



# Women Empowerment in Agriculture and Child Nutrition Evidence from Ethiopia

*Gebremeskel Berhane Tesfay  
and Babatunde O Abidoye*

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## Abstract

Child nutrition is a pressing issue in Ethiopia. Reports show that 28% of child deaths are associated with under-nutrition, where 38.0% of children under five years are stunted, 23.6% underweight, 9.9% are wasting, and anaemia prevalence among under-five children is extremely high at 57.0%. This paper examines the impact of women's empowerment in agriculture on intra-gender nutritional outcomes of children below five years old. We use a two-round survey panel data (baseline in 2013 and midline in 2015) of the Women Empowerment in Agriculture Index (WEAI) collected by IFPRI, Central Statistics Agency of Ethiopia, and Addis

Ababa University in the Feed-the-Future and non-Feed-the-Future zones in Ethiopia. The primary objective is to examine whether an empowered woman can influence the household decision for better nutritional outcomes for the household members. The allocation decision is obviously influenced by unobserved individual-specific effects such as child gender preference and community variables. We applied the correlated random effects panel model with instrumental variables method to estimate the impact of women's empowerment in agriculture on children's nutrition outcomes. To identify which empowerment domain has a larger effect on intra-gender child nutritional outcomes, we separately estimate the five disempowerment scores on child nutrition outcomes. Nutrition outcomes, in this case, Weight-for-age z-score (waz06), Length/height-for-age z-score (whz06), Weight-for-length/height z-score (haz06), and Child Dietary Diversity Score on the interaction variable of women empowerment in agriculture and gender dummy indicated dissimilar evidence, implying that women empowerment in agriculture, and gender dummy interacted with women empowerment does not show a gender-biased effect on child nutrition outcomes. Similarly, child nutrition outcomes are improved by programme interventions but with no bias to gender. The five domains of disempowerment score negatively correlate with child nutrition outcomes, yet with no gender-biased effect. Therefore, these results suggest that exerting additional efforts on women's empowerment in agriculture can improve child nutrition outcomes without gender bias.

## Introduction

Women empowerment is vital given the role they contribute to poverty alleviation and nutrition outcomes. It is vital not only for their well-being but also for their potential contribution to the overall economic development and improvements of the nutrition and education of kids (Quisumbing and Maluccio, 2003; Malhotra and Schuler, 2005). According to Kabeer (1999), women empowerment is a process of making strategic life choices based on resources, agency, and achievements (well-being outcomes). Recent studies on women's empowerment used the Women Empowerment in Agriculture Index to understand women's empowerment in agriculture. This index is an aggregate indicator that captures control over resources within the agrarian household. The WEAI is an innovative technique by USAID, IFPRI, and the Oxford Poverty and Human Development Initiative (OPHI) under the umbrella of 'Feed the Future (FtF)' with the goal of measuring women's empowerment in agriculture. The WEAI is composed of two sub-indices, namely the five domains of women's empowerment (5DE) and the Gender Parity Index (GPI).

In Ethiopia's context, the 5DEs refer to women's decisions over agricultural production; access to and decision-making power over productive resources; control over the use of income; leadership in the community; and time. These 5DEs, in turn, are constructed from 10 indicators (see for example Malapit *et al.*, 2015; and Alkire *et al.*,

2013 for a tabular presentation of the 5DE). The 5DE examines the extent women are empowered with respect to these domains, and the percentage of domains that are empowered for the disempowered ones. The Gender Parity Index (GPI) indicates the percentage of women with equal empowerment scores as their men counterparts.

Women could achieve these empowerment indicators by interacting with their community at the village level and beyond, and among household members within the household. As a result, the intra-household externality, especially interactions among adult men/primary male respondents versus adult female/primary female respondents, plays a crucial role in empowering women in agriculture.

At the household level, spouses are the two economic agents that interact on matters pertaining to agriculture and resource allocation. We can call this interaction an intra-household externality that can be important in understanding intra-household welfare allocation between sexes. The level of women's empowerment in agriculture can be influenced by this intra-household externality.

In a resources non-pooling agrarian household, there is a link between women's control of resources and the allocation of resources to food (Udry *et al.*, 1995; Peterman *et al.*, 2014; Doss, 2006). Sraboni *et al.* (2013) found that greater empowerment of women measured using WEAI confirms the existence of per adult-equivalent calorie availability and dietary diversity in Bangladesh. Similarly, Quisumbing (2003) confirmed that greater control of resources by women creates better children's nutrition outcomes, which complement the conclusion by Carlson and Wardlaw (1990) that maternal resources play a key role in child nutrition status than paternal resources do. A critical case that needs keen consideration during household decision-making is the occurrence of household-level environmental shock. An agricultural household diverts production resources during a shock event to what they believe is a productive factor of production, probably to adult men, from less productive factor of production, can from women and children and that calls an empowered women in the decision process.

Although the direction of empowerment and nutrition outcomes linkage is ambiguous (i.e., due to its contextual aspect), it is confirmed that an increase in women's empowerment enables women to allocate more of the family's resources to food, and to food dietary diversity. Empowering women including women's participation in paid and unpaid work is considered a strong determinant factor for resource access to the family and increased disposable income for consumption. Feed the Future midline Survey report by Bachewe *et al.* (2014) in Ethiopia indicates that there are small improvements in women empowerment in agriculture in the FtF Woredas of influence, and therefore improvement in welfare and child nutrition. This report is based on the results using an average treatment effect on the treated and control technique.

## Nutrition policy targets in Ethiopia

Most people in Ethiopia, the second most populous African country with an annual population growth rate of 2.6% (Ringheim *et al.*, 2009), live in rural areas (82%) and are impoverished. According to UNDP's 2015 Human Development Index, Ethiopia is position 174 out of 188 countries with 0.448 Human Development Index.

Malnourishment due to low access to clean water and sanitation, proper diet, and quality health services is the main contributor to high maternal, neonatal, and child mortality in the country. Though the country has started exercising rapid, sustained improvements in reducing malnutrition such as children stunting, underweight, and wasting, many children in Ethiopia remain in a hazardous situation of malnutrition. UNICEF Ethiopia's (2017) report indicated that 28% of child deaths are associated with undernutrition. Specifically, 38% of children under five years are stunted, 23.6% are underweight, 9.9% are wasting, and Anaemia prevalence among under-five children is extremely high at 57%.

The Government of Ethiopia in collaboration with various partners is working on multi-sectoral coordination to improve the nutrition of all children, pregnant and lactating women, and their families (Ministry of Finance and Economic Development, 2010). As a plan of action, the first national Growth and Transformation Plan (GTP I) was designed to achieve four comprehensive objectives: (i) maintaining at least an average real GDP growth rate of 11% per annum and attaining the Millennium Development Goals (MDGs) by 2015; (ii) expanding access and ensuring the quality of education and health services and achieve MDGs in the social sectors; (iii) establishing conditions for sustainable nation-building through the creation of stable democratic and developmental State; (iv) and ensuring the sustainability of growth maintaining macroeconomic stability.

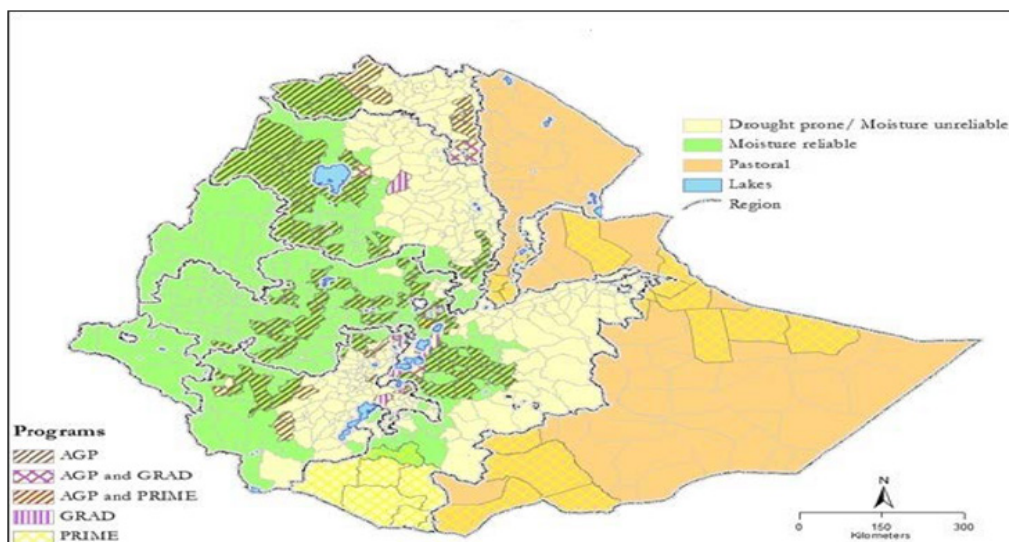
In the second five years national plan, Growth, and Transformation Plan II, the country's policy priority targets with respect to nutrition are clearly presented. It sets out to reduce maternal mortality rate (MMR) from 420/100,000 live births in 2015 to 199/100,000 live births by 2020. Similarly, the under-five child mortality rate and infant mortality rate are expected to decrease from 64/1000 live births in 2015 to 30/1000 live births by 2020 and from 44 in 2015 to 20 per 1000 live births by 2020 respectively (National Planning Commission, 2016).

**Feed the Future in Ethiopia (FtF):** The National Ministry of Health involves various government sectors and non-governmental international aid actors to implement the Growth and Transformation Plan II (GTP II). Among others, Feed the Future is one of the non-government international initiatives engaged in contributing to improving the livelihood of citizens. Feed the Future is the United States America under the umbrella

of USAID to address global hunger, which strives to address the root causes of global hunger by supporting countries to increase their agricultural productivity to meet the demand for food, supporting and facilitating access to markets, and increasing incomes for the rural poor so that they can meet their food and other needs.

In Ethiopia, USAID exerts its efforts to accelerate the FtF programmes in 149 Woredas which include 3.58 million rural households and 16.8 million individuals. According to the FtF Ethiopia Strategy document, the main intervention programmes supported by the USAID are Agricultural Growth Programme (AGP), Graduation with Resilience to Achieve Sustainable Development (GRAD), Pastoralist Areas Resilience Improvement through Market Expansion (PRIME), Empowering New Generations to Improve Nutrition and Economic Opportunities (ENGINE), and Livestock Market Development (LMD). These programmes mainly involve institutional strengthening and development; scaling up best practices; market and agribusiness development; small scale agricultural water development and management; and small-scale market infrastructure development and management. The programmes in the FtF Woredas are indicated on the map of Ethiopia (national map), Figure 1, which indicates a considerable overlap of the programmes in the Woredas. As it is on the map, AGP, GRAD, and PRIME are the main projects. These programmes are implemented mainly in five regions, namely, Tigray, Amhara, Oromia, Somali, and SNNP.

**Figure 1: Map of the FtF intervention area in Ethiopia**



Source: Adopted from the Feed the Future (FtF) of Ethiopia – Baseline report, 2013 by Bachewe et.al (2014)

Because Women in Ethiopia own little independent decision-making on most individual and family issues, FtF has set goals to improve women's empowerment in rural areas along with alleviating poverty. Women empowerment in agriculture plays a key role in sustainably reducing global poverty and hunger through inclusive agricultural

growth and improved nutritional status of women and children. Therefore, FtF deploys resources to reduce gender inequalities and enhance improvements in women's status, which is critical for improvements in global food and nutrition security.

## Problem Statement

Children's nutritional status in Ethiopia, as reported by UNICEF Ethiopia (2017) and explained in section 1.1 of this paper, is extremely disturbing despite the extensive efforts by government, non-governmental organizations (NGOs) and other stakeholders to minimize malnutrition. One of the interventions to enhance child nutrition status is empowering a woman, which is seen as one of the important factors in ending malnutrition (Stevens *et al.*, 2012; Ruel *et al.*, 2013). The intervention priority on women empowerment emanates from the empirical evidence that empowered women allocate household resources for the betterment of family members (Quisumbing and Maluccio, 2003; Malhotra and Schuler, 2005). Notwithstanding, much of this empirical evidence lacks indication of whether women's empowerment equally enhances the nutrition of boys and girls without disparity. This inquiry is potentially significant for Ethiopia as the country gives more attention to alleviating malnutrition. However, the evidence regarding the effect of women's empowerment on malnutrition is inconclusive and requires more research. Another important concern is the unavailability of nutrition indicators at an individual level. Usually, per-capita expenditure is taken as a good proxy for individual welfare variables which is criticized for not considering individual heterogeneity in the analysis.

The lack of consistent evidence on whether women's empowerment results in a homogenous effect on both genders' nutrition using individual-level nutrition indicators requires an alternative technique for analysis. Certain studies use child anthropometry as a nutrition outcome variable while the challenge rests on how to find endogeneity-free empowerment indicators. The question of household decision behaviour affects nutrition outcomes when household-level resource shock occurs. Therefore, how decision-making in the household affects nutrition outcomes in the presence of empowered women during shock events is a valid question.

In addition, how the decision-making household agents behave with resource scarcity during shocks and whether or not they make a gender-biased decision is still an area to be researched on. The contribution of this paper is based on anthropometry and WEAI outcome variables and a predictor variable, respectively, to identify the effect of the association and nutrition contribution by gender. Therefore, this paper seeks to answer the following research questions:- (i) To what extent does women's empowerment affect children's nutritional status in Ethiopia? (ii) Does women's empowerment create a gender-biased nutrition effect? (iii) What are the gender dynamics in decision-making when resources are scarce, especially during an environmental shock?

The contribution of this paper is the use of an innovative measurement technique for women empowerment in Ethiopia to understand nutrition dynamics by gender within a household. This provides empirical evidence using the WEAI data and fills the knowledge gap on whether a change in women's empowerment in agriculture results in gender-biased nutrition outcomes. To examine the effect of individual empowerment indicators (marginal effect), a separate examination of the individual indicators is done. This is important for prioritizing interventions for women's empowerment. Beyond directly estimating the impact of changes in women's empowerment in agriculture on child nutrition, indirect benefits of changes in women's empowerment in agriculture, including response to environmental shocks will be tested. Environmental shock variables interacted with women empowerment in agriculture (i.e., WEAI) to examine how empowerment affects allocation behaviour during livelihood fluctuations.

## **Objectives of the study**

The general objective of the research is to examine the effect of women empowerment in agriculture on intra-gender children nutrition allocation with and without household level adverse environmental shocks. Particularly, the research aims to:

- i. Examine the association between women empowerment in agriculture and child nutrition.
- ii. Examine if women empowerment in agriculture has differential or child gender-biased nutrition effect within the household.
- iii. Examine if gender interacted with WEAI and shock variable affects child nutrition.

## **Statement of Hypothesis**

Based on the gaps in the empirical evidence, this research seeks to answer the question whether there is a nutrition distribution disparity between sexes and the impact of women's empowerment in agriculture on individual child nutrition within the household given environmental shocks. During shock, households adapt by readjusting welfare distribution among household members, and smoothen consumption to share risk among the members. Men and women participate in the decision-making process including bargaining power with bargaining power represented by the level of women empowerment at the household level. The null hypotheses can be stated as follows:

- (i) Women empowerment in agriculture has no significant association with child nutrition.



- (ii) Women empowerment in agriculture has differential and/or child gender-biased effects on nutrient allocation between boys and girls within the household.
- (iii) An interaction of women empowerment in agriculture and environmental household-level shock has a significant effect on child nutrition.

## Source of data

We use a two-round panel data from a baseline (6,977 households in 2013) and midline (6,696 households in 2015) survey of the WEAI dataset collected by IFPRI in collaboration with the Central Statistics Agency of Ethiopia, and Addis Ababa University, in Ethiopia. The survey has an attrition rate of 4% with data collected from both empowerment intervention areas known as the ‘zone of influence’ and an area without empowerment intervention. In the survey, the following questions were elicited: household demographics; dwelling characteristics; household consumption expenditure; household hunger scale; role in household decision-making around production and income generation; women’s dietary diversity and anthropometry; child anthropometry and infant and young child feeding; employment; agricultural productivity and input use; crop utilization; agricultural extension; technology and information networks; livestock ownership and income from livestock and livestock products; shocks; non-farm income and business activities – own business activities; off-farm employment; credit; trust; control and agency; household assets (non-land); transfers, gifts, and remittances; aspects of market supply and access and farm productivity are the main modules among others.

Among these modules, one module is designed and administered to collect information on the 10 empowerment indicators required to calculate the WEAI and consists of anthropometry measurements for women, and for children below 6 years old. The outcome variables are child nutrition in terms of Z-score in reference to the World Health Organization (WHO) population standard calculated using the anthropometry measurement for children under six years old.

## Conclusions and recommendations

Our estimation using the Correlated Random Effect Panel model with the instrumental variable method is to examine the effect of women empowerment on child nutrition outcomes where nutrition outcomes are among the excellent welfare indicators at an individual level in rural Ethiopia. The reason why women's empowerment is used as a predictor of nutrition outcomes, as we explain in section one, is that an empowered woman plays a key role in the development and, of food and nutrition security agendas and thereby reduces gender inequalities.



The descriptive result shows that close to 50% of male and female children are stunted. The summary of weight-for-age indicates that about 11% of both male and female children are wasting while the prevalence of underweight is between 10 and 25% for male and female children, respectively. This descriptive result is evidence of severe malnutrition in the nation.

The correlated random effects panel with instrumental variables model estimation indicates that inadequacy score affects child nutrition outcomes differently. An inverse significant correlation between inadequacy score with both weight-for-age z-score(waz06), length/height-for-age z-score(haz06), and child dietary diversity indicates that the more inadequate the woman is in women's empowerment indicators, the more malnourished is the child while it shows no significant causal effect on weight-for-length/height-for-age. The impact of the variable interaction between women empowerment in agriculture, FtF dummy, and gender dummy on weight-for-length/height z-score is a statistically insignificant coefficient. We find that the same variable interaction has a significant effect on height-for-age (haz06) and child dietary diversity score when the child is a boy in the non-FtF Woreda and there is a significant influence of this interacted variable on child dietary diversity score when the child is a girl in the FtF Woreda. The reason for the negative relationship between the interacted variable and the nutrition outcomes measured using anthropometric indicators might be that empowerment increases the burden of agency and other household responsibilities other than child caregiving in the household. The results also find that the environmental shocks dummy has a significant effect on weight-for-age (waz06) for both sex and child dietary diversity (CDDS) if the child is female. Women's dietary diversity positively correlates with weight-for-age (waz06) and child dietary diversity score (CDDS).

The correlated random effects panel models with estimation using the inadequacy of women empowerment indicators, in summary, show that all the inadequacy indicators, namely, control over the use of income (inadequacy on decision making over the use of income), inadequacy in-group membership of a woman, inadequacy in input in production decisions, inadequacy in group membership, inadequacy in speaking in public, inadequacies in small asset ownership, autonomy in production, access to and decisions on credit, control over the use of income, workload, and leisure variables have a varied effect on nutrition outcomes. The result of the marginal analysis shows that a unit change due to a unit change in women's empowerment in agriculture does not create a gender differential significant effect on the nutrition of children. The estimated contrast -0.0668 is the average marginal change of both boys' and girls' nutrition due to a unit change of WEAL.

From the findings we have seen thus far, we can conclude that women's empowerment in agriculture is gradual in its effect on nutritional outcomes. A possible explanation for this can be that the time interval of baseline and mid-term surveys might not be enough time duration to observe the gradual effect of women empowerment in

agriculture on nutrition outcomes measured using anthropometry, which also invites us to wait for the project completion, though the results indicate a tendency of some change when the project completes. An interesting finding is the impact of women empowerment in agriculture on child dietary diversity in the FtF and non-FtF Woreda. The marginal effect of women empowerment in agriculture on nutrition outcomes varies with project intervention. This differential effect on nutrition invites policy attention that promotes women's empowerment in agriculture so that it will have a positive significant effect on nutrition for boys and girls equally.

The results of inadequacy indicators versus nutrition outcomes give a clue to policymakers about where their priority of attention should be. Therefore, policies should be in a way to encourage and promote women to achieve the adequate levels the indicators that have a negative significant effect on nutrition outcomes of children. In general, women empowerment in agriculture shows a tendency for positive contribution to both genders' nutrition and more work should be done by the government and NGOs working in the project area.

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