CGIAR SUSTAINABLE FARMING

Home Garden Intensification: A Sustainable, Economically Viable, and Nutrition Sensitive Model for Smallholders

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Contents

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Abstract

This report presents the main findings of the end-line assessment and the current status of an integrated home garden intensification intervention implemented across 120 households (HHs) in Lemo, Doyogena, and Abamote districts over the 2 years. The intervention integrates avocado, vegetables, and poultry within a nutrient recycling framework, supported by continuous capacity building on production, post-harvest handling, nutrition, and marketing. Evidence from end-line surveys indicates positive trends in crop diversification, egg consumption, dietary diversity, and compost use, with emerging income benefits. Building on these results, the report outlines the Home Garden Intensification Model (HGIM) framework, which combines empirical nutrient mass balance, production response functions, household-level optimization, and typology-based scaling pathways to guide expansion to additional households and districts.

1. Introduction

Home gardens are increasingly recognized as effective entry points for improving household nutrition, income diversification, and resilience in smallholder systems. In Ethiopia, many home-garden initiatives remain fragmented, often focusing on single commodities without integrating nutrient flows, labor constraints, or long-term sustainability considerations. The intervention assessed here adopts an integrated systems approach, combining perennial fruit trees (avocado), seasonal vegetables, and smallholder poultry linked through composting and nutrient recycling. Piloted in Lemo, Doyogena, and Abamote districts, the intervention reached 120 beneficiary households and was accompanied by structured training on agronomy, livestock management, post-harvest handling, nutrition, and marketing. This report synthesizes end-line findings, assesses scaling readiness, and presents a pathway toward a scalable HGIM.

2. Study Area Description

Basona Werena Woreda is found in the North Shewa Zone of the Amhara region in Ethiopia and geographically located between the latitude of 90 38’ - 9o 41’00’’ N and longitude of 39 0 30’ 00’’-390 32’00’’E (Figure 1). It covers a total area of 1215.29- square kilometres. The topography of Basona Woreda is largely mountainous with escarpments covered predominantly with reddish-brown soil. Based on figures reported by the Central Statistical Agency (CSA, 2007), the woreda has a total population of 120, 930 (CSA, 2007). The livelihood of the majority of the population is dependent on agriculture and agricultural-related activities. They dominantly practice a crop livestock mixed farming system where farmers cultivate a variety of cereals such as Barley (Hordeum vulgare), Wheat (Triticum aestivum), and Teff (Eragrostis tef ZUCC.) and pulse crops such as Faba Bean (Vicia faba L.) and Field Pea (Pisum sativum L.) in the woreda.

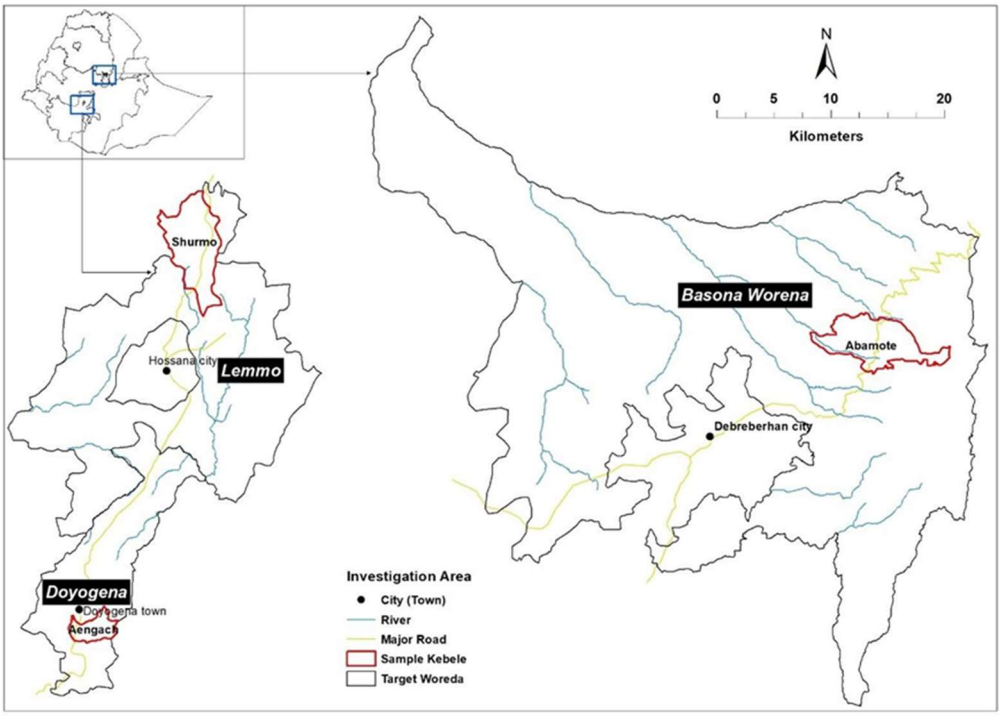

Figure 1. Location map of the SIMFS study sites in Ethiopia(a) Basona Worena Woreda (of North Shewa Zone of Amhara region), (b) Doyogena Woreda (Kembata Timbaro Zone of SNNP), and (c) Lemmo Woreda (Hadiya Zone of SNNP). Three sample kebeles (or intervention sites) from each woreda i.e., Abamote (from Basona Worena Woreda), Shurmo (from Lemmo Woreda), and Aengach (from Doyogena Woreda), are selected for detail study.

The woreda incorporates Kola, woyne Dega and Dega agro-ecological zones. Doyogena is one of the woredas in the Kembta Tembaro Zone of SNNP in Ethiopia, and it lies between latitude 7º18’25’’N-7º21’49’’N and longitude 37º45’33’’E- 37º48’51’’E (Figure 1), and it covers a total area of 130.62-kilometre square. The woreda has an estimated total population of 78,634 (CSA, 2007). Crop-livestock mixed farming is a common practice, and Teff (Eragrostis tef ZUCC.), Wheat (Triticum aestivum), Haricot Bean (Phaseolus vulgaris), Maize (Zea mays L.), and Potato (Solanum tuberosum) are the major crops produced in the woreda. Other pulse crops like Field Pea (Pisum sativum L.) and Faba Bean (Vicia faba L.) are also produced in small amounts. Traditionally, the woreda can be classified into the Dega and Woyina Dega Agro-ecological zones. Lemmo Woreda is situated in the Hadya zone, in the SNNP Region (Figure 1). The Woreda is geographically located between 7°14'N to 7°45'N latitude and 37°05'E to 37°52'E longitude, and it has a total area of 354.51 square kilometres. According to the CSA report (CSA, 2007), Lemmo Woreda has a total population of 118,594 where the majority of them are engaged in mixed agricultural activities, where they practice complete integration of trees, crop production, and animal husbandry. The major crops grown in the area are cereals (e.g., Barley (Hordeum vulgare), Maize (Zea mays L.), Teff (Eragrostis tef ZUCC), Sorghum (Sorghum bicolor), Wheat (Triticum aestivum), vegetables, fruits, cash crops and roots. Woyna dega is the predominant agro-climatic zone in the woreda, which makes the woreda more suitable for most agricultural production. The topography of Lemo and Doyogena woreda is characterized by undulating, rugged, and hilly topography.

3. Study design and objectives

The primary objective of the study is to evaluate whether integrating perennial fruit trees, seasonal vegetables, and smallholder poultry improves household nutrition, income, resilience, and environmental sustainability. The evaluation focuses on multi-dimensional performance rather than single-outcome assessment. The study adopts a quasi-experimental design, leveraging baseline, midline, and endline data to assess changes over time. Where

feasible, treatment households are compared with non-beneficiary households within the same districts to approximate counterfactual outcomes. The evaluation emphasizes descriptive and comparative analysis, while laying the groundwork for more rigorous impact evaluation at scale.

4. Data methods & intervention packages

This assessment draws on multiple data sources. Baseline data were collected in 2022 to characterize household socio-economic conditions, garden practices, and dietary patterns before intervention. Midline data and qualitative assessments provided interim insights into adoption and implementation challenges. Endline data were collected in 2025 using ODK-based household surveys across Lemo, Doyogena, and Abamote districts. The endline survey captured detailed information on vegetable production, poultry management, compost use, food consumption, and exposure to training and extension services. Data analysis focused on descriptive statistics, cross-district comparisons, and triangulation with baseline and midline findings.

The intervention package consists of four interlinked components. First, avocado establishment focused on introducing locally adapted Hass varieties, planted at the garden perimeter to minimize competition while providing long-term fruit and shade benefits. Tree survival and growth indicators serve as early performance metrics. Second, vegetable production emphasized nutrient-dense crops, particularly Ethiopian kale and hot pepper. Improved agronomic practices, including compost application derived from poultry litter, were promoted. Third, the poultry component introduced improved local breeds, with training on housing, feeding, and health. Finally, capacity building supported all components through training on home garden management, post-harvest handling, and nutritious food preparation.

5. Key findings from the end-line survey

Endline survey coverage included all targeted beneficiary households across the three districts. While overall participation was high, district-level differences were observed in terms of adoption intensity and management practices. Lemo and Doyogena districts demonstrated stronger engagement with poultry and vegetable components, while Abamote households highlighted the importance of continued extension support. Across districts, households reported increased diversification of home garden production systems. Vegetable availability and egg consumption emerged as key contributors to improved household diets. Although avocado trees remain in the establishment phase, survival and growth indicators suggest promising future contributions to nutrition and income. Economic outcomes indicate emerging income streams from vegetable and poultry sales, though net returns remain modest at this stage. Environmental outcomes include increased compost use and improved nutrient recycling, supporting soil health and sustainability. Comparative analysis reveals that agroecological and socio-economic contexts shape intervention performance. Doyogena households exhibited higher vegetable productivity, likely reflecting favorable climate and market access. Lemo households showed stronger poultry engagement, while Abamote households faced greater constraints related to labor and input availability.

6. Scaling Readiness and HGIM Implications

The intervention demonstrates strong technical feasibility and social acceptability at the pilot scale. However, scaling will require systematic approaches to address labor constraints, input supply, suitability of locations, and market integration. We are developing the Home Garden Intensification Model (HGIM) based on the framework provided in Figure 2 to optimize resource allocation, manage trade-offs, identify suitable areas, and support typology-based scaling pathways.

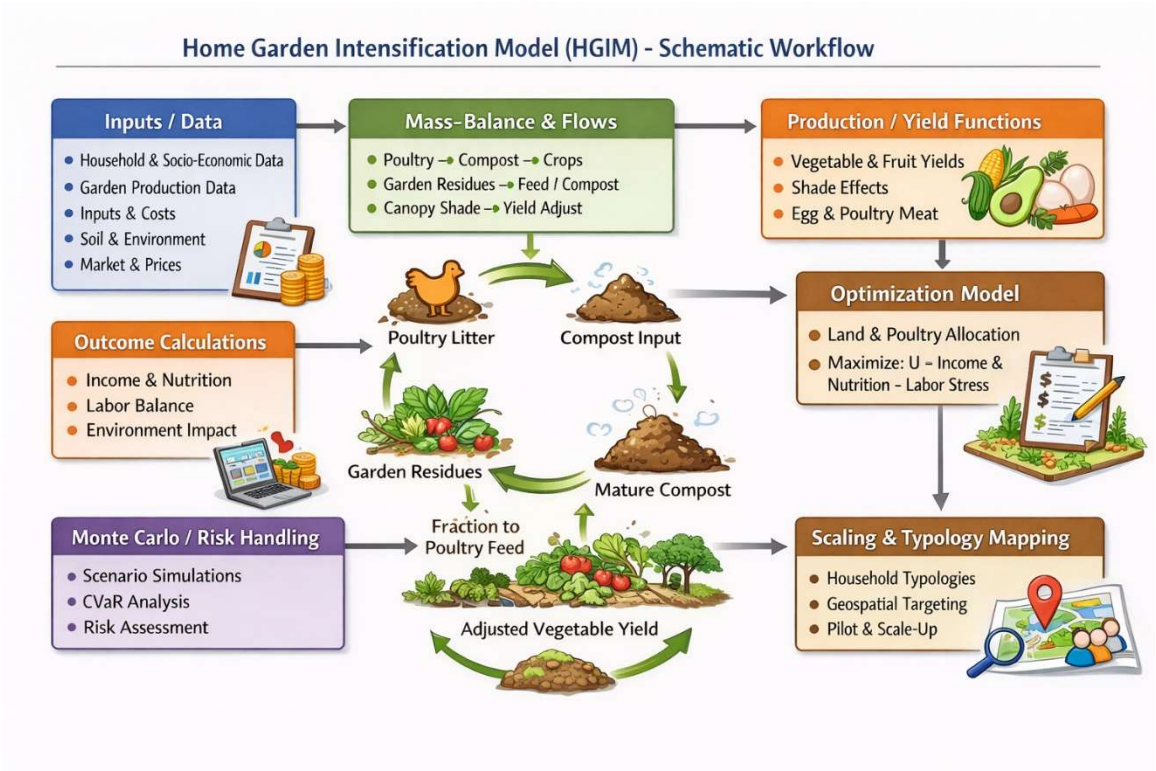

Figure 2. Schematic diagram for HGIM development and scaling pathways. The figure presents the Home Garden Intensification Model (HGIM) workflow, linking household data inputs to nutrient mass-balance, production functions, and optimization. It illustrates integrated flows among poultry, compost, and crops, outcome and risk analysis, and typology-based scaling pathways to support nutrition, income, and sustainable home-garden expansion.

7. Conclusion and way forward

In conclusion, the integrated home garden intensification intervention shows clear potential to improve nutrition, income diversification, and sustainability outcomes among smallholder households. The forthcoming endline evaluation and HGIM development will enable more rigorous performance assessment and guide strategic scaling to additional households and districts. Continued collaboration with local partners will be essential to ensure long-term impact.

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The CGIAR Sustainable Science Program forms a part of CGIAR's new Research Portfolio, addressing key challenges in agri-food systems by fostering efficient production of nutritious foods and safeguarding the environment to create fair employment opportunities, as we simultaneously tackle climate change, soil degradation, pests, diseases, and desertification. Its research is being implemented by CGIAR researchers from 13 CGIAR Research Centers (Alliance of Bioversity and CIAT), in close partnership with partners (Lemo, Doyogena, & Abamote agricultural office).

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About CGIAR Sustainable Science Program Report

This research was conducted as part of the CGIAR Sustainable Farming Science Program. This research is being implemented by CGIAR researchers from the Alliance of Bioversity and CIAT in close partnership with Lemo, Doyogena, & Abamote agricultural office. CGIAR is a global research partnership for a food-secure future. Its science is carried out by 15 Research Centers in close collaboration with hundreds of global partners. www.cgiar.org

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Key Words:

Homegarden, nutrition, poultry, avocado, income, livelihood

Partners

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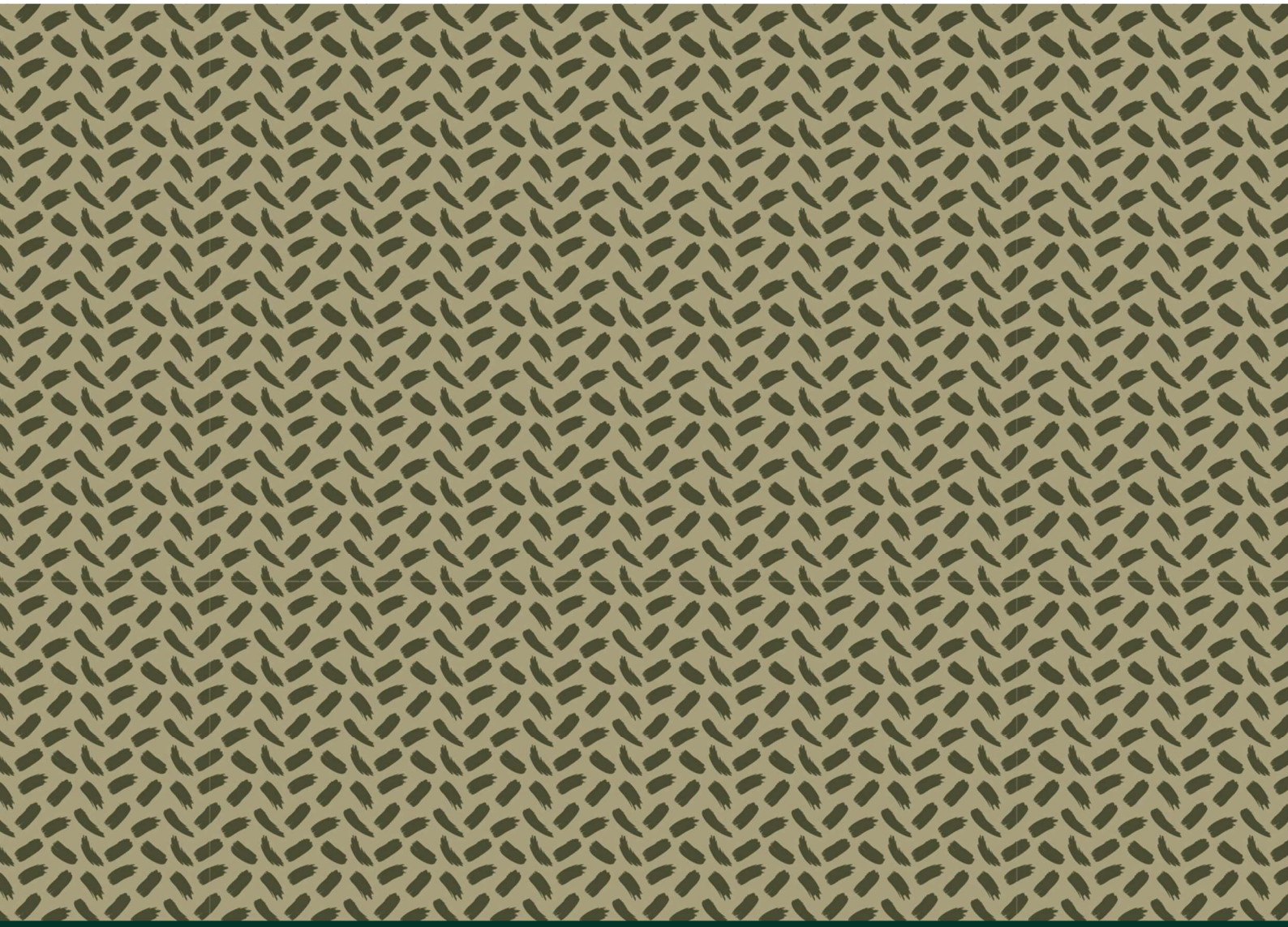
The CGIAR Sustainable Farming Science Program will address key challenges in agrifood systems by fostering efficient production of nutritious foods and safeguarding the environment to create fair employment opportunities, as we simultaneously tackle climate change, soil degradation, pests, diseases, and desertification.



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