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Gender Dynamics and Food Security in the Kenyan African Indigenous Vegetables Supply Chain

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Introduction

Female empowerment within a household can increase child health and child education, reduce the share of uneducated work force in an economy (Allendorf, 2007; Bandiera & Natraj, 2013; Rubalcava et al., 2009) and improve food expenditure and food security of households (Asitik & Abu, 2020; Friedberg & Webb, 2006). However, women in sub-Saharan African countries are traditionally responsible for the production of so-called food crops, whereas men are predominantly responsible for the so-called cash crop production (wa Gĩthĩnji et al., 2014; Wayua et al., 2020). In dynamic agricultural markets, so-called food crops, like African indigenous vegetables (AIVs), sometimes advance to cash crops, and men may take over the role of production and marketing from women. Nevertheless, AIVs are full of essential nutrients (Kamga et al., 2013) and can thus play an important role in fighting food insecurity and hidden hunger in Kenya (Krause et al., 2019). While there has been some qualitative research on gender equality in the Kenyan AIV value chain, quantitative evaluation of the role of women, especially within male headed households, is not yet available (Kassie et al., 2014; Colverson and Farnworth, 2015; Wayua et al., 2020). Also, the relationship between intra-household female bargaining power and food security is not clear (Asfaw & Maggio, 2018; Djuikom & van de Walle, 2018; Friedberg & Webb, 2006). By using a unique primary data set from rural and peri-urban AIV producers in Kenya, this study tries to fill this gap. Our research provides insights into gender-related issues in households in developing countries, contributing to the monitoring of the fifth SDG on gender equality.

Material and Methods

To account for the complex dynamics within a household (Kilic et al., 2015), we base our framework on the Collective Model of the household (Fafchamps, 2001; Himmelweit et al., 2013). The bargaining power of an individual is determined by the threat point, or *fall-back position*, describing the level of utility, which each individual would have without the cooperation in the household (Agarwal, 1997; Himmelweit et al., 2013). The better this position is, the better is the position of bargaining, as the thread of leaving the household increases (Agarwal, 1997; Himmelweit et al., 2013). Thus, the model includes determinants of female bargaining power, factors that influence the *fall-back position* of a household member. Further, the framework conceptualizes the decision-making process within the household and its outcomes. Since decisions are mostly made in favor of the participant with the highest bargaining power (Agarwal, 2018; Quisumbing & Maluccio, 2003), we use the ability of a woman to achieve outputs in her favor as a proxy for her bargaining power (Alkire et al., 2012). Hence, we examine the participation in the

decision-making process (Alkire et al., 2012; Doss, 2013) and the outcomes of the decision-making process.

A primary data set obtained during the *Horticultural Innovation and Learning for Improved Nutrition and Livelihood in East Africa* (HORTINLEA) project and covering socio-economic characteristics of actors along the Kenyan AIV value chain is used for the analyses.

For the econometric analyses we used multinomial multivariate logistic regression with the participation in the household decision-making as a proxy for female bargaining power and the dependent variable in the model. In order to evaluate the impact of female bargaining power on household welfare, we use the Propensity Score Matching (PSM) for controlling for possible biases by endogeneity and self-selection (Ahmed et al., 2016; Asfaw & Shiferaw, 2010). We looked at the treatment effect of female decision-making on household welfare, measured in food security, including the Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), Months of Adequate Household Food Provisioning indicator (MAHFP) and the Coping Strategies Index (CSI) (FAO, 2008), and household expenditure (Haughton and Khandker, 2009).

Results and Discussion

AIV value chain mapping

The results from the AIV value chain analysis showed that in about two thirds of the households, women are responsible for the production and selling of AIVs (production – 73%, selling – 83%). Regarding the production of other crops, which included cash crops, the numbers of households with women being responsible goes down significantly and is more evenly distributed since only in 52% women are responsible for the production and 68% for selling. Our findings of partial participation correspond with the literature that suggests that women are not involved in the production of cash crops to a great extent (Kes & Swaminathan, 2006; wa Gĩthĩnji et al., 2014).

The decision on money derived from AIVs is made by women in 71% of the households, whereas the production decision is mainly done by men (38% female decision, 50% male decision, 10% co-decision), presenting a significant difference regarding bargaining power in different areas of the household decision-making. These results show that the allocation of tasks in the AIV value chain, and bargaining patterns within the household have not yet changed substantially from women to men as it is expected to happen with increasing commercialization (wa Gĩthĩnji et al., 2014).

Determinants of female bargaining power

The regression on the determinants of female intra-household bargaining showed that increasing land size and asset scores have a negative impact on female decision-making. Households with more land tend to commercialize their agricultural production (Francis, 1998; Martey et al., 2012; wa Gĩthĩnji et al., 2014) which is also correlated with the asset score of a household (Murathi, 2018). Since commercialization is also associated with higher male involvement, this might explain the negative correlation between the land size and female decision-making. This further indicates that females are still disadvantaged within commercial crop production in Kenya (Kilic et al., 2015; Martey et al., 2012). Additionally, tertiary education and owning land, as it is an important asset in developing countries, is as expected highly associated with bargaining power (Allendorf, 2007; Doss, 2013; Quisumbing & Maluccio, 2003). However, only 9.7 % of all females in Kenya were enrolled in tertiary education in 2017 (World Bank, 2020) and land rights in Sub-Saharan Africa remain rather unfavorable for women (Doss et al., 2015). Working outside of the farm decreased a woman's probability of participating in the decision-making process for production and money handling, possibly due to less time the female household head spends on the farm and the increased time pressure on her and thus, might lower her bargaining position (Colverson & Farnworth, 2015; Dodoo & Tempenis, 2002; Kes & Swaminathan, 2006). Nevertheless, a high share of female income of the total household income does improve a woman's bargaining position, as financial resources from employment were expected to increase a woman's bargaining power (Agarwal, 1997; Doss, 2013). Women living in the counties of Kakamega, Kisii and Kiambu have a lower chance of being part of the decision-making process.

Impact of female bargaining power on household welfare

While there were no statistically significant effects on the household expenditure, food security was affected in varying ways. The HDDS and MAHFP decreased, indicating that female bargaining power has a negative impact on the household's ability to access a variety of food (Kennedy et al., 2011) and that the household had about one more month without adequate food supply (Swindale & Bilinsky, 2010), opposed to the findings from the literature (Duflo & Udry, 2004; Haughton & Khandker, 2009). A female decision over the money from sold AIV increased the FCS of the respective household, showing a positive effect on the household diet diversity. Furthermore, the negative ATT regarding the CSI indicates a reduction in food insecurity as this means a lower frequency and severity of occasions in which the household needs to cope with an inadequate access to food (Maxwell & Caldwell, 2008).

Conclusions and Outlook

There is a continuing importance of women within the AIV value chain in Kenya. Households that are not yet commercially producing these crops still show the traditional gender differentiation of production. Furthermore, with higher education, land ownership and high female income we found important intervention points for increasing female intra-household bargaining power by improving land rights and education for women. We further showed that the traditional variables indicating rather commercial crop production, e.g. large farm and high asset scores, correlated with lower female bargaining power.

Lastly, significant, but inconsistent, impacts of female bargaining power on the welfare of a household were found. The HDDS and MAHFP are decreased, opposed to the expectations. Only the FCS and thus the access dimension of food security increase with higher female bargaining power. In contrast to earlier findings, the expenditure of the households is not altered by high female bargaining power in our case.

It must be noted that the decisions over crop production and the income from the AIVs are carefully taken as representative for the decision-making process within the household, as they may not reflect the intra-household dynamics completely and precisely (Alkire et al., 2012; IFPRI, 2012). Thus, further research in this field is necessary to understand the effect of intra-household bargaining power on household welfare in Kenya.

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