I will decide what to prepare.
	Programmes	I have benefitted because these programmes have helped me take good care of my children.
3. Food division		I serve the land lord first (husband), then serve the rest of the people in the house.
4. Difference females of different ages		They are treated differently. The oldest girl gets more than the youngest girl.
5. Gender differences		I do not treat them the same, the girl gets more than the boy.
6. Workload	Work Domestic work	If day breaks I show each child what to do, some go to get soya beans, others go to get okro and I am home to prepare food. But the workload it's too much for me.
	Programmes	

CHILD ID:

ID 1055

Interviewee: Nafisah

Age:28

Spousal age gap:20

Order Wife (total):2(2)

1. General decision-making power		There are some decisions I take with the other wives and others I take by myself.
2. Past decision-making power	Different life stages	My parents decided for me and also my elder brothers.
	Other household members	I and the other women most of the time take decisions, it has been like that even in the past.
	Different areas	In the past whatever my mind tells me to prepare is what I will prepare and it is the same even now.
	Programmes	
3. Food division		Everyone has his/her bowl. It is the children who eat together but as for the grown-ups everyone has their bowl.
4. Difference females of different ages		We treat all the girls the same.
5. Gender differences		Even boys and girls are treated the same.
6. Workload	Work Domestic work	I make sure that I do my work fast so that I can go to the farm and now come back to cook food for the evening.
	Programmes	

ID 1064

Interviewee: Azaratu

Age:48

Spousal age gap37

Order Wife (total): 2 (2)

1. General decision-making power		Yes I am able to make decisions, if it is regarding food preparation I will tell him this is what we should do for the children to eat. Because if we run out of food I will tell him, then we tell my eldest son Fatawu to get some food for the family.
2. Past decision-making power	Different life stages	When I was a girl, I could say that when I grow up this is what I want to do or this is what I want to become. As a newlywed I did not have children but now that I have children and they are older, some of the decisions I take it with them. I think it is different, because a boy and a girl their needs are different.
	Other household members	Now most of my decisions are with my children because my husband is weak and cannot do much for himself. And with regard to the other wife there is nothing because she is more of less a mad woman.
	Different areas	With regard to food preparation is the past it was not much but now the children are more sometimes I even loose count. In the past is was easier to care for children because Salchi (chief) was strong, but now it's difficult because most of the things are resting on my shoulders. I am not able to move as I used to because I am sole responsible for this household. Salchi (chief) is weak. The other wife is also mad, so it makes movement difficult for me, but is the past it was better. I think we are two responsible adults, and even what strength does he have to beat me.
	Programmes	I think some of the programmes which are geared towards child nutrition is good, because they advise us on issues with regard to the children, but I'm not really able to do everything they say because the compound

CHILD ID:

		is big and doing it means spending more.
3. Food division		In this house Salchi (chief), the first wife, the old woman in that room, myself and the children.
4. Difference females of different ages		They are not the same, their minds and thinking are also not the same, in that case the young girl takes more than the eldest girl.
5. Gender differences		I do things differently for boys and girls.
6. Workload	Work Domestic work	In case I have to prepare sheabutter for that day, I wake up early, then first and foremost beat the sheabutter down, then cook for them, then go back and continue with the sheabutter work. Then later cook dinner.
	Programmes	

ID 1066

Interviewee: Mariam (grandmother of index child)

Age:37

Spousal age gap:?

Order Wife (total):1 (2)

1. General decision-making power		My husband is the head of this house. What decisions will I have if not he decides for me or sometimes do it together, but for me I do not have decisions on my own. As for the other woman, I make decisions in relation to her, because whenever there is a place we are supposed to go I call her and tell her to prepare so that we go. If it is that she is busy she will then tell me that oh my senior sister I cannot go with you I have to do other things.
2. Past decision-making power	Different life stages	I do not think I knew what decision making was at that time. As for an adolescent what decisions did I have, at that age you neither see nor hear anything all you are interested in is to wake up, have food and nice clothes to wear. As a newlywed my husband made all the decisions in the house. When I had children I realised that it was time I started taking some decisions in the house with regard to the children, because I realised that if I do not start doing something things will go wrong. I told my husband that he should help me get a plot so that I could also farm and get something for the children if they needed it. I believe having children has changed the way I think and make decisions. Initially my husband making decisions for me was ok but I cannot sit and watch him take decisions for me and the children every time; I had to also take part. I do not have a boy so I cannot tell if having different sexes can change the way I make decisions.
	Other household members	There has been change between my decision making in relation to my husband. In the past when I was alone the decision was just I and him how it is different because there is another woman. There has been changes between my sisters and brothers in law in the sense that when I was new and fresh wed they were very lovely and accommodating but now things are different.
	Different areas	In the past, food preparation was not difficult because it was just me and my husband, but now getting money to even buy the soup is not easy. So is prepare what I have just so that we do not sleep on a hungry stomach. As I said earlier on, in the past it was better so taking care of the children was not that difficult, but now that times are hard, things are difficult. Sometime I had my own plots that I farm on, so if the children need something I can sell what I have cultivated to buy for them, but my husband has taken over the plots.
	Programmes	There are no programmes like that around this area, so I do not think it has affected my life or my decision making.
3. Food division		I just serve four bowls in this house, two people to one bowl.
4. Difference		Girls or different ages apart from food that they do not eat together, any

CHILD ID:

females of different ages		other thing we treat them equally.
5. Gender differences		Boys and girls are not treated the same in this compound.
6. Workload	Work Domestic work	I sell porridge, so I wake up early to prepare the porridge and bath the kids before I go out to sell my porridge, I only cook food when I come back. I get a little busy with time and works, but I try to make things work.
	Programmes	

ID 1078

Interviewee: Arahamatu

Age:37

Spousal age gap:8

Order Wife (total):1 (1)

1. General decision-making power		I am able to make decisions in general, but with regard to my husband we have to do it together.
2. Past decision-making power	Different life stages	When I was growing up, I took decisions with my mother. She decided for me and I also decided for her. Now that I have children my decision making is different from when I did not have children, because most of the decisions are towards the children.
	Other household members	In the past and now my decision making in relation to my husband and other household members has not really changed.
	Different areas	In the past when I did not have kids, someone prepared the food, but now I also cook. It was my mother in law who cooked.
	Programmes	There has not been any programmes like that in this area.
3. Food division		I serve my husband's uncle first, then my husband, then the children. Everyone in his house have their bowls.
4. Difference females of different ages		I treat all of them equally.
5. Gender differences		Boys and girls are treated differently.
6. Workload	Work Domestic work	Immediately they call the Adhan for prayers, I set fire to heat water to bath the children, then prepare the older one to go to school before I attend to the younger one. I later cook lunch and then supper.
	Programmes	

ID 1083

Interviewee: Sanatu

Age:25

Spousal age gap:3

Order Wife (total):1(1)

1. General decision-making power		My husband makes most of the decisions.
2. Past decision-making power	Different life stages	I can't really tell how my decisions were as a girl because I have little memory of it. As an adolescent I made most decisions by myself and I could stand by my decisions. As a newlywed making decisions were tough for me because I needed to satisfy myself and my husband, so it was not as when I was not married. Making decisions with children is not like is as when you do not have

CHILD ID:

		children. This is because the children's welfare is at stake. Baby boys are easier to handle as compared to baby girls, because for girls you need to do their hair and small things for them but boys they are ready to go.
	Other household members	
	Different areas	(<i>food preparation</i>) In the past my husband and I used to prepare whatever we wanted, but now it's not like that. I never made large household purchase in the past and even now I still don't. (<i>child care</i>) In the past it was easier to because it was only one child but now things have changed since they are more. Moving around has not been easier now, but in the past it was a lot better since there were no children. My husband does not beat nor verbally abuse me.
	Programmes	
3. Food division		The Head of the household is first served. Then I the wife and then the children. The head of the household gets the main share of meat and the children get wings, legs and head. The children get most, because they are with more, but everybody gets a fair share.
4. Difference females of different ages		No, because they are not of the same age.
5. Gender differences		No, this is because they are not the same.
6. Workload	Work	I do not do any work apart from farm work. Yes I get time to go.
	Domestic work	Yes, I have time to do domestic work. I do not dived it, I do it as and when I get the chance
	Programmes	I do not have an idea about these programmes.

ID 1087

Interviewee: Damata

Age:35

Spousal age gap:0

Order Wife (total):1 (2)

1. General decision-making power		My husband does not allow me to make my own decisions, neither am I able to make any decisions in relation to the other woman. The only person I can say I am able to make decision in relation to is my mother in law.
2. Past decision-making power	Different life stages	When I was growing up I was surrounded by my brother whom I usually took decisions with or they took decisions for me. As a newlywed things were better those days, but currently things are very difficult for me, because anything I will get ends up with my children.
	Other household members	In the past my husband never allowed me to make decisions, but now things are different, I think it's because I have children now, so he thinks I am more matured now. My mother in law has always allowed me to make decisions in relation to her, even in the past.
	Different areas	Whenever I wanted to prepare food and the things are not enough, I tell my mother in law and it's has always been this way. I have never been able to go anywhere without informing my husband. If I inform him and he tells me to go I go and if he doesn't I do not go.
	Programmes	The programmes around here are just about farming and water. They talk to us about what to do to get good yield.

CHILD ID:

3. Food division		I serve our bowl, serve my mother in law, serve my husband and his brothers, then serve the children. We eat together in this house.
4. Difference females of different ages		Girls of different ages are not treated the same.
5. Gender differences		Boys and girls are not treated the same.
6. Workload	Work Domestic work	When day breaks, I sweep, bath the children, wash their clothes, then prepare their food if there is anywhere I want to go I go.
	Programmes	

ID 1095

Interviewee: Samata

Age:26

Spousal age gap: -5

Order Wife (total):1(3)

1. General decision-making power		My husband allows me to also take part in decision making.
2. Past decision-making power	Different life stages	My parents made decisions for me then. As a newlywed my husband allowed me to make decisions. When I had children I take decisions with my husband. If it is that one of the children is sick, I will sit with their father to decide what to do. Making decisions for boys and girls is not the same. Boys are for the farm and girls are for the home.
	Other household members	My decisions compared to different household member is the same since I came to this house.
	Different areas	The way I prepare food and the way I take care of my children has definitely changed, because in the past we were just a few but now we are more.
	Programmes	Doctors come around to tell us to feed our children colostrum and also we should not allow others to breastfeed our babies and also that we should try and keep our children clean. I think it has helped me a lot.
3. Food division		It is my father in law we serve first, followed by my husband, then Yakubu and then the children.
4. Difference females of different ages		We treat them equally.
5. Gender differences		Boys and girls are treated differently, as for girls they are always around you and the boys follow their father to the farm.
6. Workload	Work Domestic work	Those that I have to do in the morning I do them, then go to the farm, come back in the evening to finish with the rest and prepare dinner.
	Programmes	

ID 1120

Interviewee: Abibata

Age:46

Spousal age gap:7

Order Wife (total):1 (1)

CHILD ID:

1. General decision-making power		I have a cordial relationship with my husband. My decision making power in relation to the household head is good. I am able to sit with my husband to make decisions with regard to our children.
2. Past decision-making power	Different life stages	I was raised by my aunty, so as a girl I had no decision of my own. Usually it was my aunty who took the decisions for me. Even as an adolescent, decisions were taken on my behalf. My decisions as a newlywed was towards my husband, how I could manage with him to make the marriage better than my previous marriage. When I had children things changed, because I need to make decisions for me and my children. The needs for boys and girls are not the same. Boys are much easier to handle than girls.
	Other household members	With my husband in the past and now there is still no difference. With my brother and sisters in law in the past used not to be able to have much power over them and is still like that, because they are my in laws.
	Different areas	Food preparation in the past was easier, because it was me and my husband, we could cook anything and eat or even not cook at all, but now I can't choose not to cook, and when I am to cook I am to think of my children and what is best for them. I have to make large household purchases, because I want to ensure that there is food available every time. Child care is a lot easier now, because I have older children who take care of the house chores and I could have time for the young ones. Mobility in the past was not easy, because I had no one take care of my children, now that I have older ones they take care of the younger ones whiles I'm away. I don't think there is any chance I will suffer any domestic violence abuse.
	Programmes	I think such programmes have improved my level of thinking and also helped me to be able to take good care of my children.
3. Food division		Household head, mother, children. When we are to share meat, the household head gets the thigh of the chicken, I get the back of the chicken and the children get the head, legs and wings. The children get the most of the food because they are more in the house. Everyone gets a fair share, especially children.
4. Difference females of different ages		The eldest gets bigger share than the youngest.
5. Gender differences		Boys are treated differently from girls.
6. Workload	Work Domestic work	Yes I have time for work Yes because I have my older children (girls) to help me. I make sure I finish with my domestic chores before I attend to things like that.
	Programmes	Some people came to teach us about how we can manage ourselves. I think it has helped me to manage my workload well.

ID 1123

Interviewee: Ayisha

Age:25

Spousal age gap:9

Order Wife (total):1 (1)

1. General decision-making power		I sit with my husband to discuss and also his elder brother who is the head of household to discuss on issues.
2. Past decision-making power	Different life stages	It came to a time when I had to stop schooling so I decided to. It was not my decision to stop school, it was a result of poverty. I went to Tamale to work for some time, gather some money, came back and furthered my education. As a girl my mother took decisions for me. As

CHILD ID:

		an adolescent I was sometimes allowed to make decisions. As a newlywed I had to always consult my husband before making any decision. It is faster to make decisions for girls than for boys.
	Other household members	It is the same, nothing has changed.
	Different areas	Because my husband can't cook I have to tell him what we need to buy for food. I have to always consult my husband before I go anywhere and it has always been this way. My husband is educated so he understands domestic violence issues.
	Programmes	People come around to talk to us about child nutrition and I think it has affected my life because I do what they say.
3. Food division		Food is served in this house according to sex and age.
4. Difference females of different ages		Females are treated equivalently.
5. Gender differences		Children of different sexes are not treated equally.
6. Workload	Work Domestic work	The respondent had difficulty in answering this question.
	Programmes	

ID 1170

Interviewee: Taiba

Age:28

Spousal age gap:5

Order Wife (total):2 (2)

1. General decision-making power		In general I make decisions, but only if the decisions is good. I cannot make a decision in relation to my husband or even his mother.
2. Past decision-making power	Different life stages	When I was growing up my prayer was that I get a good husband and money so that I could take care of the children I will give birth to. My life was centred around my mother and father. Anything I did or will do they have to decide that.
	Other household members	Being married was a whole new experience for me because now someone apart from my parents took the decisions for me. I think that having a boy and girl and deciding for the mas a mother is difficult but since they are all your children, when I am to make decisions I do it the same. There has been a change because some time back if I tell him that we have to do this and that he will snob me but now I see that he takes what I tell him.
	Different areas	There has been changes with relation to food preparation, because in the past I struggled a lot to prepare food. I have to know what to do to prepare the food, but now if my husband has money he gives me to some to help me prepare the food. If it is just around I can go, but if I am to travel to a far place my husband has to give me the permission, if not I cannot go. I have not offended my husband for him to abuse me.
	Programmes	I have not heard of such programmes around, so it has not affected my life.
3. Food division		My husband's mother is first, followed by my husband, then we, the two women, the last is the children.
4. Difference females of different ages		Girls of different stages are treated not the same, because one is older than the other.
5. Gender differences		Boys and girls are also not treated the same, because they are different sexes.

6. Workload	Work Domestic work	I first pray, then set fire to heat water for bathing, I fetch my husband's mother the water to bath, then she bathes the children while I prepare breakfast. Then everyone goes to their work place until in the evening when everyone come back, then you decide what food to cook.
	Programmes	

ID 1176*Interviewee: Balmini**Age:33**Spousal age gap: 40**Order Wife (total):4 (4)*

1. General decision-making power		My husband is a chief and I'm not able to have much of the decisions to make. He makes most of it.
2. Past decision-making power	Different life stages	I was someone who was self-dependent. As a girl, I can't remember much of the decisions I took, or even took it at all. I'm sure it was my parents who took decisions for me. As an adolescent, I was very much on my own. I was very quick in thinking of things I could sell to make money. As a newlywed I think I lost much of the decision making power because my husband now made certain decisions for me. When I had children I still make little decisions concerning them, because a lot came from their father. The only thing I make decisions on is their food and what they wear. Making decisions for boys and girls is challenging, but the boys their dad makes most of the decisions for them.
	Other household members	I got married to my husband as the chief, so I don't get to make decisions on certain things apart from food. I don't have much decisions with regard to my in laws. With the other wives even though I have a say. It is not much because I'm considered the youngest among them.
	Different areas	We are many in the household so preparing food is quit challenging. Most you need to think of how to get the best for everyone even though the food is in large quantity. Household purchases has always been the same because the chiefs house always has large number of people. I think with regard to child care I make or I have greater decision making power there, because I decide what to cook for them to eat and what I should wear on them. As the chiefs wife, I don't get to move more unless it's my husband who permits me to go before I can go. Chiefs don't marry wives they choose, so I can't really make much decision towards domestic violence abuses. (<i>She indicated in the questionnaire her husband does not beat her</i>)
	Programmes	It has helped me to make an informed choice towards what food to give to my family.
3. Food division		Head of the household (chief), first wife, second, wife, third wife, myself, and the children. Men and children get more and better of things in the household. Children get most, because they are more in the house.
4. Difference females of different ages		No
5. Gender differences		No, boys are treated different form girls, boys go to the farm and girls do the house chores.
6. Workload	Work Domestic work	Yes I do the house chores early, so that I could get time for the children.
	Programmes	Sometimes I have to leave my work to attend these programmes.

CHILD ID:

ID 1306

Interviewee: Maami

Age:20

Spousal age gap: 25

Order Wife (total): 2 (2)

1. General decision-making power		My decision making power towards other member of the household is not all that strong, because my husband is way older than me and more to the point. I'm the youngest of the two wives.
2. Past decision-making power	Different life stages	In the past my decision making power was not strong. As a girl I was never allowed to make decisions myself. As an adolescent I was given a little chance to make decisions towards certain issues, but issues that will affect my life. My parents took those decisions for me. As a newlywed I was not given total freedom to make decisions, because I was young and new. When I had children things changed a little because I was considered an adult who needed to take decisions for me and my children.
	Other household members	My decision is just towards my boys, because I don't have baby girls. It is difficult to make decisions for boys because fathers tend to concentrate more on them and does not allow me to make most of the decisions for them. My husband and other members now consider me matured, so they now even sort for my advice towards certain issues.
	Different areas	Food preparation in the past was easier to handle but now I need to think for myself and my children, that is what should I prepare for them to eat and be happy. I'm not able to make large household purchases, because their money meant for it will be used to take care of other needs for the children. I have not been able to move as I used to because of my children and husband. I think I am free from any domestic violence abuse.
	Programmes	I have not really taken part in any programmes.
3. Food division		The head of the household is served first before any other person. The children are the last to be served. In terms of food the children get more but, the children are those who get the least when it comes to meat sharing. The children get the most, because they eat much. Men do not get the main share, children do.
4. Difference females of different ages		No, the eldest gets the most and the youngest gets the least.
5. Gender differences		Children of different ages are treated differently and children of different sexes are treated differently as well.
6. Workload	Work Domestic work	I have time for work. Yes, I have time to do my domestic work, because I always wake up early. I do most of my work early in the morning so that I can get time for my children.
	Programmes	I have never taken part in any programmes.

ID 1313

Interviewee: Maata

Age:28

Spousal age gap:10

Order Wife (total):1 (2)

1. General decision-making power		It is not every decision I can make and it is not everyone in this household I can make decisions for.
2. Past decision-making power	Different life stages	I was very close to my mother and I usually take decisions with her. When I grew up a little my mother allowed me to take certain decision that are not major. There is a difference between when you are married and not have children than when you are married and also when you have boys and

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		girls. This feels like you are moving from one life stage in to another.
	Other household members	In the past when I was alone with him and the way we took decisions now it is not like that since there is another woman now.
	Different areas	There has been some changes with regard to food preparation. When I was alone with my husband we cooked what our children liked to eat, but now they have to eat another woman's food whether they like it or not. In the past I go to places if only my husband give me the permission and is still like that. I am a market woman I go to the villages on market days to sell things, but there are times I would have to stop going because my husband would want me to do something different. I have nothing to say with regard to that (domestic violence)
	Programmes	There are no programmes like that around. Even the sanitation officers will announce that they are coming but they never come.
3. Food division		I serve my husband, his elder brother and younger brother, then we, the women, then the children.
4. Difference females of different ages		I treat them differently.
5. Gender differences		Boys are treated differently and girls are also treated differently.
6. Workload	Work Domestic work	In the morning after prayers I sweep, then I leave to the farm. I f I am the one cooking I cook if not I do other things.
	Programmes	

ID 2002

Interviewee: Abiba

Age:31

Spousal age gap:7

Order Wife (total): 2 (3)

1. General decision-making power		I don't have much decision because I'm not the first wife. For instance if the maize for cooking gets finished it is the first wife who will ask us to bring bowls so that she will measure it for us to take to the grinding mill. I am able to make decisions with regard to the other wives, because if there is something we need to decide on I take part.
2. Past decision-making power	Different life stages	I can't tell if I were able to make decisions as a girl. As an adolescent mostly I decided on things but with my fellow girls. For us you have to give birth before the man marries you. It is after you have a number of children with him before he marries you. When I did not have children I had no say, but now that I have children I take decisions with my husband, because if one of the children is not well, I have to sit with him to decide on what to do.
	Other household members	Things have changed between myself and my husband because of the children. In the past when I wasn't married I was not allowed to make any decisions it was the first wife who decide on most tings.
	Different areas	In the past I was not allowed to prepare food, it was the first woman who cooked food and then serve me some. With regard to child care things were difficult in the past because I wasn't cooking sometimes the children might want a different thing form wat is cooked but because I was not cooking I force them to eat it like that. I can't go anywhere without my husband's consent. I think I have not offended him that is why he does not beat me.
	Programmes	They talk to us about sanitary and what to give to our children to keep them healthy. So because of this sometimes when you wake up and don't clear your compound you husband will talk.
3. Food division		If I finish preparing T.Z. I serve my mother in law, then my husband,

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		then the first wife, then myself and the children.
4. Difference females of different ages		They are treated the same.
5. Gender differences		As for that the boys are normally not at home, so sometimes it is different.
6. Workload	Work Domestic work	In the morning I bath them, then tell the oldest to take care of the young ones so that I will rush to the farm and come back. When I return I prepare food for dinner.
	Programmes	

ID 2007

Interviewee: Malia

Age:18

Spousal age gap:7

Order Wife (total):1 (1)

1. General decision-making power		My decision making power towards the household head is not something that has been easy, because he is my father in law. The other wives I consider as my mother's because they are way older than me.
2. Past decision-making power	Different life stages	As a girl I can't remember anything concerning that, because I was still little and could not think of anything much. As an adolescent it was difficult for me because I had to sometimes find a way with my parents on things I wanted to do by myself. I am not married to the man I currently living with, because that I am not able to make decisions as I use to when I was not with him. Now that I have children my decision making is structured because I need to find balance between me and my children. My children are girls, so I don't have experience for boys. Girls need a lot of attention. So I can say that my decision making power has evolved somehow.
	Other household members	
	Different areas	Because I am not married to the man I don't really take part in food preparations. I only help out when the food is being prepared. I don't have a say in household purchases. My husband mostly makes the decisions on my behalf. Sometimes I have to make bold decision as to whether to get to a place or not to go because of the children and house chores. I should be able to make a decision if there are issues of domestic violence.
	Programmes	
3. Food division		First the parent in law, then the husband and brothers, followed by the wives and then the children. Children get the wings, legs and head of fowls and the eldest get the rest of the parts. Children get most, because they are more.
4. Difference females of different ages		No (not equal)
5. Gender differences		No (not equal)
6. Workload	Work Domestic work	I am trying to make more time for my work. I have little time because I am usually at the shop. I try to do things as early as possible.
	Programmes	

CHILD ID:

ID 2014

Interviewee: Arahamatu (real mother of index child)

Age:36

Spousal age gap:9

Order Wife (total): 2(2)

1. General decision-making power		I am able to make decision with regard to my husband and the other wife.
2. Past decision-making power	Different life stages	As a girl and an adolescent my parents decided for me. I could make decisions with my husband as a newlywed. There is not much decisions to be taken with regard to children in the village. The food is there all you need is prepare T.Z for them, here we do not buy food.
	Other household members	Nothing has changed with regard to my husband. The way it was some time ago, is the same now.
	Different areas	With regard to food preparation, definitely some things has changed. I used to prepare small meals but now I have to prepare plenty so that it will be enough for all of us. Since I came to this house, I have not gone anywhere without my husband's consent and it has continue up till now.
	Programmes	In this community people visit us to talk to us about agriculture what to do to get plenty yields, and also people come to talk to us about the children how to keep them clean.
3. Food division		When I cook, I first of all serve my husband, followed by his brother, then the other woman, then me. For the children I divided them in to three categories, the older ones, followed by those in the middle then the little children.
4. Difference females of different ages		Girls of different ages are not treated equally, the older ones eat together and the younger ones also eat together.
5. Gender differences		Boys are also separated form girls.
6. Workload	Work Domestic work	I wake up early to do my domestic chores but sometimes the work gets too much that I postpone some to the next day.
	Programmes	

ID 2032

Interviewee: Fulera

Age:28

Spousal age gap:?

Order Wife (total):1 (1)

1. General decision-making power		The household head does not allow me to make decisions. Also I am not Allowed to make decisions in relation to my mother in law.
2. Past decision-making power	Different life stages	When I was growing up my parents made decisions for me. As a newlywed my husband and my mother in law made the decisions in this house. When I had children, nothing has changed because it is the children's father who decides for me and the children.
	Other household members	In the past, I was not able to make decisions in relation to my husband and his mother and I am still not able to do something.
	Different areas	I decide what to prepare even in the past my husband only provides the maize and I make the decision. In the village what else do we eat apart from T.Z. so there is not much to decide on. The only decision has to do with the soup how you can vary the soups, if not there is nothing. In the village we do not make large household purchases, because we do

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		<p>not have to do so.</p> <p>In the past and now is still the same when it comes to taking care of the children, because my mother in law is always around to take care of them so that I can do other things.</p> <p>I have not offended my husband, that is why he does not beat me. It is not because I have or do not have a say in this house.</p>
	Programmes	No one comes, It's just the white people who came last year and gave us salt and told us that is good for us and the children.
3. Food division		When I cook I serve my mother in law first, then I serve my husband, Then I serve my children. In this house, the men eat differently, but we, the women, eat together and the children also eat together.
4. Difference females of different ages		Girls who are not of the same age are treated the same in this house.
5. Gender differences		Boys and girls are not the same, so they are not treated the same.
6. Workload	Work Domestic work	When I wake up I sweep, then wash utensils, then prepare food for breakfast and lunch, then in the evening I prepare food again.
	Programmes	

ID 2040

Interviewee: Shakira

Age:29

Spousal age gap:9

Order Wife (total):1

1. General decision-making power		My decision making in relation to the head of this house is that everting he is going to do the discusses it with me.
2. Past decision-making power	Different life stages	In the past I was not allowed to make my own decisions, because I was still young and my parents took every decision for me. As a newlywed my husband and I decided on the things we should do, but I could not make my own decisions without him. When I had children my decision-making has changed since the attention has shifted to my children.
	Other household members	My decision making in the past and now with regard to my husband is the same, nothing has changed.
	Different areas	In the past I cooked the food in small quantity, but now since we have children the food is more. What I prepare in the past is still the same food I prepare. We village people do not have much to cook apart from T.Z. We never made large household purchases and we still don't.
	Programmes	My decision making power has not been affected by any programme.
3. Food division		In this house, it's only the children who eat together from the same bowl. The rest of us have our own bowls. My husband is served first, followed by his brother, then me and the children are served last.
4. Difference females of different ages		I have only one girl among my children, but I think if I should have another girl who is not the same age with Safia I will treat them all equally.
5. Gender differences		Boys and girls are treated differently. I do not mix Safia and Thomas to do things.
6. Workload	Work Domestic work	When day breaks I prepare food for the children to eat, then heat water for them to bath, then I prepare to go to the farm, I come back later in the evening to cook food for supper.
	Programmes	

CHILD ID:

ID 2045

Interviewee: Fusheina (other wife)

Age:26

Spousal age gap:20

Order Wife (total):2 (3)

1. General decision-making power		As for this house I cannot just sit and take my own decisions. Mostly I am involved in the overall decisions taken in this house. My husband will not allow me to decide on my own. All the three wives and our husband make the decisions.
2. Past decision-making power	Different life stages	I think when I was a girl my parents must have taken decisions for me. I think I was able to make decisions as a newlywed. Since I came to this house everything I will do my husband has to give me the go ahead.
	Other household members	
	Different areas	
	Programmes	
3. Food division		In case I finish cooking I serve the women first, then my husband and the children. We eat together in this house.
4. Difference females of different ages		We treat all girls equally.
5. Gender differences		Boys and girls are not treated equally.
6. Workload	Work	I bath the children, prepare them for school, then cook lunch. After that, I do not have anything until evening then I cook again.
	Domestic work	
	Programmes	

ID 2060

Interviewee: Fuseina

Age:25

Spousal age gap:7

Order Wife (total):2(2)

1. General decision-making power		My husband and the two of us (women) live in his aunt's house. I can't make decisions in relation to her because she is the head of this house and besides she is way older than me and my husband, but for my husband and the other wife, I am able to make decisions in relation to them.
2. Past decision-making power	Different life stages	When I was a girl my parents helped me decide on certain things. As an adolescent I was able to make my own decisions. When I got married and came to this house I took decisions with my husband and not his aunt. Baby boys and baby girls making decision for them is different, because boys and girls are different.
	Other household members	Making decisions with my husband in the past is better than now. This time around he is usually not at home, so we hardly see each other. In the past and currently nothing has changed in relation to my decision making towards my aunt in law. She is my in law, my husband's parents are no more.
	Different areas	In the past and now my food preparation has changed, because now with the children we cook more. I think with regard to child care, things are changed and better. I go to wherever I want to go provided I informed my husband, and also because I am a business woman (jewellery seller) I am out every time. I do not think if a woman has a say in issues concerning the household it would prevent her husband from abusing her. I think that the only thing that would let her husband not beat her is for the woman to respect her

CHILD ID:

		husband's decision.
	Programmes	There has not been any programme around here that takes about child nutrition.
3. Food division		In this household everyone has their bowls except the children, they eat together.
4. Difference females of different ages		Girls of different ages are not treated the same, because one is older than one.
5. Gender differences		They are also not treated the same. The boy will get more than the girl.
6. Workload	Work Domestic work	In the morning I will set fire, prepare breakfast and sweep the compound. If the children go to school I will also leave home to go and sell my jewelleries. Sometimes things get too much for me. Especially when I come home in the evening I get tired by yet I have to cook food.
	Programmes	

ID 2061

Interviewee: Abiba

Age:33

Spousal age gap:13

Order Wife (total): 2 (2)

7. General decision-making power		I'm a woman and most of the decisions are made by my husband. I have little to say even though sometimes I make certain decisions by myself.
8. Past decision-making power	Different life stages	In the past and now I don't think there has been much changes, because those days my parents made decisions for me. I think there is just some small changes between and adolescent and a girl-child. This is because my parents still made decisions for me, but now I'm just given a little chance to think. I was able to make decisions, to start selling at the age of 15, to be making money for myself. As a newlywed I was a little bit shy so I never liked to talk much. Now I'm a mad woman, because I talk a lot because of the children. Baby boys and baby girls, the decisions are different because they have different needs.
	Other household members	With different household members I think my decision making power has evolved especially my husband's mother and sisters.
	Different areas	My food preparation has improved as compared to the past. With regard to large household purchase we don't make large household purchases. It's just the maize my husband brings from the farm. With regard to child care its easy because of my mother in law. Mobility has not been challenging because I am able to go to places I want to go because of their grandmother.
	Programmes	
9. Food division		First the husband's mother is served, then the head of the household, followed by the wife and then the children. In terms of meat, the head of the household and his mother gets the best part and the children gets the least. The children gets most of the food, because they are more. Children get the main share.
10. Difference females of different ages		No they are treated differently, because they are not the same age.
11. Gender differences		No, boys are treated different from girls e.g. they do not eat together from the same bowl.
12. Workload	Work Domestic work	I have time to do my work. I have time to do my domestic chores. I make sure I do things faster when I know I have a lot of work to do at home.
	Programmes	Sometimes it does.

CHILD ID:

ID 2070

Interviewee: Alima

Age:39

Spousal age gap:14

Order Wife (total):1 (1)

1. General decision-making power		Because I am the first wife (brother also has one wife), I am able to make decisions in this house. If there is anything I can call the other wife, talk to her and she will listen to me.
2. Past decision-making power	Different life stages	Since I was little then , I could not make decisions. My parents did that for me, even as an adolescent they still took decisions for me. As a newlywed I could now make decisions because by then I was also matured to take decisions.
	Other household members	In the past it was a little hard to make decisions with my husband but now it's better, because we are able to fit and take decisions smoothly.
	Different areas	With regard to food preparation, I make the decision for the other wives. I go to any place I want to, provided I discuss it with my husband. I am obedient to my husband. That is why he does not beat or insult me, because anytime he says something I make sure I agree with him or his decision.
	Programmes	Most people come to talk to us on sanitation and agriculture. I think it has helped to improve the sanitation in the community.
3. Food division		After I finish with the T.Z I serve my mother in law's bowl first, followed by our bowls (women), then the men and the last is the children.
4. Difference females of different ages		With regard to food, all girls are treated the same.
5. Gender differences		Boys and girls are not treated the same.
6. Workload	(Domestic) work	In the morning if I am not going to the farm, I stay and prepare food for those who have left to the farm, set everything down for them. Then I now get time to breastfeed my daughter. In the evening if those from the farm are not back yet I sweep the compound and set fire whiles I wait for them to come and prepare evening meals.
	Programmes	

ID 2075

Interviewee: Asana

Age:25

Spousal age gap:-3

Order Wife (total):1 (1)

1. General decision-making power		You know that a married woman does not own herself. In that case I can never make decisions without my husband. This house whenever there is an issue they call everyone to come and sit so that the family will know what to do. With regard to my husband and my mother in law, each time I am to make a decision I do it with them
2. Past decision-making power	Different life stages	When I was growing up, I took decisions with parents. If it was a good one, my parents will allow to go ahead and do it, but if they think otherwise they will not allow me. As a newlywed and then when I had children my decision making has changed because being alone with your husband, reality has not settled in, because the money we used to get was enough for both of us but now that there are kids things have changed because we need to think about the children's future in every decision we make. When we were dating, things were different from now that we are living together.

CHILD ID:

	Other household members	
	Different areas	Honestly I do not cook, I only prepare porridge in the morning. It is my brother in laws' wife who cooks. Taking care of them has not been easy because I live with a man, we are not married, so most of the things I cannot do for them. I cannot go anywhere unless my husband permits me. I have told you that I cannot do anything without my husband's permission. Him not abusing me is not because I have a say in, but because I try not to offend him.
	Programmes	There are no such programmes around here apart from sanitation officers who come once a while to talk about sanitation.
3. Food division		My husband's mother has her bowl, my husband has his bowl and the children also have a bowl.
4. Difference females of different ages		It is not going to be the same because they are not equal.
5. Gender differences		This is also different because a boy and a girl are not the same.
6. Workload	Work Domestic work	In the morning when I wake up I pray then start with whatever work I have for the day.
	Programmes	

ID 2078

Interviewee: Safia

Age:28

Spousal age gap:10

Order Wife (total):2(2)

Note: Interviewee doesn't speak Dagbani fluently, so she has trouble with the interview. After a while interview is stopped, because she doesn't know how to answer.

1. General decision-making power		I am allowed to make decisions but my husband makes most of it.
2. Past decision-making power	Different life stages	In the past, my parents took decisions for me. In the past my husband did not allow me to make decisions but now is better.
	Other household members	-----
	Different areas	
	Programmes	
3. Food division		
4. Difference females of different ages		
5. Gender differences		
6. Workload	Work	
	Domestic work	
	Programmes	

ID 2081

Interviewee: Aishetu

Age:34

CHILD ID:

Spousal age gap:14

Order Wife (total):1(3)(The order she indicated in the family composition does not correspond to her interview)

1. General decision-making power		My husband allows me to make decisions, because if there is something to do he discusses with me and the other wives.
2. Past decision-making power	Different life stages	My mother and father decided for me as a girl and an adolescent. When I'm deciding for boys and girls I do it differently.
	Other household members	Nothing has changed in the decisions of my husband and I, the way we used to is still the same.
	Different areas	With regard to food preparation I do not make decisions, it is the first wife. Even in the past it was like that. It is the women who decide to buy ingredients for soup in large quantity. It has been like that even in the past. I think because I agree to whatever he tells me that is why he does not beat me.
	Programmes	Whenever they come it is always about sanitation and how to keep the children.
3. Food division		Whenever food is prepared in this house it is my father in law's bowl we serve first, then all the men eat from the same bowl, all the women eat from the same bowl, boys in the same bowl and girls in the same bowl.
4. Difference females of different ages		They are not treated the same. The youngest get more favours, but in terms of food the oldest get more.
5. Gender differences		Girls and boys are not treated the same. Girls get more than boys.
6. Workload	Work Domestic work	When I wake up in the morning, I fetch water, wash yesterday's dirty bowls, then prepare food for them, then bath the little ones. After that I go to the farm. When I come back I wash the dirty bowls again, then cook.
	Programmes	

ID 2093

Interviewee: Asana

Age:21

Spousal age gap:4

Order Wife (total): see note

Note: Mother lives with her parents without the baby's father.

1. General decision-making power		My father and mother sometimes allow me to make certain decisions. There are some I have to discuss with them before I can do it.
2. Past decision-making power	Different life stages	No, as for that when I was a girl I could not make any decision. My parents took those decisions for me. But now that I have children I make my own decisions or sometimes with the children's father. I am a young woman and these twins are my first, so I do not have an experience with boys, all I know is making decisions for the two girls I have.
	Other household members	My uncles and their wives I have never been able to make decisions in the past and is still like that. My father, I am not able to make decisions in relation to, but my mother I am able to.
	Different areas	I do not cook in this house, my mother does. I only help her out if I am around. My parents do not make large household purchase. My mother takes care of the twins while I go to work. I have children and I cannot just decide to go anywhere unless that place is important and also I have to inform my mother first. In the past

		things were different, I could go and not think back but now anywhere I have to go it must be very important before I go.
	Programmes	Mostly the programmes around here are in relation to the children, how we should take care of them, so that they do not fall sick easily. I think it has helped because when I am to things for my two girls I think of what they have said, so I try to do it better.
3. Food division		This house in the morning and in the afternoon the small households cook their food separately. It is in the evening that we cook together . the women have their bowls, we the younger women have our bowl, the men have their bowls, and the children have theirs.
4. Difference females of different ages		It is the same, but if it is food, the older one will eat and give the younger one.
5. Gender differences		My mother treats us the same. Whenever she wants to tell us something she calls both sexes.
6. Workload	Work Domestic work	What I do when I wake up in the morning is to fetch water for my mother, wash my children clothes, then go to work, any other thing is done after I have returned from work.
	Programmes	

ID 3011*Interviewee: Amiratu**Age:26**Spousal age gap: 25**Order Wife (total):2 (3)*

Note: woman sometimes with aunt and sometimes with baby's father.

1. General decision-making power		I live with my aunt, but sometimes I do come to stay with my children's father . this two people are those I normally discuss my issues with. As for my brother in law I have little decision in relation to him because I am not married to his brother, we only have a child. As for the rest of the two wives I really do not have much because we hardly see each other. It is only when I come to sleep around that we have little things to discuss.
2. Past decision-making power	Different life stages	My aunt is the one who took care of me and unlike your mother you cannot just start making decisions at that little age. Mostly if I decide to do something I have to hide and do it. When I did not have Rafia, I use to still have the craziness in adolescence and young lady, but now I am forced to think maturely because of the child I have to, since her welfare is in my hands now.
	Other household members	I have been with my child's father for like 3 years so it's hard to say anything and also because I do not live in this house permanently I hardly know his true colour.
	Different areas	I do not cook, it is my aunt I help out when it's her turn to cook in her husband's house. I only come once a while if there is something he feels like having, he asks me to make for him, but I do not cook regularly like the way the wives do. When my child was little she was very disturbing so my aunt sometimes helped me to take care of her. But now I think she is better because she is growing up. My aunt has to give me the go ahead to go to any place I want to. In the past I could go but now because of Rafia I am not able to go everywhere I want to if my aunt is not around to take care of her whiles I am away.
	Programmes	No one comes around to tell us anything on our children's nutrition. Its just sanitation officers and from the agriculture sector, but this has not affected my life in any way.
3. Food division		At my aunts place when we cook in the afternoon we eat together, but in the evening everyone have their bowls. We serve my aunt's husband first, then my aunt, then the other woman (Aunts rival), then the

CHILD ID:

		children.
4. Difference females of different ages		We treat them equally.
5. Gender differences		We do not treat them equally because they are a boy and a girl and for that matter they are different
6. Workload	Work Domestic work	Because I stay with my aunt the only thing I do is fetch water, sweep the compound and bath Rafia. I then sometimes cook, I do not have much work to do so I am able to take care of my daughter.
	Programmes	

ID 3021

Interviewee: Fuseina

Age:41

Spousal age gap:-5

Order Wife (total):1(1)

1. General decision-making power		My husband has taken me as a sister, because that was what I prayed for. I am allowed to make decisions because most of the time my husband is not around, but when he is around it's he who makes the most of the decisions with his brothers and uncle
2. Past decision-making power	Different life stages	As a girl I had nothing much to take decisions on. As an adolescent I was still living with my parents so I had little decisions to make. As a newlywed most decisions were just between me and my husband, but now other members of the family have a better part of it because of the children. Baby boys and girls in my view, boys are easy to handle because their needs are not as complex as girls.
	Other household members	My decision making power towards parents (in law), sisters and brothers (in law) is not all that strong because I am just a wife.
	Different areas	I am not able to make large household purchases because situations have changed financially. My husband and his brothers usually make most of the decisions with regard to the welfare of the children. I just have little to say. My movement has been challenging if no one is home I am not able to go to most places. I think I might not face domestic violence issues even though my husband has ever hit me.
	Programmes	
3. Food division		My husband's uncle is served first, followed by my husband and his brothers. Then me and my brother in law wives are served and then the children. My husband, his brothers and uncle get the better part of the meat and me and the children get the rest of the parts. The children get the most in terms of the food, because they are more.
4. Difference females of different ages		No, because they are not equal.
5. Gender differences		No, because they are not the same.
6. Workload	Work Domestic work	Yes, I have time for work Yes, there is time but it is tiring. I handle the children when they go to school, then I now have time to do other things.
	Programmes	

CHILD ID:

ID 3025

Interviewee: Abiba

Age:

Spousal age gap:

Order Wife (total):

Note: Women does not speak Dagbani fluently, so she struggles with the interview.

1. General decision-making power		When I want to take decision I have to fit with my husband so that we can decide on one or two things we need to do. I can't decide for the other wife, is our husband who decides to for both of us.
2. Past decision-making power	Different life stages	My parents took decisions for me when I as a girl. As an adolescent I could decide on small-small thing, but bigger issues my parents did that for me. As a newlywed my husband decided for me, but now that I have children I am allowed to make decisions small-small. When I make decisions for boys is different from when I make decisions for girls, boys go to the farm and girls do the home chores.
	Other household members	In the past it was different. My husband decides everything, but now he allows me small chance to also decide on things.
	Different areas	In the past I prepare small and delicious meals, but now I prepare large meals, you know that if you are to prepare large meals it won't taste as good as small meals. In the past when you purchase in large quantity it takes longer, but now it's not even enough because the children are more. In the past taking care of the child was easier, now because they are many it is difficult, because your need time for every child. In the past I could go anywhere I wanted but now with kids, even if I go I'm rushing home.
	Programmes	Yes there are people who come to talk to us on agriculture and how to take care of our children, but because we don't have much we are not able to give the children what they tell us to.
3. Food division		Yambilla (household head) is served first, followed by Issahaku (brother), followed by Kwabena (old son), then the children.
4. Difference females of different ages		I do things the same for them.
5. Gender differences		I do not treat boys and girls the same.
6. Workload	Work Domestic work	I first of all go to the farm very early in the morning, come back and cook for them to eat, then I have to wash then I was and now wait till evening so that I can cook supper.
	Programmes	

ID 3028

Interviewee: Afia Zibilim

Age:27

Spousal age gap:3

Order Wife (total): (not married, do not live together)

1. General decision-making power		I am not able to make decisions with relation to members of this household.
2. Past decision-making power	Different life stages	My mother took decisions for me. I had nothing to say what they said was final. When I had children, things were better because their father sometimes calls me to see what both of us can do in case anyone of

CHILD ID:

		them falls sick.
	Other household members	For me nothing has changed that much since I do not live with the children's father.
	Different areas	It is my mother who cooks. I don't have a say with regard to that. Taking care of children is easier since my mother is around. Whenever I have to go anywhere, I need to tell my mother, but usually I just go to work.
	Programmes	Because I do not sit at home I do not know of any programme and I have not benefitted from any.
3. Food division		When we cook my mother is served first, then they serve me and my siblings and then the children.
4. Difference females of different ages		In this house, girls of different ages are treated the same.
5. Gender differences		Children of different sexes are treated differently
6. Workload	Work Domestic work	When I wake up in the morning I sweep, fetch water, bath the children those leaving for school I will leave. Then I leave the little girl with my mother and go to work.
	Programmes	

ID 3067

Interviewee: Rashida

Age:28

Spousal age gap:8

Order Wife (total):1 (1)

1. General decision-making power		In this house I only take part in decisions that will affect the lives of my husband and children, but anything aside that is my husband's decision.
2. Past decision-making power	Different life stages	Making decisions while I was at my parents' house was done by my parents and making decisions when I got married is my husband's responsibility. This is because whatever decision I have to make is either I do it with him or after I make the decision he has to give me his approval before I can go ahead and execute it. This is because a woman does not own herself in her marital home. Making decisions for girls and boys is different. This is because boys are easier to handle than girls.
	Other household members	In the past my decision making in this house was not that much and important, but now my husband and I have to decide on many things together because of the children.
	Different areas	I mostly decide on what to prepare because the man has done his part of providing the maize, I have to also provide the soup and it has been like this since I got married. It is not easy to care for a child in the village because there is nothing in the village. In the past and now is still the same. Whenever I have to go anywhere far from home, my husband has to give me the permission before I can go. I only go to places my husband feels it is important. For a woman when you are making a contribution concerning your home, it should be something positive to avoid misunderstanding.
	Programmes	There has not been any programme like that around this area.
3. Food division		When I am going to serve, I serve seven bowls. My husband's father's bowl is first, then my husband's mother, then my husband's brothers, then our bowls and then the children bowls.
4. Difference females of different ages		Girls of different ages are treated the same.
5. Gender		Boys and girls are also treated the same in this house, since they are all

CHILD ID:

differences		from the same compound.
6. Workload	Work	When I sleep and wake up in the morning, I first of all pray, then sweep the compound, wash last nights' bowls, bath the kids, prepare their breakfast and prepare them for school, Then I leave to the farm, come back and cook evening food.
	Domestic work	
	Programmes	

ID 3073

Interviewee: Amatu(aunt from index child, mother deceased)

Age:23

Spousal age gap:10

Order Wife (total):1 (1)

Note: The interview stopped, because the woman did not know how to answer the questions being asked.

1. General decision-making power		In this house they allow me to also take part in decision making that concerns all of the members in the house.
2. Past decision-making power	Different life stages	Everything that concerned my life at that time was my parents, I could not make any decision for myself.
	Other household members	
	Different areas	
	Programmes	
3. Food division		
4. Difference females of different ages		
5. Gender differences		
6. Workload	Work	
	Domestic work	
	Programmes	

ID 3080

Interviewee: Bushira

Age:25

Spousal age gap:0

Order Wife (total):1 (1)

Note: woman lives with her parents

1. General decision-making power		My father is the head of this household and since he is my father I cannot make decisions unless he does that for me. But the children's father he allows me to make decisions, but with him.
2. Past decision-making power	Different life stages	Since I am still living with them they still see me as a little girls and they will always want to take decisions for me. When I did not have children my way of thinking was different, but now I have to thinks of what to do to get food and clothes for them
	Other household members	When I did not have children with him anything I asked him he gives, but now things are different. I cannot get anything I want. My mother helps me take care of the children and it has always been like this.
	Different areas	
	Programmes	

CHILD ID:

3. Food division		After my mother cooks she serves my father first, followed by she and the other woman, then the young men in the house then we young ladies, then the children.
4. Difference females of different ages		Girls of different ages are not treated the same.
5. Gender differences		Also boys and girls are not the same, so they are not treated the same.
6. Workload	Work Domestic work	When I wake up I clean the room. I wash my children's clothes, bath them and also bath, that's all. I do not have much work to do in a day.
	Programmes	

ID 3082

Interviewee: Kusumi

Age:34

Spousal age gap:?

Order Wife (total):3(3)

1. General decision-making power		I am really not able to make decisions on my own without my husband. Sometimes if there is something I want to do I can't do it without him giving me the permission.
2. Past decision-making power	Different life stages	My parents were the ones who took decisions for me. I was not allowed to make decisions by myself. Even now that I am married there are some things my mother has to give me the go-ahead to do it. As a newlywed and even though I have children I still cannot make decisions by myself, because I am owned by someone in this house. Making decisions for boys and girls is different because they are not the same.
	Other household members	In the past I was married to a different whom I was able to discuss and do anything, but this is a new and different marriage. I'm not really able to make much decisions with this new man, but some of the issues I discuss with my mother in law.
	Different areas	With regard to food preparation I do not make much decision because it is the first wife who takes the decision, since I came to this house it has been this way. In the past and now is still the same. I am only able to go to places if only my husband gives me the go-ahead. I make sure I agree to whatever he tells me, In that case he won't beat me.
	Programmes	They come around to talk, but because I am most of the time not at home I do not know what they talk about.
3. Food division		When I finish cooking, I first of all serve mine, followed by my husband's bowl, then his mother's bowl, then the children.
4. Difference females of different ages		Not the same because their work is not the same.
5. Gender differences		Differently, I do not mix them up.
6. Workload	Work Domestic work	When I wake up in the morning I pray, then cook food for the children, then leave to the farm. The old woman in the house will feed them when they are hungry. Then come back in the evening and prepare food for supper.
	Programmes	

CHILD ID:

ID 3096

Interviewee: Samata (Grandmother of index child, parents do not live here)

Age:59

Spousal age gap:?

Order Wife (total): ? (2)(husband and other wife do not live here)

1. General decision-making power		This household in general I make the decisions, because the head of the household is my younger brother and for that reasons he involves me in all decisions regarding this house.
2. Past decision-making power	Different life stages	My mother and father were there so they took decisions for me, how can you have your parents and then you will make decisions it does not happen that way. When I was a newlywed I could not make my own decisions because my husband is responsible for me. He owns me so he makes the decisions. As for a married woman living in your husbands house you have no decisions of your own. Every decision has to be taken by your husband concerning everything in the house.
	Other household members	I do not live in my husband's house anymore so I can't tell if anything has changed.
	Different areas	I do not cook in this house, my younger brothers wives cook for me and my children to eat. How can you, a woman, own yourself in your husbands house, it is the man who owns you so you should do what he likes to avoid you being eating.
	Programmes	I have not seen any programmes like that in this town.
3. Food division		When the women finish cooking, they serve their bowl, then my bowl before my younger brothers bowl, then the children.
4. Difference females of different ages		In this house all children are treated the same because they belong to the same family.
5. Gender differences		How can a boy be treated differently from a girl? We treat all of them the same.
6. Workload	Work Domestic work	As for me, when I wake up after prayers I bath and leave for the farm. I do not do anything because my children are grown ups.
	Programmes	

ID 3128

Interviewee: Rabi

Age:30

Spousal age gap:44

Order Wife (total):1 (2)

1. General decision-making power		In general the decisions I make in this house it is just in relation to my husband and children, but anything aside that I have no hands in it. In relation to the other woman the only decisions I make towards her is with regard to food preparation, since I am the eldest wife I measure the maize for the flour.
2. Past decision-making power	Different life stages	What decision can a girl make by herself. It was my parents who made decisions for me, but when I grew up a little those decisions that they need to make for me they do and those that I have to make by myself I do it. As a newlywed there was nothing much to decide on, just what we can do to better our live. When I had children my prayer is that I will be able to take care of the children and also god should bring an end to the poverty and hardship me and my husband are facing. I do not think that sex of the child has anything to do with the way you

CHILD ID:

		make decisions, it is just that you should pray to get money and take care of them either boy or girl.
	Other household members	When I first got married to my husband, I never knew what hardship was, but now because it's difficult to make ends meet things have changed between us, any little thin we get upset with each other. With me nothing has changed in relation to the other woman, but I do not know for her if she feels things have changed between us.
	Different areas	I think so many things have changed with regard to food preparation. In the beginning things were better for me and my husband so we cook at least better, but now we could hardly afford protein on our meals. Whenever there is a place or occasion I have to go I go. Even in the past it was like that.
	Programmes	There are no such programmes around, maybe there is but I do not know of any.
3. Food division		When I finish cooking I serve we the wives first, then our husband, the rest is for the children.
4. Difference females of different ages		I treat all of them the same.
5. Gender differences		I have a boy and a girl, I do not treat them separately since they are my kids.
6. Workload	Work Domestic work	Because it's farming season the workload sometimes gets too much for us. I wake up in the morning, cook both breakfast and lunch before I leave for the farm.
	Programmes	

ID 3132

Interviewee: Booya

Age:45

Spousal age gap:15

Order Wife (total):1(2)

1. General decision-making power		In general I am able to make decisions. My husband and I together with the other wife sit to make decisions.
2. Past decision-making power	Different life stages	When I was a girl I discussed with my friends what I wanted to become when I grow up, but my parents made decisions for me. Most of my decisions I took it with my friends as an adolescent. My husband and I made decisions together as newly married couple. When I had children nothing changed much because I was matured already before I got married, so I already had control over my decisions. I do not think that having boys or girls would change the way you make decisions, it can only make you feel more blessed because you have different sexes.
	Other household members	My husband and I nothing has changed in relation to our decision making.
	Different areas	As for me, since I came to this house nothing has changed, the way I cook and do everything is the same
	Programmes	
3. Food division		I serve, we the women first, then my husband and his brothers, then the children.
4. Difference females of different ages		As for this house all girls are treated the same.
5. Gender differences		As for boys and girls they are different so we treat them differently.
6. Workload	Work Domestic work	Mostly I do my work in the morning. Then I go to the grinding mill to check on my groundnuts. If I come back and it's my turn to cook I do so.

CHILD ID:

ID 3165

Interviewee: Booya Alhassan

Age:26

Spousal age gap: 7

Order Wife (total):1 (1)

1. General decision-making power		I can't make decisions unless with my husband. My mother in law gives me the chance to make decisions, because there are times she would want to do some things she will call me and discusses it with me and sometimes the advice I will give her she takes.
2. Past decision-making power	Different life stages	I do not think that my parents will allow me to make my own decisions at that age. When I was an adolescent by then they allowed me to be taking some decisions. As a newlywed my decision making changed because I was now between me and my husband not me only. When I did not have children, things were different, now that I have them I am matured and I think matured.
	Other household members	I think they are all children and whether it is a boy or a girl it really cannot influence the way you make decisions. Nothing has changed between my husband and his mother with regard to the way we make decisions.
	Different areas	And also nothing has changed in relation to my food preparation. It is that same old decision since I came to this house. I told you that madam, the way things are now are the same way they were ever since I came to live in this house. As for a married woman you can never have your own say or way in your husbands house, because you do not own yourself, he owns you, so whatever he wants is what you will do for him.
	Programmes	The only programmes around here is just about sanitation. It has helped me because I make sure I clean my house every day.
3. Food division		When I serve my husband and his mother the rest is for me and the children. We do not eat together, just the children.
4. Difference females of different ages		Girls who are not the same age definitely their treatment will also not be the same.
5. Gender differences		Boys and girls are treated differently
6. Workload	Work Domestic work	In the morning I fetch water for the house, then cook breakfast and in the evening I cook again. I am able to get time to do everything since my workload is not much.
	Programmes	

ID 3204

Interviewee: Damata

Age:33

Spousal age gap:6

Order Wife (total):1 (2)

1. General decision-making power		My husband allows me to make decisions in this house, even if it is in relation to him. My mother in law and the other wife also allow me to have a say when it comes to their decision.
2. Past decision-making power	Different life stages	My aunt took decisions for me when I was a girl, but when I became an adolescent my aunt did not have much decisions around me, I mostly took decisions with my friends. When I came to this house my husband and I were like a brother and a sister, because I could take certain decisions and if I am not sure about it I go to him for his advice. When I had children my thinking changed, because as a newlywed I still

		had a childish mind, but now I feel matured.
	Other household members	What has changed is that whatever issue my husband and I were harbouring has changed now.
	Different areas	In the past the food we cooked was small but now we cook in large quantities because we are more. When my husband likes he allows me to go to funerals, weddings and other places, but if he does not like he will not allow me to go. I always do what my husband likes, because if I don't it could lead to problems.
	Programmes	
3. Food division		When we stir the T.Z. we first serve the women, then the head of the household, then my husband and the children.
4. Difference females of different ages		Differently.
5. Gender differences		All of them I treat differently.
6. Workload	Work Domestic work	Now that it is farming season, we wake up around 5 am, heat water for bathing, prepare porridge and also lunch, then leave for the farm. Because it is a farming season, sometimes the work gets too much for us.
	Programmes	

ID 3712*Interviewee: Kande (Other wife)**Age:41**Spousal age gap:1**Order Wife (total):1(2)*

1. General decision-making power		In general I am able to make decisions, but if it is with relation to my husband, I have to do it with him. As for the other woman, she and I are both under somebody, which is my husband, so I think he decides for both of us.
2. Past decision-making power	Different life stages	As a child I do not think I was allowed that much to make my decisions. Think my parents did that on my behalf. When I got married I first came to this house, my husband did not allow me to make decisions without him. Even if I decide by myself he has to give me the permission before I can go ahead and do it. If I am making decisions for a girl, I do it differently and if I am doing it for a boy I do it differently.
	Other household members	In the past and now, I think there has been a change, between my husband and I because of the children that have come between us.
	Different areas	With regard to food preparation I just decide and cook. In the past I made small household purchases, but now I have to make large household purchases, because we are now with more, because of the children. Taking care of them in the past was a lot easier because my aunt in law was around and she helped me take care of them. I think I have not offended him that much, I make sure I agree with him and also do not talk back when he talks or gets angry.
	Programmes	Sanitation officers come around to advise us to keep our houses clean, but I do not think that has affected my life.
3. Food division		When I finish preparing the food I serve my husband first, and then serve some in a food flask, then after the children exhaust the ones in the bowls I serve then from the food flask. Everyone in this house have their bowls.
4. Difference females of different ages		I treat them differently because their ages are not the same.

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5. Gender differences		Boys and girls are also treated differently, I can't treat all of them the same.
6. Workload	Work Domestic work	If I sleep and wake up in the morning I sweep, then if I have to go to the farm, I prepare lunch, then leave for the farm. I come back in the evening to set fire and cook dinner.
	Programmes	

ID 5004

Interviewee: Abiba

Age:

Spousal age gap:

Order Wife (total):

Note: Women did not speak Dagbani. An extra translator was included during the questionnaire, but the interview was too complicated.

1. General decision-making power		
2. Past decision-making power	Different life stages	
	Other household members	
	Different areas	
	Programmes	
3. Food division		
4. Difference females of different ages		
5. Gender differences		
6. Workload	Work Domestic work	
	Programmes	

ID 5006

Interviewee: Zuwera

Age:25

Spousal age gap:10

Order Wife (total): 1 (2)

1. General decision-making power		I am able to make decisions in relation to my husband and in relation to the other wife because I am the first wife.
2. Past decision-making power	Different life stages	A girl cannot make decisions for herself. It was my parents who did it on my behalf. Definitely things are not the same as being an adolescent. Getting married and having children, my decision making has changed over this period.
	Other household members	In the past and now between myself and my husband nothing has really changed the way I relate to him. In the past is still the same now.
	Different areas	As for food it has changed because what I and my husband will eat when we were alone, we can't eat it now because of the children. This is because they might not be able to eat that same food and sleep. I have told you that things will never be the same throughout these periods.
	Programmes	People come, but what they tell is about our farms.
3. Food division		When I finish cooking I serve my mother before any other person.

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4. Difference females of different ages		As for girls, the youngest gets more than the oldest.
5. Gender differences		Boys and girls are not treated the same.
6. Workload	Work Domestic work	I make sure I wake up early, take care of the children in the morning, their food and other things before I go to the farm.
	Programmes	

ID 5008

Interviewee: Samata (mother in law)

Age:21

Spousal age gap:3

Order Wife (total):1 (1)

1. General decision-making power		My decision making in relation to my husband is towards the farm and the children. Most of the time he decides on these issues. There are times I decide for him and there are times he also decides for me.
2. Past decision-making power	Different life stages	Honestly when I was growing up most of my decisions I took it with my friends. There has been changes with regard to when I was a newlywed and now that I have kids. Now that I have children I feel responsible for my children's decisions.
	Other household members	
	Different areas	In the past we used to cook in small cooking, but now I have to cook in a big cooking pot before it is enough for everyone.
	Programmes	
3. Food division		We eat together in this house. The children have their bowl, the women have their bowl and the men have their bowl.
4. Difference females of different ages		The oldest girl gets more than the youngest girl, in that case they are not equal.
5. Gender differences		We treat both boys and girls the same. Even food they eat together.
6. Workload	Work Domestic work	When I wake up in the morning I bath my kids, prepare breakfast for them, then fix lunch, before I leave for the farm. That will show when I will come home to cook dinner again.
	Programmes	

ID 5014

Interviewee: Amama

Age:26

Spousal age gap:-4

Order Wife (total):1 (1)

Note: Women is not willing to speak.

1. General decision-making power		I am not able to take decisions without my husband's consent. I don't really have much decisions towards the wives of my brother in law.
2. Past decision-making power	Different life stages	I was staying with someone in Tamale who was mistreating me so at some point I decided to run away from him. My parents never allowed me to make my own decisions, even when I decided to run away from my husband because he was not treating me well, my mother brought me back. As a newlywed things were good but now that I have children things are

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		different, because I am no longer comfortable this house.
	Other household members	In the past I could take decisions with my husband, but I couldn't make decisions with regard to my brother in law even in the past.
	Different areas	In the past, I did not prepare large meals, but now that there are kids more, and not delicious anymore. Nothing has changed with regard to taking care of the children. When I wasn't married I could go anywhere I want to, but now my husband has to determine where I can go. I think because I do not have a say that's why he beats and treat me bad, because even if I decide to leave him my mother will bring me back.
	Programmes	Some people visited us to education us on sanitation and also that we should keep our children and the bowls we feed them in clear, we should not allow flies to touch the food when they eat or feed them.
3. Food division		This house we do not cook together. I cook different and my brother in laws wife also cooks different, is when I cook something that they do not cook then I give them some. Everyone has his bowl. When I cook I serve my husband first, then myself then my children.
4. Difference females of different ages		I treat hem the same.
5. Gender differences		I treat them also the same, what I will do for the boy is the same thing I will do for the girl.
6. Workload	Work Domestic work	When I wake up in the morning I prepare breakfast, then bath my children and leave to the farm. I leave the children for their grandmother to take care of them. I come back from the farm in the evening, then prepare evening meal.
	Programmes	

ID 5016

Interviewee: Yaa

Age:21

Spousal age gap:4

Order Wife (total):1 (1)

Note: Recording did not work. Therefore, the interview is transcribes immediately after the interview.

1. General decision-making power		I am able to make decisions in relation to my husband.
2. Past decision-making power	Different life stages	When I was a child my parents took decisions for me, I was not Allowed to make dictions as an adolescent. As a newlywed I never took decisions on my own until I had children.
	Other household members	I think now I have kids I am able to make decisions with my husband
	Different areas	I can't go everywhere without my husband permission. I think because I am able to take decisions with my husband, that is why he does not beat me.
	Programmes	There is nothing on children's nutrition, only on sanitation issues.
3. Food division		I first serve my husband's father, followed by his two mothers, followed by me and then the children.
4. Difference females of different ages		No they are not.
5. Gender differences		No, they are not treated equally

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6. Workload	Work Domestic work	When I wake up in the morning , I prepare breakfast, then I go to the farm. Later in the afternoon I come back home and prepare lunch. Then wait and cook dinner in the evening.
	Programmes	

ID 5021

Interviewee: Adamu S

Age:36

Spousal age gap:7

Order Wife (total): 2(5)

1. General decision-making power		In general my decision making power is good, because he allows me to make certain decisions by myself. Also my decisions making power in relation to the other wives is good because we sometimes take decisions to do things together.
2. Past decision-making power	Different life stages	As a girl I was not allowed to make my own decisions. Even as an adolescent they never allowed me to make my own decision. As a newlywed was not entirely allowed to make decisions. Because I did that with my husband. Even with children I can't make decisions without my husband, because he is the final authority over them. I think making decisions for both boys and girls is the same.
	Other household members	In the past my husband and I with the other wives took decisions and is still like that. In the past I was not able to make decisions for my sister and brother in law, and am still not able to. With regard to the other wives I do not make decisions for them, but rather we do it together with our husband.
	Different areas	When it comes to food preparation I decide what to put together since the ingredients are available. When it's my turn I decide and when it is the other wives turn she decides. With regard to large household purchases, all the women come together to decide what items should be purchased for the house. I decide what I give to my children. I together with my husband decide what is good for our children, but the final say lays in the hands of my husband. I am able to go to places I want, but with my husband's permission. I don't think I will be able to decide if am being abused in my marriage.
	Programmes	These programmes have helped me a lot with regard to what to feed my children, so that they can be healthy.
3. Food division		Head of the household, his brother, wives and children
4. Difference females of different ages		No, they are not treated equally. The youngest gets more of things than the oldest.
5. Gender differences		No they are not, boys are for the farm and girls are for domestic chores.
6. Workload	Work Domestic work	I fetch water and cook breakfast in the morning. Wash clothes and prepare lunch in the afternoon and then cook dinner in the evening.
	Programmes	

Appendix V: Interview transcripts key persons

Interview transcript health promotion officer Karaga district

1. *Can you briefly describe your job function?*

As a health promotion officer, you have to align with other health staff to implement certain policies within the country. For example if there is a policy that nobody should irrigate openly, it's just an example, definitely you have to honour and stuff in order to dedicate the people in the community, the importance of not ..(sounds like descating) their own environment. And also as a health promotion officer it is your duty to lobby for resources for the community members, so if the community ..., as a health promotion officer one thing you should do is to advocate the issue to the authority, for instance if a chief in a community, they need something like toilet facility, you also need to get in contact with the stakeholders, they are responsible for providing toilet facility to the community. As a health promotion officer you have a function of advocacy and lobby. As a health promotion officer you need to reinforce the health and living behaviours by stimulating people to exercise, drink more water during the day. Also as a health promotion officer you need to conduct monitoring to other health staff as to how they are doing

2. *What is your perception of the level of empowerment and decision-making power of women in the Karaga district?*

The empowerment and decision-making power of women. For Karaga district, you see, women have little power when it comes to decision-making. Cause they believe that, if you are married to a man, the man is fully responsible of making the decision. You only need to implement. Just assume, the man want something, like I want to build a house, so you come and be fetching water for the people to be building. You, the lady, don't have any decision, or any say, like let's do this, let's do that. In terms of Karaga and decision-making, the women have little power. Their voice is very low when it's comes to decision-making.

3. *How do you think the decision-making power of women is over different stages of their life? So starting when they are a girl, to an adolescent and when they marry and when they get children. How do you think the decision-making power of women evolves over different life stages?*

When you look at some people like adolescent, you see, sometimes decision-making at that age is self-full for them. As they are still in their fathers house, their decision-making for women in general, if you are a lady or you are still a boy, you don't have any say towards, in terms of decision-making. But in terms of marriage, sometimes you have little to say, but not fully, you can decide I want to marry this person, your parents can decide you won't marry this person.

4. *How in your perception is the decision-making power of women in relation to different household members? So in comparison to their husband, in comparison to their parents in law, and if there are other wives, how is in relation to other wives.*

The other wives within the house. For the decision-making, let's assume within the one house, definitely there are different household. But in terms of decision-making, as I already mentioned,

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within the ladies can decide on something, if they present it to the husband, the husband's say is the final. In the household there is interaction with each other, but when it comes to collective decision within the household, the men within the house, they can decide. But for women in the house, as I already mentioned, they are following what the husband decides. Within the house they come together and decide on one thing. In terms of the ladies, the older woman have much say than the younger one. When it comes to decision-making, the older woman, she is elder, that means that the younger one has to obey what the elder one wife has said. When it comes to the elder and the junior, the elder one has much say than the junior.

5. *How do you think the decision-making power of women is with regard to different areas?*
 - a. *For instance, food preparation*

For Karaga, for example, sometimes when it comes to food preparation, let's assume if they want to prepare food today, a man can decide that I want T.Z. But if the man said I want to have decide, it is left to decide on the soup. She has a say in terms of food preparation, with regard to the soup, the wife decides which soup to cook.

- b. *With regard to large household purchases, how is the decision-making power of women?*

In terms of purchasing, the man is solely responsible for that. In certain areas, something like buying of food items, it is the responsibility of the man to decide when and how I'm buying the food.

- c. *In terms of child care, how is the decision-making power of women?*

In terms of child care, both the man and the wife have some little say. The wife also have some say, cause they wife is directing the children and the man, let's assume, the man will send the child to school. What the child will teach, the child in the morning I go the school, it is not left to the wife to be deciding that. In terms of child education, the man can decide you cannot go to school, and the woman cannot influence that.

- d. *How is the decision-making power of women in terms of finances?*

Decision-making in terms of finances, it depends upon the household. Let's assume that within this particular household, the wife is somehow richer than the husband, if the wife has much to say, then in terms of finances the woman had more say than the man. If they said, we have to buy rice, buy maize for the household, for as the lady, she has the money, the wife can decide that I'm buying maize for the house. Even if the man want rice, because he don't have the money, he can decide that no don't buy the maize, buy rice rather.

- e. *In terms of, freedom from domestic violence, how is women's power?*

For freedom with regards to domestic violence, when you look at Karaga setting, that's where the woman has little say. For domestic violence, if the man or the lady did something which is against the husband, the husband can just get up at any time and start beating. Cause if you say something which is not going down well with the man, the man can just start beating you. You can't say anything. If you say anything, the man say you should pack your things and go to your husband's

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house, so can say little, so in terms of that, they will be beating you. Sometimes you will be talking small small, but if you talk much the man can even ask to leave the house, like if you insult him to a certain extent.

6. *What is your perception on current programs addressing women's empowerment and workload?*

Perception on..?

- *Here there are a lot of programs and NGO's that target women's empowerment and workload, what is your perception on these?*

For that one, the thing you sometimes encourage the women to somehow involve in decision-making. Because if, there is a women's group association, and there is a NGO working within the setting, the NGO sometimes come there and assist them in one or two things like finances. They sometimes give them money to do some petty petty trading, with regard to those NGO's help, they have say, o today we have meeting with this people. The man can't say you won't go, because it's a particular programme and every lady is involved, then you can't deny your wife from going there, so they have much say.

- a. *Some programmes here target children's nutrition status by improving agriculture. How do you think this pathway is related to empowerment?*

Yes, as you know empowerment is not necessarily finances, empowerment can cost a lot, because you can talk of education, when you do that, knowledge is a form of empowerment. When a person is financially sound, it's a form of empowerment, you understand? So with this kind of, it will definitely encourage ladies to get something up from wound and diseased, and you cultivate maize, you cultivate groundnuts, and harvest, definitely you have some money down. If it is not cash, but it can, if you want to buy maybe a cloth, you can take some of the soybean, sell and get your money. With that, you are not solely dependent on the man. For that matter, it is helpful.

- b. *What are barriers for improving women's empowerment*

The barriers, the major one is the culture. Some of the culture does not encourage fully participation of women in certain decision-making. And also the religious business. The religion says the woman and man should come together and decide on one commission, that because of the culture the people rather follow much of the culture than the religion. But if you look at the barriers, the major problem there is the culture, and sometimes the poverty. All the ladies have something in the hand, the man is too, definitely there is a collective effort. Let's do this, let's do that, they will all be coming together. But in this instance, the man is fully responsible of the whole household, he will decide what to do or not to do.

- *And religion is part of that culture?*

Yes, the religion too is part. The religion says the woman should respect the husband. The people rather emphasize on the woman respecting the husband. For that matter, if they are talking, because of the religion, they will say no, let my husband decide on what we will do, so is also another barrier.

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And education. Because people ,the majority of them, they are not educated. If they were to be educated, like this kind of program on decision-making, this and that, if maybe also have knowledge on your right, definitely there are certain things you have to take part in the house. And because they don't have the knowledge, they don't know this is not my right, but if people were educated, definitely, that kind of decision-making or empowerment issue, very nice. But because they are illiterate whatever you say, they say aah you have to accept education. Education is another barrier.

c. What are assets for improving women's empowerment

The first thing that will improve the empowerment within the karaga district is the education. If people have been educated, the need to involve the wife and the children in decision-making, if people will understand that, then definitely there will be an improvement in women empowerment. And sometimes, as I said, this kind of culture, people really don't understand why people should involve in decision-making. But if they are given enough education as to why there is need for them to take part in the decision and to work, and also finances. Definitely the women in those areas they have something doing, maybe I'm going to market, I'm going to this, you are doing your petty petty trade, definitely you can provide for your stuff

d. What in your perception is needed to improve empowerment?

For this area, for how to improve empowerment, it would be education. If we are able to educate people within the locality, definitely, there will be some kind of improvement in women empowerment.

7. In your perception, are females of different ages treated equivalently?

Well, within in the localities, I can say yes. Because there are some areas whereby the females, they have some kind of freedom, when it comes decision-making, they can do whatever they like, but in some places they are so restricted, they cannot decide anything on their own. But some places they give opportunities, they are free to express their feeling. For that matter definitely there is a variation within the setting

8. In your perception, are children of different sexes treated equivalently?

Within females and males, definitely there is different treatment given to them. When you have a male in your house and three females, the man within in the house prefer one male than the other three. And sometimes, like, there are some cultures, not all, you see that if they don't feel meat, the boys rather take lion's share of the meat and give much of the meat to the males than females. Sometimes they even deny the females, they say they are not supposed be taken those, because the men they need to eat well and they need to go to the farm and work. And the lady, you don't work in the farm, definitely there is a variation between the treatments given to the males and the females.

And for children of different sexes?

Yes for children it still applies. Definitely for here, because, they are dealing with farming issue, they prefer male than the female, because the male will be helping them in the farm.

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9. *How is the workload of women in the Karaga district?*

a. *Work vs domestic work*

The workload in Karaga district is very much on the lady. The lady both has to farm, to look for firewood to come and cook, the lady have to go to the river to fetch water for the houses, the lady have to come to the house to cook for the children, the lady has to bath the children, the lady has to cook within the house. So for the workload, if they have farm, the lady has to harvest. So the workload here is very much on the lady. You understand?

Interview transcript researcher/business man post-harvest loss

1. *Can you briefly describe your job function?*

My job function? Well, I came as a volunteer, and when that finished I was looking for something to do and I saw a business opportunity, so I brought two ideas to Ghana and that was GPS and storage, storage that moves when it's empty. The GPS idea never really caught on, but the storage idea got me something, notoriety, meaning people started to ask me about it and I saw that it fits well with the culture and agriculture, that doesn't own their land, so my job is to reduce post-harvest loss, replace post-harvest loss with grower marketing. Right now, someone harvests a 100 bags of maize, they eat 30, they lose 30 and they try to store 30 bags in a warehouse. If you add it all up after the losses, and the warehouse people take their profit, there is not much left and that's what you see as agriculture in Northern Ghana. So my job is to replace post-harvest loss with grower marketing. And the tool I use to do that is called a mobile utility storage bin.

2. *What is your perception of the level of empowerment and decision-making power of women in rural Northern Ghana?*

Well, that was one of the shocking things when I came to Ghana and worked for the ministry of food and agriculture for a year, was how smart and hard-working the women were, but how they didn't benefit from it. They had nothing and I started to hear stories about if a marriage goes bad and the woman is divorced, she can't go home, because they disrespect her as, you know, damaged. Then I started to hear how women couldn't own land, they have never owned land by themselves, outright, like weak women can anywhere else and that limits their ability to invest and run a business and become independent. Then I started to read to literature, as to whom my best customers might be and I started to see that, if I wanted to improve a segment of the population's life, I should target women in agriculture, because they are three times as disempowered in Ghana, as in many many other African countries, it's bad here, so that's the people I should try to help. They will benefit the most from anything I do.

3. *How is the decision-making power of women in rural Northern Ghana over different stages of their life? So from when they are young, become an adolescent, get married and get children. How do you think it evolves over their lives.*

That's an interesting, I haven't thought of that. But I propose that it gets better. I'm sure if you're a young daughter and your dad won't have to pay your school fees, I hear and I read, that he pays the suns school fees much sooner than he'll pay a daughters school fee. So I think it's pretty bad in the beginning. And maybe what motivates women to get married young, that because at least when they're someone's wife, whether it's the first or third wife they're better off. I've been in discussions with women in Tamale, who say they're quite happy to be a third wife, because the first wife has to have all the kids and no job. The third wife, maybe one kid, and she gets to get a job, so they are very happy to be the third wife. That's their life making decision. Now they have a job and a baby, before, so they have a little money to spend, they get intellectual ability, I don't think it is much better. But I think it is better than being second to three or two sons, so they get married, they get some education, who knows, they become more important seems to me. But as they age, and maybe they are not so pretty, their hierarchy at the marriage maybe decreases, so I don't know, it's not very good at all throughout the thing and I think you see a lot of women who see a dead-end life and are frustrated and disappointed and it transfers to how they raise their children. And if you think about

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removing half the people from a population, you lose a lot of mental capacity, of thinking, of problem-solving, so I don't think it is very good, I don't think it changes much. Maybe it changes for different reasons, but they are pretty second class citizens.

4. *In your perception, how is the decision-making power of women in rural Northern Ghana in relation to different household members?*
 - a. *Husband*
 - b. *Parents in law*
 - c. *Other wives (older and younger wives)*

I haven't thought about that, I haven't thought about the others. In relative to the husband I see some productive marriages. But I also read about how when the food is scarce, the husband eats and the wife feeds later after the kids and that's not good. You know on an airplane, the safety discussion, it says in an emergency, when the air pops down and the oxygen mask pops down, you grab it first. The adult should grab the mask first, put it on and then put on the oxygen mask of the kids, because the kids aren't going to figure out the emergency. You need the adult thinking, so I see keeping a housewife from nutrition and hungry is just a way to control them.

I don't see it any good, I see the matriarchs, who, the older women. You know that word? *No*. Well it's the queen of the family, have too much power and they you know, I don't see it any good. They are called queen bees, that's the syndrome. I see that very prevalent, I see women getting hand-up, climbing higher out of the average, but they don't help other women, they help men, because they don't want another women to come along and remove them from their position, so they help men, who will keep them there. Queen bees, terrible situation.

5. *How do you think the decision-making power of women in rural Northern Ghana is with regard to different areas?*
 - a. *Food preparation*

I'm stretching it if I talk about that. Off course, where I lived, when I lived in the communities I see the women having to do a lot of work to prepare food that has little nutritious or caloric value. They are working hard to produce fufu and banku, which doesn't deliver the energy, the net result of making banku and fufu is not very good. When you spend that same energy making bread from good wheat, your family gets a lot more benefit, the net benefit is much higher.

- *So they don't have a say in what they want to prepare?*

Well, who knows, if that's just their cultural way to keep women busy. You have to poor water in the fufu, you have to beat it and then you don't really have much food. For all that effort, it's not a good source of calories and nutrition, for example. You get to Accra, now food is easier to get. You can go, you can sent your daughter down the road to get rice or something, and they bring it back, so you don't have to cook every night. If you have a little job, and you make a little money or you have something to barter, now the women gets time, gets better food, the family get better food. They get nutrition now, they can do some thinking, they can do business.

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b. Large household purchases

Terrible, what I read supports the fact that they don't make the decision. They can't go out and buy a new phone or radio to listen to news or to listen to broadcast that help inform women.

- *Why not do you think?*

Because it challenges men's position. And the men are quite lazy, maybe lazy is not the right word. They are African men, possibly, African men are the worst investors this planet has created. You can give an African man more money and he will do less with it to provide for his family than on any other man on the planet. So for women it's not good, and these men have the upper hand and when they see this easy life of total control being eroded, they can push the woman back, they don't have to feed her, they can divorce her, sent her off, so they have control, it's not a good thing, it's not an equal give and take, ying-yang situation, it's not a marriage.

c. Child care

Well, I think that's where they have the upper hand. The husband wants a son, wants some kids, cause that's the investment for retirement, so the woman who can raise the kids is, that's why he needs her, to raise his sons, so the son can take care of him in his old age, so that's where the women become important. So yes they have decision-making capabilities there, and if they're smart, they can, by raising kids, healthy kids, strong kids, smart kids, the husband gives them more respect. But it's a risky situation, because that's where you are only important. As soon as that son is eighteen and on his own, the wife is not there anymore, she is not important.

d. Finances

Terrible, they don't get to have money and if they make the decision to spent something and the neighbour sees that it wasn't the husbands decision, it's bad for the husband.

e. Mobility

No, they are not free to go anywhere they like at all. That's an interesting question, because I have noticed that Muslim ladies, wear the fail, they only show the eyes, so you don't really know who it is. The west seems to think that it's terribly repressive, but I see it, that maybe the Muslim ladies don't mind it at all. Once they get out of their house, no one know who it is, they can go wherever they want to, because nobody knows who it is, you can't tell who it is under the fail. They get to go and meet a friend, talk to another woman, and nobody knows who's talking. They can go out in broad daylight, but they are covered, so I see it as a two-edged sore. You can look at it as very repressive, that men don't let the women being exposed, and then the women go, actually this is not too bad, I can actually move around in my environment without anyone knowing who it is.

- *Do you feel this is also relevant in this area?*

Well I don't know, that's under current, the most repressed women here are to me Muslims, Islam's, but yet mobility, you ask me about mobility, no I don't think they get to move around a lot. On the other hand, they are disguised, and you see a lot of them moving around and you don't know who it is. So they do have mobility.

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f. (Freedom from) domestic violence

Gender based violence? Well that's what the man has over the women. It may not be physical, but I've heard where mental violence is way more repressive than physical violence. Physical violence you have proof, but mental violence you don't. It can be quite subtle and threatening and worse than physical, because it is hidden, it's implied, so gender-based violence is why my product, my mobile storage bin is not moving into women's groups. Because its perceived as empowering women, not men. What I need to do, I need a NGO, who will inform the groups and their husbands, that really this bin stops insects, rats and birds form eating. The men can have what they need, what they already getting from the agricultural system. It's the women who now get what otherwise was going to insects, rats and birds. I would like men to see that. They would keep what they get now, they are not feeding insects, rats and birds and that resource is going to their wives, who then should be able to raise better children.

6. In your perception, are females of different ages treated equivalently in rural Northern Ghana?

No, I think we touched on this before right, I don't believe that. I think you can divide it into pre-child bearing age, child-bearing age and post-child bearing age. I don't want to get crude, but you can apply that to livestock also.

- What exactly do you mean with that?

Well before they can have children, they are not of much worth. After they can't have children, they are not of much worth.

7. In your perception, are children of different sexes treated equivalently in rural Northern Ghana?

No, absolutely not. Sons are much more valuable.

8. How do you think the workload is of women in rural Northern Ghana?
a. Work vs domestic work

What I read about the workload, and I summarize what I've read I think, I'm waiting for someone to correct me. There are four people working in the field. One of those people is a man, the three others are women. Two of those women are productive, what they do grows food, and makes life better, but the third woman, because of post-harvest loss, gender-violence and that kind of stuff, does nothing. Her labour is wasted, it feeds insects, rats and birds, she doesn't get to go to school, the food she eats or feeds her baby is not very good and that child, whether it is a boy or a girl, is not an asset to the community. So the labour is terrible. If you look at a cross-section, the result of that labour, the productivity, because that girl doesn't go to school, there is no Indira Gandhi, Margaret Thatcher, Hillary Clinton in Northern Ghana, and that you can't calculate the loss opportunity costs to a culture when their women will never produce a leader.

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9. *What is your perception on current programs addressing women's empowerment and workload in this area?*

That's a good one. I'll just stick to my scenario and you can correct me some day, tell me I was wrong. But right now, better storage is not moving into Northern Ghana, because the NGO's argue, that they have to build a stationary warehouse, which is terrible storage, because that gives them the key to the community. The stationary warehouse provides protocols, fees and services for the men, politicians and administrators in the area. They control the land in the area where the warehouse is built on. That gives them power over the money the warehouse makes. Because of the bottleneck in the storage, for instance, women have no storage, they have to store, either sell for low prices or store in the warehouse. Those politicians and administrators, MOFA (Ministry of Food and Agriculture) directors, whomever make money. And because the NGO builds the warehouse for free and supplies them with lots of support, including pest-control and fertilizers and seed, those politicians can make lots of money and that kind of income is what gives that NGO the key to the community to go and do gender education, so in return for these protocols, fees and services that is generated by the warehouse, the NGO gets to go in and try to make women's lives better. If you make women's lives better, if you actually do that, you solve all the agricultural problems. The bad agriculture goes away. So someone like me has to say, ok I see what you're doing, I guess that a lost investment for a bigger cause. You solve gender, the problems in agriculture and many other go away. You get women equal rights to own land and to raise their children and suddenly men have to perform. They have to stand up and you know, compete, in the arena, in the cultural and political arena with women who are thinking differently. Women often think to invest in their families, they're thinking ten years down the road, when the daughter and son are finished school or are going to get to school. So women are much better investment than an African man. So the NGO's argue that they're going, that the results of their work is much better than anything than I can do focused on agriculture.

i. *You already mentioned this, but can you explain how post-harvest loss and the implementation of mobile storage facilities is related to women's empowerment and workload?*

Well yeah, I'll explain it again. There are four people in the field, three of them are women, one of those women, usually the youngest, her work is not productive, she doesn't even feed herself. She definitely, her work doesn't feed her child, so it's a huge resource sink for that community. Now, if you take away the post-harvest loss, and there's two aspects to post-harvest loss, there's insects, rats and birds, the quality of volume lost, that no one gets to eat, if you suddenly provided that to that girl, the labour that now is wasted, she would suddenly be productive, right now she is feeding insects, rats and birds, but if you stop that, she would suddenly be productive, she would eat better, she would either go to school, because she wouldn't have to work and her child would be healthy. There's a huge other aspect to this, that right now the food those three women grow has high levels of aflatoxin in it, which is a mentally and physically stunting poison. I won't go into that, you can research that yourself, but if you remove, while there is aflatoxin in the system, it doesn't matter if you grow fruits and vegetables, it doesn't matter if you put that girl into school, they are growing poison. They are shooting themselves in the food. Anything you do to up the volume, to increase the yield is really just growing aflatoxin.

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b. What are barriers for improving women's empowerment?

Well, land ownership, being able to own land would be one. But I don't think it would be Africa if people if people would be able to own land. It's about tenure. That is what drives much of the resource investment in the west, is people own their land and if they invest they are going to benefit. When they retire, they can sell that land for more than they paid for it and retire, simply. Here in Africa, it's not Africa if people own their land. Their culture, nowhere do they own land is important, everybody owns it. In fact, the chief explained it one day. He said: this land is owned by the dead, the living and the unborn, it's not ours, which is kind of a wise perspective, it's good. However, it really hurts the, it's the result of what we see now, if you bring systems which are based on land tenure to Africa, I don't think they would work. If those systems come to place with no land tenure and they come from a system which doesn't have post-harvest loss, it's double pain. They don't have tenure so the system is based on tenure, it won't work when there is no tenure, it's comes from a systems where there is no post-harvest loss, so it's not solving post-harvest loss that is here. So what do I do, I bring a product that solves post-harvest loss, that a woman can own, because it moves. And that's what I get excited about, seeing somehow, I have this idea before anyone else. My product is a very good solution and defines the problems of systems that come from tenure where there is no post-harvest loss. Yet, those systems have developed these products for other reasons and it's just a matter of bringing it here. Now a woman who doesn't own land, who doesn't need to, her culture doesn't need to let her own land, it just needs her to own her storage.

Interview transcript professor community nutrition at University of Development Studies

10. Can you briefly describe your job function?

I work in the university, I'm a lecturer. There are three main aspects of what I should do. One, is to teach. Second, is to research and the third to outreach, so teach student who have undergraduates and then to research in my area of discipline and the outreach is about whatever you find in your research. Then you communicate it with the community, that you are serving. That are the three main core functions.

11. What is your perception of the level of empowerment and decision-making power of women in rural Northern Ghana?

That will be difficult to say. But if you are talking about the level of involvement in decision-making, if you don't categorize it, then it will be difficult to say how deep they are involved in decision-making. There are decisions that need to be taken in terms of child care, there are decision regarding household, there are decision that need to be taken about finances.

If it comes to child care, I would say that the decision-making component, that women contribute to is large, because mostly, they are with the children, so they know more about the child than usually the father. So when it comes to deciding what the child needs, they are the most influential in that. But when it comes to household resource control and allocation, the men seem to dominate and the women don't seem to contribute that much. Even though in terms of bringing the resources, they also contribute resources, but in terms of the decisions about the resources, then the man dominates.

- Why do you think that is? Women are not allowed to participate or don't want to participate?

I think over time it has become a combination of the two. It's not so much that the woman don't like to participate, because they have known over time, they may not be allowed to participate, so they show lack of interest in participating. It's already known, when it's comes to this, I don't have a say, so I don't even try.

But with time, some of these things have changed a bit, because there are programs that target women, trying to empower them a bit, give them some micro credit, so they can be financially independent. For some of them, the more become independent, the more their husbands try to involve them in financial decision, because now they have their own money, they can use it for things on their own. So depending on how well the women is doing, the level participating in decision-making financially will improve.

- You already touched on child care, household decisions and finances, but in terms of mobility, how is the decision-making power of women in this area.

They are free to move around, if it is within the community. But if she has to move out of the community, most of the time they need permission from their husband before they can go. I wouldn't say they are restricted, they are not so much restricted. Once there is a good reason for the woman to move, she'll move. But she has to first discuss and get permission of the head of household before she can go.

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- *With regard to domestic violence, how do you think decision-making power of women is in this area?*

When the violence itself takes place, it's instantaneous, and you are not able to tell he's going to slap me, so let's discuss so he doesn't slap me. It's all of a sudden and he gets angry and he slaps, or she gets angry and uses her knife on him because she's in the kitchen and they have come to annoy her, so she uses whatever. The chances that a woman will be violence towards a man is less than for the man to show violence towards a woman. That is in the north here. Even there's a prescription within the traditional set-up, allow a man to discipline his wife if she is wrong, but the reverse is not true.

- *What do you mean that it is part of tradition?*

It's part of culture, it is part of cultural upbringing of a man to know that he can discipline his wife if she goes wrong, but it is not part of cultural upbringing that a woman can discipline her husband when he goes wrong, she may try to advise him or talk to him, but disciplining is not under her control, but he does.

12. *How is the decision-making power of women in rural Northern Ghana over different stages of their life?*
 - a. *Girl*
 - b. *Adolescent*
 - c. *Newly-wed*
 - d. *Children*

Again if you put it in context, it is easier to discuss it. When it is decision-making with respect to growing up, if you are still in school you hardly have any part in decision-making. You are told what to do, and you are told what is not good to do, so it's not about you participating and deciding anything, it's about you being told what to do, so a child all the way through adolescence, but we know naturally that adolescents want to start deciding what to do and what is good for them and what is not good to do. So it's a stage, where there is conflict. But the environment, because of the cultural set-up, doesn't so much allow the expression of that physiological state where the adolescent wants to participate in deciding. So there always conflict. So they live in an environment where physiologically what they want to be part of, culturally they are not allowed to. So they become frustrated. They don't feel like they are allowed to be heard. But later when they get married, something changes, they become adult, they become responsible. And those who were seen them as not knowing anything and told what to do, begin to see them as adults who can also contribute towards decision-making. But the sharp distinction as to what kind of decision they can contribute in and what they cannot contribute in. Household keeping, it is clear what to do. If it's about child care, it is clear what to do. Once you relate it to household and child welfare, they seem to have a lot to contribute and people are willing to listen to them. Once it goes outside the household and child care, then more and more the autonomy it is reduced. Especially when it involves economic decisions. Economic decision, they don't have that much autonomy, but household, welfare, feeding. Even feeding, their autonomy is more related to preparation, rather than what. It's not about what to eat, but when what to eat has been decided, how to get to become food and they have autonomy in how it becomes food. What to eat is already decided, but she has the autonomy to vary what goes

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with it, so mostly to be the TZ, but she can decide which sauce or soup goes with the TZ. So she has autonomy to decide those. But finances, the economic decision how to eventually get the resources for food, for feeding, most of the time she doesn't have the autonomy. Over the life stages, autonomy or participation in decision-making improves gradually, but it shifts more to some specific aspects of household living.

13. In your perception, how is the decision-making power of women in rural Northern Ghana in relation to different household members?

- a. Husband*
- b. Parents in law*
- c. Other wives (older and younger wives)*

Rural Northern Ghana in particular, if you want to arrange in terms of hierarchy, who decides within a household. First it's the head of household. Second, is the mother in law. Third, if the mother is living with the son and the wife, then you have the woman or the wife of the head of household, before you have maybe children, then the older child, if it is the oldest child and it is not a male and the second child is male, then most likely the male may take over, have more influence in decision than female, even if she is the first child. So it is head of household, mother in law or father in law. If there is father in law, chances are that the father in law is the head of household, so then it will be the same. Head of household, mother in law, then the wife, before you have the older children.

Most of the time mother in-law are seen as people with a lot of experience. They have gone through what you are going through already. So they are seen as people, ok if she says one thing, I should obey. It has been for so long, but lately I'm sure it is changing. Especially with the women who are educated, even if they live with their mother in-law, they don't just seem to accept what mothers in law say, but they also want to say ok I also have some idea and have some good think and I think for my children, what they should eat, and what they should do, and how they should grow. So they also tend to exert some influence on some of these decisions. But generally, if mothers in law live together with women, they tend to be very very influential, especially in the way children are brought up.

But for a woman towards her husband, the husband is 90% of the time right.

14. In your perception, are females of different ages treated equivalently?

No, they are not treated equally. A female of 60 years is a grandmother, so she is treated completely different, she needs to be respected, she doesn't needs to be stressed, she can rest and her needs will be provided. A female of 30 years, if you are not doing anything, you are lazy. If you are 30 years and you are not married, it is strange. Age is a big thing, age demands respect, depending on whether you are on the top of it or at the bottom of it. It also decides on what role you play. Depending on your age, you are either told, go and join these people and decide what needs to be done or no you don't qualify to join them, because you are not old enough to be part of that decision. The decision is for older people, you are young, so you are not part of it. So age plays a big role in how they are seen and respected and what they are assigned to.

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15. In your perception, are children of different sexes treated equivalently?

No, they are completely different. They are assigned different roles because of their perception of their future roles. They are treated right from the beginning. After a few years, they are treated completely different. Even if they are going to school together, what the child will do, what the female child will do in the morning before she goes to school, is completely different from what the male child will do in the morning in the house before he goes to school.

- *What typically are those things?*

The female child will be responsible for the dishes, if food is prepared in the morning, she part of the food preparation, if the house has to be kept clean, she part of cleaning the house. But the male child, if there are animals in the house, he is responsible for the animals. Sometimes they also take part of cleaning the house, but largely that is what they do in the morning before they go to school. For a female child that is a lot more than the male child. That is, if both of them are in the house. If there is only a male child, then you will see the male child doing these other things a female child would also have been doing. But a male child that would be doing these things are usually need to be done or think need to be done by female children, are usually regarded as less males. It's not man enough to be washing dishes, girls should be doing that, not boys. So there is clear differentiation of terms of how they are treated.

16. How is the workload of women in rural Northern Ghana?

a. Work vs domestic work

Huge, huge. Rural norther Ghana. They spend a lot of energy all day, right from the time they wake up all trough the time they go to bed. They are hardworking to the extent that hard working is part of living in the rural community. Because if you don't have enough energy to match up, you are as lazy woman. A lazy woman in the rural area in Northern Ghana will come to the city and she is hard working, because relatively given the amount of time and energy she would use to do some work, somebody in the city may find that as no I should not be doing this. Then wake up first in the morning they prepare food, they prepare children, the go and look for firewood to prepare the afternoon meals or the evening meals, they have to, if they have a small business they are also running, they still have to prepare that business and make sure if it is that is what they are selling is really towards the afternoon or towards the evening. So they are involved in household activities, commerce activities, they are involved in taking care of children, taking care of the husband, taking care of the mother in law. So they take care of everybody, except themselves. They do a lot a lot of work. Even you can trace that, two women of the same age, you find that the one that is in the rural community is lighter than the one that is in the urban community. Because she spends so much of her energy working, but the one in the city will not exert enough, that much energy for the same activity.

17. What kind of projects are currently addressing women's empowerment and workload in rural Northern Ghana?

It can be grouped into several broad areas. I cannot think of all the broad areas, but those I can remember, you can group them into education, commerce related as in credits. Some NGO's are into

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female child education. One example is camfed. Camfed means camping for female education. They support the education of children, and junior high school or senior high school or even the university, where they support those that are brilliant but are poor. That is one good program that only targets female education. Then there are a lot of NGO's that are also into empowering women. Empowering towards self-efficacy, to be able to make enough money, to take care of themselves and their families. So they give them micro-credits and also take them to what they call financial literacy, so they give them some basic knowledge on how to keep your money and how to make profit and how to keep your books.

- a. Some projects address agricultural production in order to improve children's nutritional status. What do you think is the role of women's empowerment in this pathway?*

Yeah they are related. Empowering women in such programs will go a long way, the outcome of such programs, you want to have a family that is able to decide that instead of giving my child a white potato, I'd rather give the child an orange fleshy potato. But she can only decide that she will give him the orange fleshy and not the white, because she is able to understand the benefits of the orange fleshy potato improving the nutritional status of the child. This is something she knows, but it goes against cultural beliefs. I know this food is good for my child, but according to the culture I'm not supposed to give this to my child. It is only an empowered woman, who can say, even though my culture says this is not supposed to be good for my child, I'm informed well enough to know that this is good, even though my culture does not accept it. So an empowered woman is better able to decide what is nutritious and give it to the child. So a nutrition program can only be successful if it has more woman who are empowered enough to take part of it. Because nutrition programs at the tail end on those programs, are decisions that need to be taken, and those decision at the individual family level, so the person has to be, the behavioural change has to be negotiated, and when you are negotiating a behavioural change whoever you are negotiation the behavioural change with, needs enough information to be able to change, so an empowered woman is more likely to change towards an improved nutrition behaviour, than a woman that is less empowered.

- b. Where does the department of community nutrition place women's empowerment in relation to a child's nutrition?*

Not so much just the community nutrition department, even in the pathway of improving nutrition, infant young child nutrition, a woman is central. Breastfeeding is a key component of young child feeding. We a woman who is well informed to know that the first breast milk is not poisonous, it's protection for the child. An empowered woman will give that child the first breastmilk. An empowered woman, nutrition wise, will also know the child has to be breastfed on demand, when the child want to be breastfed, you are available to breast feed and all those things. A well informed mother in terms of nutrition, will not give pre-lacteal feed, pre-lacteal is what is given to a child after birth, before they are starting to give breastmilk. Some of these can be dangerous, can introduce infections to the child and all those things. So if you look at every aspect of infant and young child feeding, whether it is breastfeeding or complementary feeding, a woman is in the middle. Any nutritional program that doesn't have the woman in the middle will not succeed. Most of the time nutrition related decision are better handled by woman than by men. Because it cause back to what

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we discussed earlier to the type of autonomy a woman has. She has autonomy when it comes to child care. Child care is at the core of nutrition. So two are related, so that why it goes back into nutrition. If you don't have the woman involved, the nutrition program is not likely to succeed. The husband also needs to be informed, so the woman is involved, the husband is informed, then it works well.

c. What are barriers for improving women's empowerment?

Barriers sometimes for improving empowerment is about other people, mostly men, understanding the key role women play in a lot of things that happen around them, the men themselves. It is the only way they get to know that then the woman should be empowered to do what they have to do. Sometimes, a barrier to empowerment, is the woman own lack of understanding of where their position should be. If I just accept that I have no role to play in this decision, when that decision comes up, I will not even attempt to be part of it. If I get to understand that a woman, I'm not just limited on deciding what the child should eat or how the child should behave and I'm also interested in the finances of my household. I should be interested in securing the future of my child. It's not just the man who should think about of the future in terms of financial security. When you see that as your responsibility, you also see yourself as contributing to eat. But if you think, no this is not part of, so that by accepting, some empowering issues are not women related, but the women themselves accepting that, is also taking them far away of taking part in it. For me, that is one of the big barriers, woman accepting they should not be part of certain decisions.

d. What elements are needed to enable an increase in women's empowerment?

That will be the flipside of it, women need to understand there is no limit to decision, they can be part of any decision. The men also need to understand, women are capable of taking good decisions, so they should be allowed to participate in deciding what is good for them, what is good for their husbands, what is good for their children, what is good for their household, for everybody. It is not that they should just be given a corner, it is within this corner they should function and think. There shouldn't be a corner that is the only place where you are useful, that all other places you are useful, so for me, ones you able to get to that level, and part of it comes through education. A lot of it. Even those of us who claim we are well educated, we are well educated within a context. You come from a background that has already prescribed what you should think of a woman to do. So it doesn't matter how well you are educated, you already have a woman sitting somewhere in a corner, this is what she should be doing. So you tend to get some shocks, when you are exposed to another environment where women don't only do what you think they should be doing, but do more. An example is, I've worked with a lot of Dutch girls when they come here, the kind of things they want to be involved in, even when they go to the field, is completely different from a typical Ghanaian female student. That comes from the orientation what a woman should do, it's not like ok you are given a group assignment, if there are males, ok let them do it and the females can relax, it's not like that. If the assignment is for the group, all of us should contribute equally to it. If you are brought up to think, the females should do as much as the males can do, then you see yourself as being restricted to do anything. And if you go to the communities and start to do something, they will tell women don't do that.

CHILD ID:

- *How is it then viewed when women do take that role?*

Then such women become too forward, they are seen as not submissive. That is seen as somehow a bad thing. It is weird, it is a gathering for men, what are you doing here as a woman, women are not here, so can you leave?

- e. *What would a true difference in terms of women's empowerment entail for the women? What would be the benefits for her when empowerment would increase in this area?*

Enormous. If you look at it, population wise we have more women than men. Education wise, we have more males attaining higher levels of education than women. The more we get women to attain high levels of education, the better we get empowered, the better they are able to take care of their families, their children. And that cycle of an empowered woman, an empowered woman will translate into the female child, so you have a kind of spiral going on, that is from one generation is transferred to another generation. But as we sit now, we still have the situation where there are fewer women who are in decision-making positions. Also at the university, there are fewer women that are at decision-making positions, but they are well-educated. They are less likely to be involved in what we call scheming, for positions. You are more likely to see men trying to outweigh each other for a particular position when it is announced than a woman. Over time, most of them, because of the pressures to take care of the families, they have not gone back to school to attain higher degrees compared to men. Even though they start together with the men, within the same period of time, the man is more likely to have gained another level of certificate or qualification than the woman. The man is likely to be ahead of them. So within the university you don't see them rising as high and as fast as the men. First, the men have outnumbered the women and secondly, the speed which a man gets another qualification is much faster than that a woman would get the same qualification. And when you find few of them, those few are extraordinarily, and they think every other person is against the. If you perceive me as a woman, you maybe think I don't deserve to be where I am, so they want to show yes I'm a tough woman, I deserve to be here, and earn it. So they tend to be a little bit more difficult than a male in the same position.