

# Assessing the Gender Dimensions in the True Costs of Food Production in Kenya



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## Key takeaways

- Gender-based environmental and social external costs create substantial economic inefficiencies in the agricultural sector.
- The gender wage gap contributes 12.8% to total external costs.
- Women's limited access to resources leads to reduced productivity, with female farmers investing 36% less in inputs than their male counterparts.
- Workplace harassment, which disproportionately affects women, accounts for 10.8% of total external costs.
- Unequal land management practices (women managing smaller plots) and having restricted access to improved agricultural inputs create additional inefficiencies in resource allocation and production outcomes.

## Introduction

True cost accounting (TCA) incorporates social, environmental and health-related externalities that traditional accounting overlooks. Grounded in the Economics of Ecosystems and Biodiversity (TEEB) Agri-food evaluation framework (TEEB, 2018), TCA aims to reveal the real costs of food systems by assessing four types of capital: natural, human, social and produced (Benfica, 2024). *Natural capital* encompasses resources like air, water and biodiversity, with costs stemming from greenhouse gas emissions, soil erosion and water pollution. *Human capital* captures the value of individuals' health, skills and labor, including costs related to wage gaps, injuries and illnesses. *Social capital* highlights societal norms and institutions, and is linked to costs associated with child labor, forced labor and gender wage disparities. *Produced capital* covers direct production costs traditionally reflected in market prices. This holistic capital-based systems approach evaluates the interconnections within eco-agrifood systems to account for all externalities—and both positive and negative impacts—and their associated value and/or costs on nature, people and society that are not reflected in the market price of the goods or services.

Integrating a gender lens into the TCA framework is crucial for exposing and addressing disparities within food systems. By explicitly considering gender dynamics, TCA can reveal how factors like pay gaps, unpaid work and health impacts disproportionately affect women. This extends to social capital, highlighting how gender norms and power relations influence access to resources, decision-making and benefit distribution within agricultural communities. This is particularly important given that women comprise a large portion of the agricultural workforce (KNBS, 2022). In Kenya, for instance, women constitute 58.1% of the agricultural labor force, yet face substantial inequalities in land management, resource access and decision-making power (Issaka, 2023). Women's empowerment in agriculture has been shown to significantly increase maize productivity in western Kenya, with

positive effects observed on both jointly managed and individually managed plots (Diirro et al., 2018). However, despite women’s empowerment in agriculture being positively correlated with increased crop productivity as demonstrated by Diirro and colleagues, women farmers generally have lower output per unit of land and are less involved in commercial farming compared to men (Croppenstedt et al., 2013). These differences stem from gender disparities in access to inputs and services (e.g., fertilizer, extension and credit), including property rights, control over resources (e.g., land) and education. Furthermore, gender inequalities in labor management practices increase social costs, with child labor, forced labor and wage gaps contributing to Kenya’s social externalities. Also, women’s reliance on informal networks for agricultural knowledge and their exposure to workplace harassment further underscore the social toll of gender inequities that are ingrained in agriculture.

This policy brief focuses on the social and environmental externalities associated with gender disparities in Kenya’s agricultural sector. The brief explores how a gendered TCA framework can improve sustainability and economic outcomes in Kenya’s agricultural sector by addressing differences in land management, productivity, input access and labor conditions between men and women farmers.

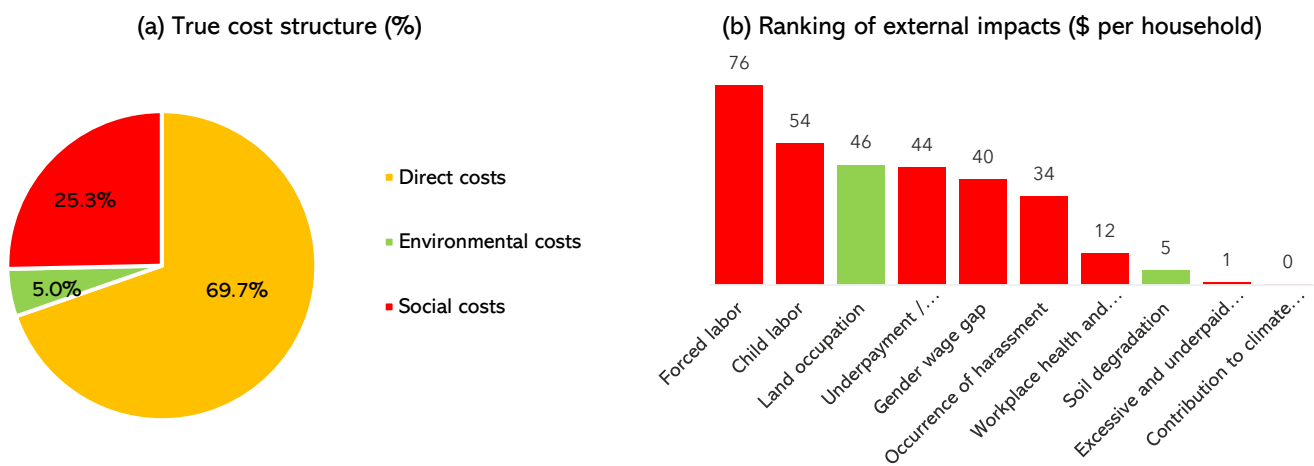
### Overview of Country and Site TCA Analysis

An analysis using the Global Impact Database (GID) finds that for the entire agrifood system in Kenya, social and environmental externalities account for 35% of the value of agri-food system output, with social costs (73%) outweighing environmental costs (27%). This disparity becomes even more stark in the crops only sector, where the share of all externalities in output falls to 27% and the relative importance of the social externalities is even greater, amounting to about 90% of all externalities (Benfica et al., 2024). Notably, issues such as underpayment and child labor emerge as critical social externalities, underscoring the economic struggles faced by agricultural workers.

The GID analysis also reveals that the true cost of food production in Kenya's agrifood system extends far beyond the farm gate and encompasses a web of upstream and downstream considerations. While direct costs like workplace health and safety violations, underpayment and child labor are often associated with on-site production, indirect costs ripple through the entire system. Issues such as the gender wage gap, water pollution and land occupation, while not directly tied to farm labor, emerge as the critical burdens during processing and distribution stages, highlighting the interconnected nature of these challenges.

At NATURE+ sites, local level true cost accounting analysis of food production in Kenya draws from survey data collected across three counties–Kisumu, Kajiado, and Vihiga–encompassing 1,502 households and 1,056 workers (Benfica et al., 2024).

**Figure 1. Structure of production costs (direct and external), and ranking of external impacts**



Source: Authors' own calculation using NATURE+ Kenya and Vietnam household and workers surveys, and monetization factors (Impact Institute, 2021). Notes: All the indicators are measured at the household level.

Figure 1(a) illustrates the cost structure of food production, with direct costs accounting for 69.7%, social costs for 25.3% and environmental costs for 5.0%. This distribution demonstrates that while direct operational costs dominate

food production expenses, external costs represent nearly one-third (30.3%) of the total cost structure, indicating substantial hidden costs within current food production practices.

Figure 1(b) presents the ranking of external costs (social in red and environmental in green), revealing forced labor as the most important factor amounting to \$76 per household (24.3% of external costs), signaling severe ethical and labor rights concerns within the agricultural sector. Child labor follows as the second-largest external cost, representing 17.2% of external costs or \$54 per household, indicating widespread reliance on underage workers in agricultural activities. Land occupation costs rank third at \$46 per household (14.6%), reflecting the environmental impacts of agricultural land use. Wage-related issues form another substantial cluster of external costs, with underpayment or insufficient income accounting for \$44 per household (14.3%) and the gender wage gap contributing \$40 per household (12.8%). These figures highlight persistent economic disparities within the agricultural labor market. The results also reveal workplace condition concerns, with harassment accounting for \$34 per household (10.8%) and health and safety incidents contributing \$12 per household (3.9%). Environmental impacts beyond land occupation, including soil degradation at \$5 per household and other factors such as water scarcity and climate change, comprise a relatively small portion of external costs.

The monetary quantification of external costs reveals a food production system primarily challenged by labor and social issues rather than environmental concerns. This suggests an immediate need for policy interventions targeting labor practices, wage equity, and workplace safety. While environmental costs appear smaller in monetary terms, their potential long-term impacts on agricultural sustainability warrant careful attention and proactive management strategies.

## Gendered Analysis

This section delves into the intricate relationship between gender dynamics and the true cost accounting of food production in Kenya, drawing on descriptive statistics from the survey conducted across rural households and workers. By examining key issues such as land management, agricultural productivity, input use, labor management and income disparities, this policy brief seeks to shed light on some of the underlying disadvantages that women face in the agricultural sector. In general, the findings reveal disparities in land management, access to resources and income between male and female-managed parcels. These disparities not only affect agricultural productivity but could also have broader implications for household nutrition, financial security and economic agency. This overview highlights critical areas where targeted interventions can promote greater equity and sustainability within the food system in Kenya.

**Land Management:** Survey results at the parcel level show that men generally manage larger parcels, averaging 0.57 hectares, compared to 0.42 hectares on female-managed plots. Jointly managed parcels average 0.49 hectares. Gender bias in access and land rights, particularly under customary systems and inheritance laws, has been found to be a barrier to women's land management in both Kenya and Tanzania (Issaka, 2023), hence limiting their ability to invest in high-value crops or expand production scale.

**Agricultural Productivity:** Male-managed plots yield higher outputs for staple food crops, such as maize and beans, which may be connected to better access to inputs and larger parcel sizes. Other studies in Kenya have also found that male-managed farms were more technically efficient than female-managed farms (Njuki et al., 2006). This finding is also consistent with Reynolds and colleagues (2020), who found that women generally face greater constraints in accessing resources for market-oriented agriculture,

**Input Use and Technology Adoption:** Male farmers in our sample generally have greater access to improved seeds, fertilizers and pesticides. For instance, 82% of male-managed parcels use improved seeds, compared to 78% of female-managed parcels, with a similar gap in pesticide application (39% vs. 24%), and the use of inorganic fertilizer (54% vs. 45%). While there are no significant differences in the use of herbicides (4.0% vs. 3.0%), this result is corroborated by the research of Peterman and colleagues (2014), who reported that in Kenya, men generally have higher input measures than women across various categories, including improved seeds, fertilizers, pesticides and extension services. These differences in input use limit female farmers' productivity and profitability, as female farmers invest 36% less on crop inputs than their male counterparts.

**Labor Management and Wage Structures:** A comparison of wage payments made by male and female-managed parcels reveals a disparity in the wages paid to hired workers. Female-managed parcels often pay lower wages to hired workers, averaging 684 Local Currency Units (LCU), compared to 786 LCU on male-managed farms. Women's

reduced spending on hired labor, likely due to limited capital, potentially results in wage-related external costs such as lower labor productivity leading to lower agricultural returns as well. This finding resonates with the research by Palacios-López and López (2015) that 34% of the productivity gap between male- and female-managed farms is linked to unequal access to labor markets, while 29% is due to credit constraints.

**Income Inequality and Asset Ownership:** Survey results also show that male workers in our sample earn about 10% more than their female counterparts, contributing to 12.8% of the external production costs (Benfica et al., 2024). This wage gap potentially impacts household financial security, limiting women's ability to invest in health, education and farm improvements. Furthermore, the results also show that women own about 29% of agricultural assets, compared to men's 53%. This had the potential to reduce their economic agency within agricultural systems.

### **Policy recommendations**

The true cost accounting analysis highlights gender-based externalities in Kenya's agricultural sector, with impacts manifesting through wage disparities, workplace conditions and resource access inequalities. These gender-driven externalities contribute substantially to both social and economic inefficiencies in the agricultural system. The following recommendations target the reduction of gender-based external costs while promoting a more equitable agricultural sector.

**Address Gender-Based Labor Related Externalities.** As the gender wage gap contributes to external costs, it will be important to establish mandatory gender-equitable wage policies in agricultural enterprises, supported by transparent reporting mechanisms and compliance incentives for employers demonstrating wage parity. Furthermore, to address workplace harassment that affects women disproportionately, measures are needed to implement a gender-responsive workplace safety program that includes mandatory training, the establishment of confidential reporting systems and rural support services designed specifically for women agricultural workers.

**Enhance Women's Economic Agency.** Since female farmers invest less in crop inputs than their male counterparts, create targeted financial inclusion programs combining credit access and input subsidies specifically designed for women farmers, with simplified collateral requirements that recognize women's unique asset ownership patterns. In addition, as women manage smaller land parcels and have weaker tenure security, review and establish land reform policies that enhance women's land rights and management capabilities through legal reforms and capacity-building programs.

**Strengthen Gender-Responsive Agricultural Support Systems.** Given women's limited access to agricultural resources and technology, develop women-focused agricultural extension services that combine technical training with input support, emphasizing crops where women demonstrate higher productivity potential. Furthermore, considering the interconnected nature of gender-based externalities, establish integrated support mechanisms that address both productive and reproductive roles of women in agriculture, including labor-saving technologies and childcare support to reduce the burden of unpaid care work.

To ensure clarity and accountability, it will be important to create a gender-responsive monitoring system that tracks reductions in external costs through regular collection and analysis of gender-disaggregated data, with particular attention to wage gaps, resource access and productivity measures.

The materialization of these measures will require coordinated efforts among government agencies, agricultural organizations, and gender advocacy groups. Success will be measured through systematic reductions in gender-based external costs and improved economic outcomes for women in Kenya's agricultural sector.

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