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Nurturing Innovation: Lessons from Faba bean Seed Business Model in Welmera District

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1. Introduction

Faba bean (*Vicia faba* L) is a widely cultivated crop in the Ethiopian highlands. It plays an important role in food security, nutrition, soil fertility improvement, and farmer income. However, its production

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and productivity is constrained among others by the limited availability and supply of improved faba bean seed by the formal seed system.

To address this challenge and improve access to seed of improved faba bean varieties, demonstration of faba bean "Seed Business Model" were executed at Welmera Woreda with the support of RAISE-FS project. The Seed Business Model promotes the production and distribution of improved seed by organizing farmers into seed-producing groups that operate as small seed businesses. This approach helps to engage farmers in seed production business as an income-generating activity and ensuring the sustainable supply of quality faba bean seed.

It is a noble method of producing and availing quality seed sustainably in the Woreda and beyond by strengthening local seed systems.

2. Demonstration of Seed Business Model

Demonstration of "Seed Business Model" was conducted at four Kebeles of Welmera Woreda (Burkusami Gabarobi, Bakaka-Koreodo, Telecho and Welmera Choke) of Oromia Regional State to scale out faba bean seed business model. This model helps to improve access to improved faba bean seed, increase production, productivity, and income, and to contribute to availability of nutrient dense food in the Woreda. To this effect, host farmers were grouped and trained on crop husbandry and seed business literacy. The demonstration was

carried at four Kebeles in 2025 as a continuation of similar activity in 2023 and 2024. The farmers produced seeds of the proved variety Numan on one hectare of land.

A field visit was also organized to assess the performance of the Seed Business Model activities in Welmera woreda. The event was held at Bakaka- Koreodo Kebele in the presence of a total of 79 participants 46 farmers (15 host farmers and 31 non-host farmers), 3 Development Agents (DAs), 11 woreda agricultural experts, 18 researchers, and 1 media representative (68 male and 14 female). The event provided an opportunity for the stakeholders to observe the performance of the Seed Business Model and to exchange knowledge and experiences related to sustainable seed production.

3. Key Outcomes and Achievements

- Ability of farmers to sustainably produce quality seed of faba bean.
- Feasibility of seed business model at farmers' level.

- The relevance of full package (improved variety, soil acidity amelioration, usage of organic and inorganic fertilizers, row planting, and integrated pest management) usage.
- Understanding on the role of this model for sustainable quality seed production and income.
- Willingness of farmers to adopt the model for sustainable seed availability.
- Increased participation of women and youth in seed production, and market opportunities.
- Relevance of collaboration among stakeholders (farmers, researchers, agricultural experts, and Development Agents).
- Experience sharing on their success stories, and
- Identification of gaps and future improvement areas.



Figure 1: Field performance of the faba bean Seed Business Model at Bakaka-Koreodo Kebele



Figure 2: Welcome address and opening remarks by the Kebele Admin (Mrs. Tewabech Fekadu) and Vice Admin (Mr. Dasalegn Hirpa) of the Woreda, respectively.



Figure 4: Briefing by Kebele DA (Mr. Kibi Terefe) and the host famer (Mr. Tilahun Abera) about the Model activities



Figure 3: Opening address by Dr. Wudneh Getahun and briefing about RAISE-FS Project and objectives of the Faba bean Seed Business Model by Dr. Mussa Jarso, respectively



Figure 5: Reflections, general discussion, and the way forward suggesting during the field visit,

4. Conclusion

Farmers appreciated the practicality of the seed business model to solve the chronic shortage of improved faba bean seed.

Moreover, if organized, trained, and linked with supportive institutions, they can run profitable seed enterprise that not only improve their livelihoods but also ensure a sustainable, inclusive and resilient seed system for wider agricultural transformation.

Green Ear Maize Production: A Path for Improved Income, Land Productivity, and Livestock Feed

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1. Introduction

Maize is a crucial food security crop, consumed both as grain and green ear. Green ear maize provides both household food and high value market product (Rinaldi et al., 2023a). These scholars also noted that maize green ear stover provides nutritious livestock feed due to its higher digestibility and crude protein content compared to dry stover. Previous studies have shown that green ear maize can generate significantly higher returns than grain maize (Silva et al., 2020). Averbeke et al. (2013) also reported that farmers can earn up to 2.5 times more from green cobs than from grain of equivalent size.

Despite these benefits, its production in Ethiopia remains underexploited due to low farmer awareness, absence of improved varieties specifically developed for green cob production and lack of empirical evidence demonstrating its economic benefits under smallholder conditions. Participatory approaches that engage farmers in evaluation and demonstration are effective in generating practical evidence and encouraging adoption. Therefore, this study aimed to demonstrate the productivity

and economic feasibility of green ear maize production under highland condition of Ethiopia.

2. Methodologies

The study was conducted in selected kebeles of Welmera and Ejere district during the 2023/24 season. Two improved maize hybrids, Ambo (AM.H854) and Jibat (AMH851) planted on farm size of 2 hectares. A participatory rural appraisal approach was used, involving fifteen farmers selected based on their interest and production capacity. Standard agronomic practices were applied, including fertilizer application of 121 kg/ha NPS and 150 kg/ha urea, along with recommended pest and weed management practices. Data on input costs, labor use, and output costs were collected and analyzed using partial budget analysis, and profitability was assessed using partial budget analysis and the revenue-to-cost (R/C) ratio, following the formula described by Krisdiana et al. (2021).

4. Result and Discussion

The cost-benefit analysis revealed that green ear maize production is economically profitable under the study conditions (Table 1). The total production cost

for two hectares was 207,692 ETB (1522.67 USD), while the total revenue reached 1,280,000 ETB (9,384.16 USD), resulting in a net farm income of 1,072,308 ETB (7861.50 USD) and a revenue-cost ratio (R/C) of 6.16. Labor cost accounted for the largest share of production cost representing 55.95%, with the field guarding alone contributing 34.67%, indicating the significant labor requirement needed to protect the crop from birds and pests. A similar dominance of labor cost in maize production systems was also reported by Rinaldi et al. (2023b), and Siagian et al. (2021).

The high revenue-to-cost ratio (R/C) of 6.16 indicates that green ear maize production is highly profitable under the study condition. In practical terms, every 1,000 ETB (7.33 USD) invested generated 6,160 ETB (45.16 USD) in revenue and about 5,160 ETB (37.83 USD) in profit. Comparable profitability trends were reported by Dyah and Kahfi (2021) and Rinaldi et al. (2023b), who documented revenue-cost ratios of 1.53 and 1.74, respectively. This high profitability can be attributed to the use of improved maize varieties, proper management, and timely harvesting at the dough stage, which enhances market value.

In addition to profitability, green ear maize production offers an important opportunity for farm income diversification, as its short production cycle and strong market demand enable farmers to generate additional income alongside grain production, making it particularly attractive for rural youth and women. However, farmers at study area sold their produce at the farm gate for only 8 ETB (0.06 USD) per ear, significantly lower than the prevailing market price of 15 - 20 ETB (0.11 – 0.15 USD), indicating weak market linkages and limited bargaining power. Furthermore, the use of fresh stover as livestock feed provided additional economic benefits and strengthened crop-livestock integration during the dry season where feed shortage is common. Such early harvesting of maize at green cob stage allows replanting the same field under the main rainy season indicating this system to improve land productivity.

Table 1: Income and Feasibility of Green Ear Maize Farming in Welmera and Ejere District

Description		Quantity	Unit	Unit price	Total ETB	Cost Proportion %
Production facilities cost(1):						
Maize seeds		50	kg	100	5000	2.41
Inorganic Fertilizer	Urea	300	kg	37	11100	5.34
	NPS	242	kg	36	8712	4.19
Land rent		2	ha	30,000	60000	28.89
Herbicides (Primagram Gold660)		3	L	1000	3000	1.44
Insecticides		1	L	3680	3680	1.77
Total (1)					91492	44.05
Labor cost (2):						
Tillage *		14	oxen	700	9,800.00	4.72
Planting		40	man-days	200	8000	3.85
Hoeing and fertilization		66	man-days	200	13200	6.36
Pest and disease control		6	man-days	200	1200	0.58
Guard		12	man-days	200	72000	34.67
Harvest		60	man-days	200	12000	5.78
Total (2)					116,200.00	55.95
Total production cost (1+2=3):					207, 692	
Revenue (4):						
Green cob from 2 ha of land		160000	numbers	8 ETB /ear	1280000	
Income:						
Farm income (4-3=5)					1,072,308	
Revenue//cost (4/3)					6.16	

4. Field visit feedback

Field visits with researchers, government offices, and farmers revealed strong enthusiasm for the success of green ear maize production under highland conditions (Figure 1). Participants noted that maize performed unexpectedly well, emphasizing the potential for large-scale expansion. They also highlighted that the green ear farming enterprise has the capacity to create job opportunities for youth and women, enhance household income, and strengthen local food security. The participants suggested farmer training, timely access to improved seeds, and staggered planting to ensure a continuous market supply, and sustaining the gains.



Figure 1: On-farm performance of improved maize varieties at Welmera district

5. Conclusion

In conclusion, the study demonstrates that green ear maize production using improved hybrids is economically viable and socially beneficial under the Ethiopian highland conditions, as evidenced by high revenue-to-cost ratio of 6.16. The enterprise has strong potential to increase farm income, diversify livelihoods, and create employment opportunities for rural communities, particularly youth and women, while contributing to local food security. Scaling up

this agribusiness requires strengthening farmer training, improving access to quality seed, and enhancing market linkage.

Future research should focus on multi-location and multi-season validation, development of varieties specifically suited for green ear production, optimization of agronomic practices, and improvement of market chain efficiency to enhance profitability and support wider adoption.

Werer Agricultural Research Center (WARC) Conducted a Field Day to Showcase Irrigated Wheat Seed Multiplication Activities!

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The Werer Agricultural Research Center (WARC) organized a field day on February 7, 2026 showcasing irrigated wheat seed multiplication on 15 hectares. The event was supported by the Climate Resilience Wheat Value Chain Development (CREW) and TAAT-Wheat Compact projects. The field day was officially opened by Mr. Fikadu Robi, Director of WARC, who welcomed participants and highlighted the center's ongoing commitment to supporting Ethiopia's agricultural sector through research and technology, addressing challenges posed by nature.

The field day is part of ongoing seed multiplication and research efforts under the CREW project for pre-basic wheat seed multiplication. The multiplication covered 15 hectares and featured three selected wheat varieties: Gambo-2, Fentale-2, and Amibara. Mr. Abebe Alebu, Head of the Office of the Director General, delivered the opening speech. He noted that Werer ARC is one of 23 research centers under EIAR, serving as a key source of improved and resilient wheat varieties suited to Ethiopia's diverse agro-ecological zones. He also acknowledged the dedication

Mr. Musa Ahmed, Cluster Coordinator for the Gebi-Resu Zone, highlighted that the irrigated wheat trials, using natural water sources, offer significant benefits to Agro pastoralists in the Afar region. He stressed that field days are essential for sharing experiences, promoting technology adoption, and providing practical training to farmers. Mr. Muhammed Beri, Head of the Amibara Woreda Administration, welcomed participants and noted that irrigated wheat multiplication is expected to expand beyond the current demonstration site, reaching more farmers across the zone.

Mr. Shemelis Alemayehu, Director of the Kulumsa Research Center and TAAT Project Coordinator, explained that the TAAT project actively supports the country's national agricultural plans and objectives. He noted that the project is implemented in collaboration with ICARDA and other dryland

initiatives, in line with agreements with EIAR.

The inauguration and handover of the high-tech stationary seed cleaning machine reaffirm Kulumsa Agricultural Research Center's

unwavering commitment to advancing agricultural research excellence, strengthening seed quality assurance, and supporting farmers and seed system actors through the delivery of reliable, high-performing, and improved technologies. Through such strategic investments and partnerships, KARC continues to contribute meaningfully to the national goal of achieving sustainable agricultural growth and food security in Ethiopia.



Figure 1. Field day on February 7, 2026 showcasing irrigated wheat seed multiplication on 15 hectares.

Smart Dairy Solutions: Innovation from Holetta Food Science for Unlocking the Potential of Whey

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1. Introduction

Researchers at the Holetta Agricultural Research Center (HARC) are transforming whey—a nutrient-rich by-product of cheese and yogurt production—into valuable food products. Traditionally discarded despite its high-quality proteins, amino acids, vitamins, and minerals, whey is now being used to develop nutritious items such as whey juice, bread, and porridge. These innovations not only enhance the nutritional value of everyday foods but also demonstrate practical uses for dairy producers.

Beyond product development, the initiative trains farmers and development agents to utilize whey effectively, helping reduce environmental pollution caused by improper disposal. By converting waste into nutritious food, the project supports efforts to combat protein-energy malnutrition and improve food security across Ethiopia.

2. Major Findings

- Whey, often discarded by Ethiopia's dairy sector, is rich in nutrients and functional properties.
- Five years of research at HARC show it can be effectively used in food products.
- Products developed include whey juice, bread, and porridge.
- These serve as practical tools for training farmers and nutrition professionals.
- Using whey improves protein intake and supports better nutrition.

3. Conclusion

Whey, often treated as waste in Ethiopia's dairy sector, has strong potential as a nutritious resource. Developing products like whey juice, bread, and porridge shows it can boost dietary protein while reducing environmental pollution. Promoting its use through training and demonstrations can help combat protein-energy malnutrition and improve resource use in the dairy industry.



Figure 1: Demonstration of whey-based products for the participants.

Ensuring Sustainable Fruit Seedling Supply Systems: A Strategic Path for Empowering Smallholder Farmers and Resilient Ecosystem

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1. Introduction

Among the ten national research programs coordinated by the Holetta Agricultural Research Center, the Temperate and Indigenous Fruit Research Program plays a key role in advancing fruit production technologies. Over the years, the program has developed and disseminated improved practices in orchard management, fruit variety adaptation, and seedling propagation. These innovations have contributed significantly to enhancing productivity and

sustainability in the fruit sector. Integrating such technologies with national reforestation and land rehabilitation initiatives further strengthens efforts toward achieving sustainable development goals. However, large-scale multiplication and distribution of quality seedlings remain essential to realize these objectives. This report presents the progress made in propagating and supplying various fruit and coffee seedlings to research institutions and government development programs over the past three quarters.

Table 1: Different fruit seedling propagation status at the Holetta Agricultural Research Center

No	Fruit type	Grafted seedlings	Rootstock seedlings	Remark
1	Peach	1100	2000	Research and Development
2	Apple	1800	>3000	Research and Development
3	plum	580	500	Research and Development
4	Avocado	400	1000	Research and Development
5	Strawberry	300		Research and Development
6	Coffee	6000		For green legacy initiatives



Dedre Berhan



Welmera

Two registered peach fruit varieties promoted at different districts of Oromia and Amhara regions.

2 Conclusion

Enhancing seedling multiplication systems for temperate fruit crops serves as a cornerstone for agricultural development and a strategic approach to improving farmers' livelihoods, food security, and environmental sustainability. Strengthened propagation and orchard management practices not only boost productivity but also contribute to national greening efforts and sustainable land use. However, providing adequate training and technical support in these areas is essential element to multiplying and disseminating substantial amount of these crops seedlings. To this effect organizing jobless youth

groups is one of strategic approach in promoting employment opportunities to seedling grower youth, increase household income, livelihood of growers of such expensive fruit crops, substitute their import at unaffordable price to consumer and ultimately create their access to consumers at a lower cost. Although the benefits of perennial fruit crops take time to materialize, continuous monitoring made by the program research staff indicates promising establishment and growth, which are expected to yield with supportive institutions, they can run substantial harvests as the crops reach maturity.

Holetta Dairy Cattle Research Contributes to Government Development Initiatives through Demonstrating Dairy Technologies and Innovations

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1 Introduction

Dairy is a high-value product with significant biological and socioeconomic contribution to millions of people in Ethiopia. Recognizing the critical role dairy plays in the livelihoods of Ethiopian population and the national economy, strategic efforts have been made to establish and strengthen research systems capable of driving sustained dairy development. These efforts are centred on harnessing science and innovation to address prevailing constraints and untapped potential of the sector. The dairy research is mandated to generate, adapt and transfer tailor-made and demand-driven dairy technologies and innovations that can enhance production and productivity and thereby ensure food security, improves livelihoods, and provide raw materials for domestic agro-processors and export market.

2. Alignment of Dairy Research with the Government Development Initiatives

The dairy sector development is given top priority in the ten-year perspective plan and 'Yelemat tirufat' initiatives of the government. It is anticipated to unlock major bottlenecks in genetics, feeding, health, input and output marketing, value addition, product quality and consumer safety. The dairy sector initiatives have set target to increase milk production from dairy cattle, camel and goat from 4.3 billion L in 2020 to 28.4 billion L in 2031. One of the approaches anticipated to reach this target of the dairy sector is through establishing model dairy villages.

Cognizant to this plan, the dairy cattle research at HARC has designed village-based research for development (R4D) in its selected mandate areas. Dairy village-based R4D has been proved to be an innovative game changing approach. It is a new holistic approach to dairy development with the

objectives of demonstrating, popularizing, and scaling up of dairy technology and associated packages in selected village (see photo below).



So far, the dairy research program has established six dairy villages (Gaba Robi, Gelgel Kuyu, Bekeka Kore Odo, Guje Gefersa, Koye Fetche and Akaki Kaliti) where 154 heifers/cows were distributed to 154 participating farmers. The first three dairy villages were established in Welmera district while the Gefersa Guje and Koye Fetche were in Sheger city and Akaki Kaliti in Addis Ababa city. The participating farmers were given training on dairy cows' management (breeding, feeding, housing, health care, hygienic milk handling and processing) and currently data collection on production and reproduction and farm gate crossbred heifer production using both conventional and sexed semen is under way.

3 Demonstration of Dairy Technologies

a) Pre-extension demonstration of dairy bull fattening technologies

Globally, the dairy sector makes significant contribution to the beef sector, as bulls are half of the herd used in conventional semen/bull mating method. In developed countries, the dairy sector contributes up to 21% to the beef sector. This could be due to the fact that culled heifers and cows could be conditioned for beef along with the large number of male animals born in the dairy farm.

In the dairy sector, heifers are more needed than male animals. It is noted that dairy producers/farmers are disappointed when male animals are born to their farms. However, crossbred male animals

born in the dairy farms could be taken as an opportunity and be fattened and sold to increase the income of the dairy producers. The dairy research of Holetta Agricultural Research Center has evaluated and confirmed the fattening performance and economic feasibility of dairy bulls under on-station. Currently, the dairy research at Holetta Research Center has distributed 113 dairy bulls which were not required for breeding to organized youth groups for pre-extension demonstration (PED) of dairy bull fattening purpose. In doing so, the dairy research program contributes to the 'Lemat tirufat' and the ten years perspective plans of the government of Ethiopia. In the ten years perspective plan of the government (2021 to 2030), red meat is one of the commodities planned to be increased from 295 thousand tons to 1.7 million tons.



Figure 2: Holetta city mayor handing over steers to organized women and youths

On farm demonstration of the dairy bull fattening technologies have created job opportunity for youths, increased their income, economically empowered them and contributed to food and nutrition security at large.

b) Demonstration of dairy technology for organized youth groups: Innovative approach to create job opportunity

With an increasing number of young people entering the job market, it is predicted that at least 600 million new jobs need to be created by 2026 all over the world to sustain this expanding labor

force. Understanding this situation, the government of Ethiopia has put job creation as one of the development pillars and currently working on it through organizing youth and women in different need-based activities. In line with this government initiative, the dairy research program at HARC has designed and implemented an innovative approach to create job opportunity for unemployed youths through demonstration and evaluation of improved heifers under organized youth dairy groups.



Figure 2: Organized youths while receiving from Holetta dairy research program

So far, 26 youth dairy research groups were established of which 21 groups are currently in production. The groups were provided with 106 heifers/cows in which job is created for 115 unemployed youths.

c) Demonstration of dairy technology under Organized Women Groups.

Four women dairy research groups; each with four members were organized and provided with 16 dairy cows as an innovative approach to create job opportunity and economically empower women through demonstration and evaluation of improved heifers under women management.



Figure 3: Member of organized women

Along with the provision of improved heifers, all the necessary dairy production packages and skill training were provided to the women dairy research groups. Currently, reproduction and production data collections are under way.

Land Reborn: Transforming Eucalyptus Fields to Food Farms in Urban Agriculture

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1. Introduction

For decades, there was a deep-rooted belief among the farming community that a land once apportioned to eucalyptus tree plantation is permanently unfit for the cultivation of food crops. Now, a groundbreaking participatory initiative in the West Shewa zone is not

only disproving that myth but also forging a new path for urban agriculture and food security. Through this initiative, farmers, researchers, and local administrators have successfully converted hundreds of hectares formerly occupied by eucalyptus plantations into productive cropland, providing additional harvests to the national

agricultural output. This story has happened in the peri-urban areas of Holetta, where eucalyptus plantations is rapidly expanding. Valued for its fast growth, high economic return, and minimal management requirement, eucalyptus has spread to an estimated 500,000 hectares of land across Ethiopia. Its mean annual increment of $10\text{--}20\text{ m}^3\text{ ha}^{-1}\text{ year}^{-1}$ makes it an attractive investment, often at the expense of traditional croplands. Farmers were turning their farm land to eucalyptus driven by declining soil fertility, increasing soil acidity, and the pressures of urban expansion that made traditional crops less viable. Eucalyptus, in contrast, performed well on these marginal and acidic soils, offering a seemingly easier economic path. However, the ecologic and socio-economic costs of this shift is hard to ignore. The deep-rooted eucalyptus trees are reported to depleting soil moisture, competing fiercely for nutrients with neighboring crops, and its litter allelopathic effects that inhibits growth of other plants. Eucalyptus provides irregular income to household food and nutrition security compared to the stable and year-round sustenance derived from grain production.

2. Reconversion initiative

By 2022, farmers in Gelgel Kuyu kebele, within the Holetta area, began seeking a way back. Despite their desire to reconvert their land, they were paralyzed by the widespread and deeply entrenched belief that the soil would no longer support crops. They were imprisoned between the known challenges of eucalyptus and the fear of wasting their so-called unproductive land.

To address this deep-rooted challenge, a coalition of researchers, development agents, local administrators, and the farmers was formed under an urban agriculture initiative to change this scenario. The stakeholders agreed on the fact that reconversion is not only possible but could be highly successful if the right technical measures like selecting suitable crop varieties, rigorous soil fertility ameliorating lime technologies to counteract acidity, and implementing effective disease and weed control practices are implemented.

3. From Pilot to Paradigm Shift

The first bold step was taken in the 2022/23 cropping season by a progressive volunteered farmer who cleared three hectares of his eucalyptus-covered land for a pilot demonstration. With close supervision from researchers and development workers, the land was prepared and planted with bread wheat using all relevant technological inputs.

The demonstration activity in a wheat yield of 40 qt/ha, substantially surpassing the zonal average of 34.25 qt/ha, the regional average of 33.64 qt/ha, and the national average of 31.11 qt/ha, as reported by Central Statistical Agency (CSA, 2021/22). This result generated strong optimism among the surrounding farming community. To disseminate the results and enhance stakeholder engagement, a field day was organized with the participation of non-participating farmers, extension personnel, policymakers, and a media crew from Oromia Broadcasting Network (OBN). The minute documentary, titled

“ ባህርዛፍን ነቅለው ዋና ዋና የምግብ ሰብሎችን ያለሙ አርሶ አደሮች የስራ ተሞክሮ Etv - Ethiopia News. Mkv ”

(Experience of Farmers Who Uprooted Eucalyptus to Cultivate Major Food Crops), was broadcasted on Ethiopian Television’s “Wede Mass” program. The deep-seated fear of “it won’t work” was being systematically dismantled. Inspired by this success, the initiative expanded dramatically during the 2023/24 cropping season.





Figure 3: District level field day organized on Bread wheat cluster at Holetta town, Gelgel Kuyu kebele

What began as a 3-hectare trial grew into a cluster-based participatory demonstration spanning 80.58 hectares of cleared eucalyptus land. The effort was truly community-driven, involving 171 host farmers 96 men and 75 women who voluntarily uprooted their eucalyptus stands. This land was dedicated to a mix of urban agriculture staples, including bread wheat (33.58 ha), food barley (8 ha), and teff (39 ha).

The success of the Gelgel Kuyu model proved so compelling that it has begun to spread. In the 2025/26 cropping season, the practice was scaled up to the Damotu Kebele in the Ejere District. At this district, a total of 30 hectares of land, some of which had been left uncultivated and put under eucalyptus for over three decades, were cleared and rehabilitated. A cluster-based large-scale demonstration conducted using the improved bread wheat variety Denda around 76 farmers land resulted in the harvesting of a remarkable average grain yield of 41 qts/ha further solidifying the evidence that these lands can be converted into productive land.

To celebrate this milestone and share the experiences, a National Field Day was organized in Damotu Kebele. The event brought together researchers, development agents, farmers, and local administrators. This event created an interesting platform for host farmers to share their powerful pragmatic testimonies to field day participants about bump wheat harvested from their land previously covered with

eucalyptus. They openly acknowledged the critical support and facilitation provided by the Holetta Agricultural Research Center. Holetta Agricultural Research Center representative has also expressed their reflection about the initiative stating that; “this is not just about clearing trees; it’s about reclaiming land to meet our food demands”. By challenging a long-held misconception with science and community action, the right practices have been undertaken, to reverse the ecological and economic imbalances caused by eucalyptus expansion.



Figure 4: National field day organized on the wheat cluster-based large-scale demonstration activity in Ejere District, Damotu Kebele

4. Conclusion

The fields of Gelgel Kuyu and Damotu stand as a testament to the results of strong partnership among farmers, researchers, and local leaders to turning deep rooted impossible beliefs to nothing is impossible. They are a living witness and field school that with innovation, determination, and a willingness conventional belief can be easily challenged, and land once lost can be reborn, contributing to both urban food security and rural livelihoods.

5. Recommendation

- o Scale up this successful model in other eucalyptus-dominated peri-urban areas with similar

- o Scale up this successful model in other eucalyptus-dominated peri-urban areas with similar agro-ecological conditions.
- o Promote integrated soil fertility management, including the strategic use of lime, to mitigate acidity and boost productivity.
- o Strengthen the use of cluster demonstrations and field days as powerful tools for accelerating technology adoption.
- o Encourage integrated land-use planning to prevent eucalyptus plantations from excessively replacing lands vital for food crop production.
- o Conduct further studies to evaluate and environmental impacts following eucalyptus removal.

Affordable Nutrient Solution for Sustaining Crop Production amid Rising Fertilizer price settings: Practical Rh Result from HARC

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1. Introduction

Over the past fifty years, Ethiopia's cereal production has expanded significantly, largely driven using chemical fertilizers for improved varieties. However, rising costs, limited availability, and low nutrient-use efficiency now threaten the sustainability of this approach. In response, researchers are increasingly focusing on organic fertilizer sources as viable alternatives. These organic inputs not only enhance soil health and fertility but also offer a more sustainable pathway to maintain and improve crop productivity while reducing dependence on costly chemical fertilizers. One viable alternative under such setting includes cow urine that serves as relevant source of nitrogen.

Despite its rich nutrient composition and free access, cow urine (CU) remains an under-explored organic fertilizer in Ethiopia compared to farmyard manure (FYM), compost, and vermicompost. Cattle excrete a significant proportion of dietary nitrogen through urine—about 52%—while only 28% is excreted in dung (Devasenaa and Sangeetha, 2022). Chemically, CU comprises approximately 95% water, 2.5% urea, and 2.5% mineral salts, hormones, and enzymes. Its total nitrogen content ranges from 7 to 21 g N L⁻¹, with nearly 69% present as urea (Sandukhan et al., 2018). Research findings indicate that CU serves multiple agronomic functions, acting as a bio fertilizer, bio pesticide, and plant

growth promoter. These attributes highlight its potential role in enhancing soil fertility, improving nutrient recycling, and reducing dependence on synthetic fertilizers in sustainable crop production systems. To maximizing this resource, an integrated CU and inorganic fertilizer trial was carried by the Holetta Agricultural Research Center Organic and Biological research program undertook field condition at Sademo area, Welmera Wereda.



Fertilizer potential of CU in Ethiopia

Description	Unit	Amount
Total cattle population of Ethiopia	Number	65,000,000
Average daily urine production per cow	Liter	3.5
Total annual urine production of cattle	Liter	83,037,500,000
N content of cattle urine	g/Liter	10
Amount of N to be obtained from cattle	ton	830,375

This will clearly show the potential of CU to replace the whole urea requirement of the country, potentially.

2. Results of the study

The study comprised five treatments: absolute control, full nitrogen from urea, 75% N (urea) + 25% N (cow urine), 50% N (urea) + 50% N (cow urine), and 25% N (urea) + 75% N (cow urine). The combinations of 75% N from urea with 25% N from cow urine and 50% N from urea with 50% N from cow urine produced the highest wheat grain yields across both farm types. These treatments increased yields by 144% and 138% on Farm 1, and by 61% and 42% on Farm 2, respectively, compared with the control.

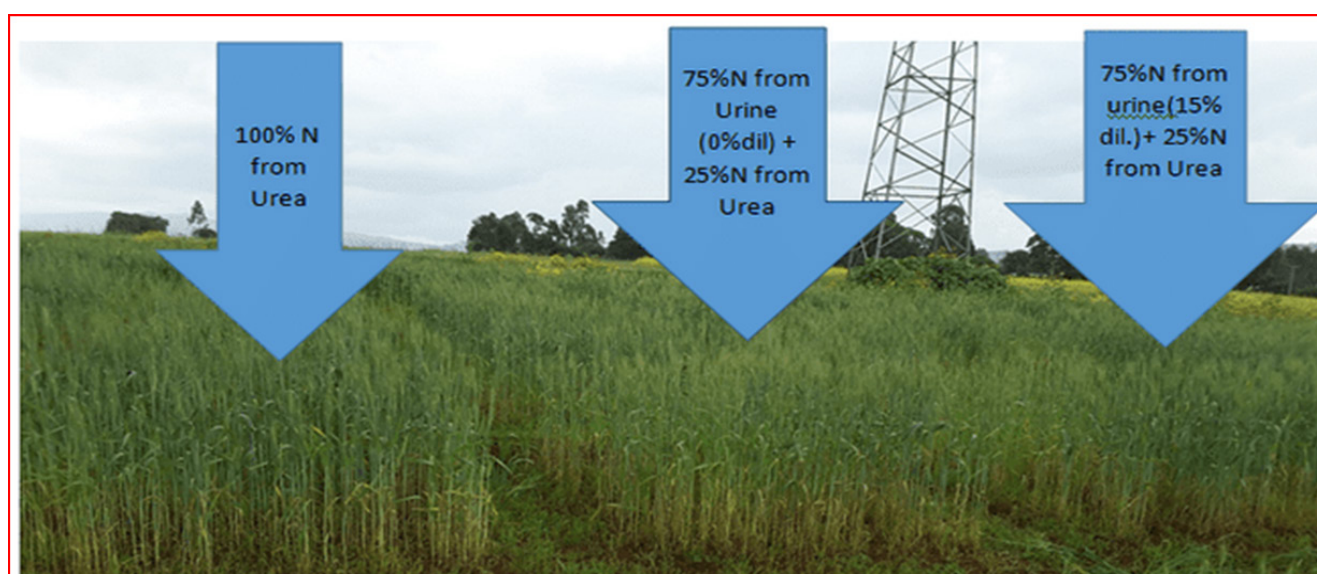
Comparable studies have also highlighted the positive impact of cow urine on wheat performance. Karale et al. (2020) observed significant improvements in nitrogen uptake in both grain and straw following cow urine application. Similarly, Sadhukhan et al. (2018) reported yield increases of 2.69%, 18.01%, and 27.21% with 50%, 75%, and 100% cow urine sprays, respectively, compared to the control. The higher yield response in the present study may be attributed to the enhanced bio-nutrient availability resulting from the combined use of mineral fertilizer and cow urine, which promotes efficient nutrient uptake (Arif et al., 2006; Pandey et al., 2009).



Photo: Cow urine preparation and spray of wheat seedling at Sedamo farm

Table 1. Growth and yield response of wheat to urea and CU integrated application on Welmera Nitisol during 2022

Urea-CU integration	Farm 1		Farm2	
	Grain yield (t/ha)	Biomass yield	Grain Yield (t/ha)	Biomass yield
Absolute control	1.6C	4.5B	2.45C	5.18C
Full N from urea	4.2A	6.4A	3.33AB	7.73AB
75%N (Urea) + 25% N (CU)	3.9AB	7.4A	3.94A	8.35A
50%N (Urea) + 50%N(CU)	3.8AB	7.2A	3.47AB	7.52AB
25%N(Urea) + 75%N(CU)	3.5B	6.5A	2.92BC	6.07BC
LSD (%)	5.37	1.4	0.88.3	1.73



High-Tech and High-Capacity Stationary Seed Cleaning Machine Handing-Over and Inaugural Ceremony Conducted at Kulumsa Agricultural Research Center

December 6, 2025

By Shimelis Alemayehu

Director, Kulumsa Agricultural Research Center

Kulumsa Agricultural Research Center (KARC), one of the flagship research centers under the Ethiopian Institute of Agricultural Research (EIAR), has a long-standing national mandate in the generation, promotion, and multiplication of agricultural technologies tailored to Ethiopia's highlands, mid-altitude, and lowland agro-ecologies. Over the years, the Center has played a pivotal role in developing improved crop varieties, particularly cereals such as wheat and barley, along with associated crop and seed management practices that enhance productivity, resilience, and sustainability.

KARC is nationally recognized for its leadership in agricultural technology generation, with a strong focus on breeding high-yielding, disease-resistant, and climate-smart crop varieties through rigorous research and field experimentation. In parallel, the Center serves as a major hub for early generation seed production, multiplying breeder and pre-basic seeds that form the foundation of the national seed system. Through close collaboration with federal and regional research institutions, seed enterprises, and development partners, Kulumsa Agricultural Research Center effectively bridges research and development, ensuring that proven technologies reach farmers and other end users, thereby contributing to food security, improved livelihoods, and the transformation of Ethiopia's agricultural sector.

In line with this mandate and in recognition of the critical role of seed quality in agricultural development, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Ethiopia Office, through the Green Innovation Centre for the Agriculture and Food Sector (GIC) project—a long-standing partner of EIAR and KARC, supported the importation, construction, and installation of a high-tech and high-capacity stationary seed cleaning machine within the main compound of Kulumsa Agricultural Research Center. The objective of this investment is twofold: first, to strengthen the Center's internal capacity to

clean and prepare high-quality early generation seeds; and second, to enable the Center to provide professional seed cleaning services to external stakeholders engaged in improved seed multiplication, thereby generating sustainable revenue to support research and operational activities.

On December 6, 2025, Kulumsa Agricultural Research Center officially inaugurated and handed over the stationary seed cleaning machine in a formal ceremony held at the Center's premises, in the presence of delegates from the Federal Ministry of Agriculture, senior officials of EIAR, representatives of development partners, researchers, technical staff, and invited guests. The event marked an important milestone in strengthening seed quality management and enhancing institutional capacity for delivering reliable and high-quality seed to the national seed system.

During the ceremony, speakers emphasized that clean and high-quality seed is the cornerstone of improved crop productivity, varietal purity, and farmers' confidence in modern agricultural technologies. The newly installed machine is expected to significantly improve the efficiency, consistency, and quality of seed processing at KARC. It will enable the Center to effectively clean breeder and pre-basic seeds of major crops, particularly wheat, ensuring that seeds distributed to partners, seed enterprises, and downstream multipliers meet the highest quality standards before reaching farmers.

In his remarks, the Center Director, Mr. Shimelis Alemayehu, highlighted that the machine will substantially reduce post-harvest seed losses, save time and labor, and enhance overall operational efficiency. More importantly, it will strengthen the Center's role in delivering high-quality seed that performs well in farmers' fields, thereby translating research outputs into tangible impacts at the farm level. He also expressed

sincere appreciation to EIAR and GIZ for their continued support and partnership in strengthening Ethiopia's seed and research systems.

Following the inauguration, the stationary seed cleaning machine was formally handed over to the responsible technical unit for operation and management. The handover underscored the Center's commitment to ensuring proper utilization, routine maintenance, and long-term sustainability of the equipment, guided by clear operational procedures and accountability mechanisms.

The inauguration and handover of the high-tech stationary seed cleaning machine reaffirm Kulumsa Agricultural Research Center's unwavering commitment to advancing agricultural research excellence, strengthening seed quality assurance, and supporting farmers and seed system actors through the delivery of reliable, high-performing, and improved technologies. Through such strategic investments and partnerships, KARC continues to contribute meaningfully to the national goal of achieving sustainable agricultural growth and food security in Ethiopia.



Sustaining Nutrition and Livelihoods through Continuous Home Garden Production Approach: Lesson from Holetta Agricultural Research Center

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1. Introduction

Pilot studies were carried from 2023 to 2025 in Oromia Region, West Shewa Zone, Welmera Woreda, with financial support of the RAISE-FS project fund by SWR Ethiopia on year-round production and utilization of home garden vegetables. Forty farmers grew vegetables such as cabbage, carrot, Swiss chard, kale, and beetroot. The host farmers across four kebeles were demonstrated with the benefits of cultivating these crops in their home Garden for improving the nutrition and livelihoods of growers. The objective of this intervention is to improve traditional gardening, promote positive behavior change, and strengthen the decision-making power of women and youth to enhance food security, diversify dietary habits, and incomes from sale of extra produce.

2. Methodologies

Forty farmers, were selected and provided practical trainings on vegetables production technologies, economic, and nutritional benefits. The production technologies training covered land preparation, organic fertilizer application, efficient water application technologies, seedlings raising, planting procedures, pest management, utilization, nutrition, and practical cooking practices. Finally, field days were organized to host as well as neighboring farmers for its wider scaling.



Figure 1: Trainings provided at Holetta Agricultural Research Center and Kebeles

3. Field Days

Field days were conducted in Welmera Choke, Berfeta Tokofa, and other kebeles to demonstrate home garden practices so that other farmers could learn from the experiences of participating households. During these events, researchers, government officials, agricultural experts, development agents, health extension workers, and farmers participated in evaluating the progress of the initiative, discussing key observations, and sharing their experiences and perspectives on home gardening practices.



Figure 3: Field days conducted to visit the vegetables performance at home garden

4. Cooking Demonstrations

Practical cooking demonstrations using locally available foods were a key intervention to improve household nutrition, guided by the Ethiopian Food-Based Dietary Guidelines (six food groups per day and at least four per meal). Conducted repeatedly in kebeles with support from Holetta Agricultural Research Center, these sessions engaged farmers, experts, and development agents. They emphasized dietary diversity, planning balanced diets from home gardens, and food preparation methods that preserve nutrients.



Figure 4: Practical cooking or food preparation demonstrations conducted

5. Achievements

After three years, farmers showed nearly double improvements in vegetable production, dietary diversity, income, labor sharing, and decision-making. These gains were driven by participatory, couple-based trainings, practical nutrition education, and behavioral change communication. Activities were implemented in selected kebeles and extended to neighboring communities, encouraging wider adoption.

Key Messages

- Welmera Woreda is highly suitable for sustainable home gardening due to reliable water access and favorable agro-ecology;
- Home garden production is a key intervention for improving nutrition, food security, and household income; and
- Cooking demonstrations effectively improved participants' understanding of the importance of dietary diversification for healthy meal preparation.

Farmers' Reflections

Farmers expressed strong interest and confidence in home garden production, noting its ease of management using organic inputs. They highlighted that it improves dietary diversity, reduces market dependence, enhances food safety and health, and provides year-round access to fresh, diverse foods.

6. Way Forward

The intervention generated strong interest and was highly valued by stakeholders, with government officials, researchers, and kebele administrators agreeing the importance of this approach in effectively improving household nutrition and food security. They also recommended scaling up of this approach to other kebeles and districts, noting its potential to enhancing crop diversity, improve dietary intake, and strengthen community health, while aligning well with current government priorities and development programs.

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