# WP4 Towards a multi-stakeholder approach to breeding: priorities for landrace-derived elite Barley in Ethiopia


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# Objectives:

- The overall aim is to deliver high-yielding barley genotypes with tolerance to biotic and abiotic stresses and adapted to Ethiopian environments and their constraints. This will ensure stable access to food/malt and feed for smallholder farmers, **well-being outcomes (such as better nutrition and drudgery and poverty reduction)** and at the same time increasing resilience to new climate-related constraints. **To ensure adaptation to local practices and facilitate the adoption of elite genotypes tested, farmer preferences, both men and women, will be integrated together with field trial and genomic data into the final selections.**
- **Objective 7.** To ensure gender equality in all aspects of the research from the composition of the project team to field staff on the ground, to participants, to ensuring **gender-responsive benefits** (such as through **drudgery reduction** and accounting for **women and men trait preferences** alike).

# Theory of change

A high and stable yield

Food security

Higher market value

More stable economy and improved living conditions

# Background

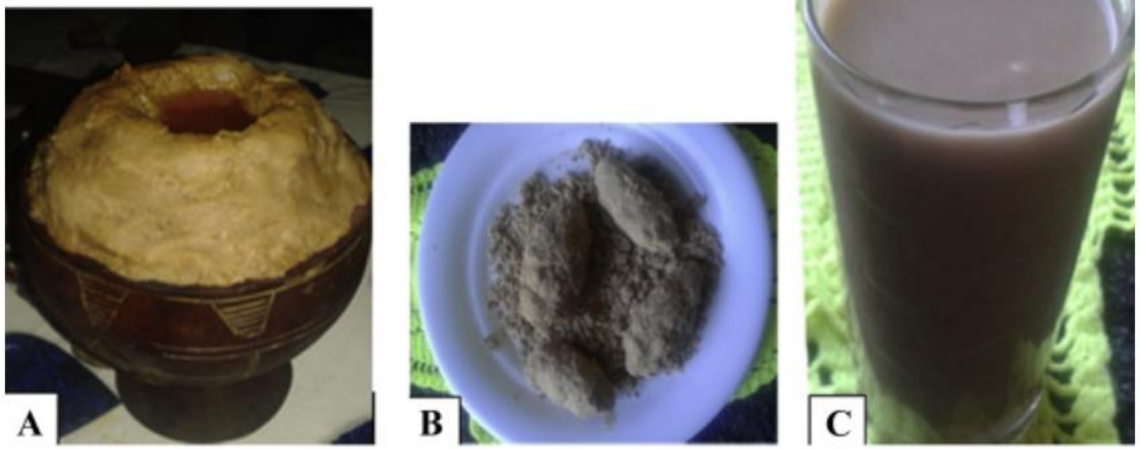
- **Barley** is a **main staple crop of East Africa** and grown for **multiple purposes** such as grazing, feed, food and malt.
  - Particularly for the highlands, barley-based foods and beverages are diverse and include *injera, kita, dabo, kolo, genfo, beso, chuko, kinch, shorba, tella,* and *areke*.
  - Multiple traits and product profiles
- Recent studies show that **women and men farmers' knowledge** can be **successfully integrated** at **early breeding stages** to better identify the worth of candidate genotypes and their potential for local adaptation in Ethiopia.
- In Ethiopia, **smallholder farmers are growing traditional landraces** and have limited access to new improved cultivars. They are highly dependent on the annual harvest. Thus, severe growing conditions and low-yielding varieties makes them particularly vulnerable to climatic conditions.
- **Multistakeholder approach**
  - Intersectionality (beyond gender, include class, other forms of social difference)
  - Multiple products
  - Market considerations
  - Traits beyond yield (e.g., dehulled, semi-hulled) and production traits (storage, processing, etc.)

Kolo

Shorba

Kinche

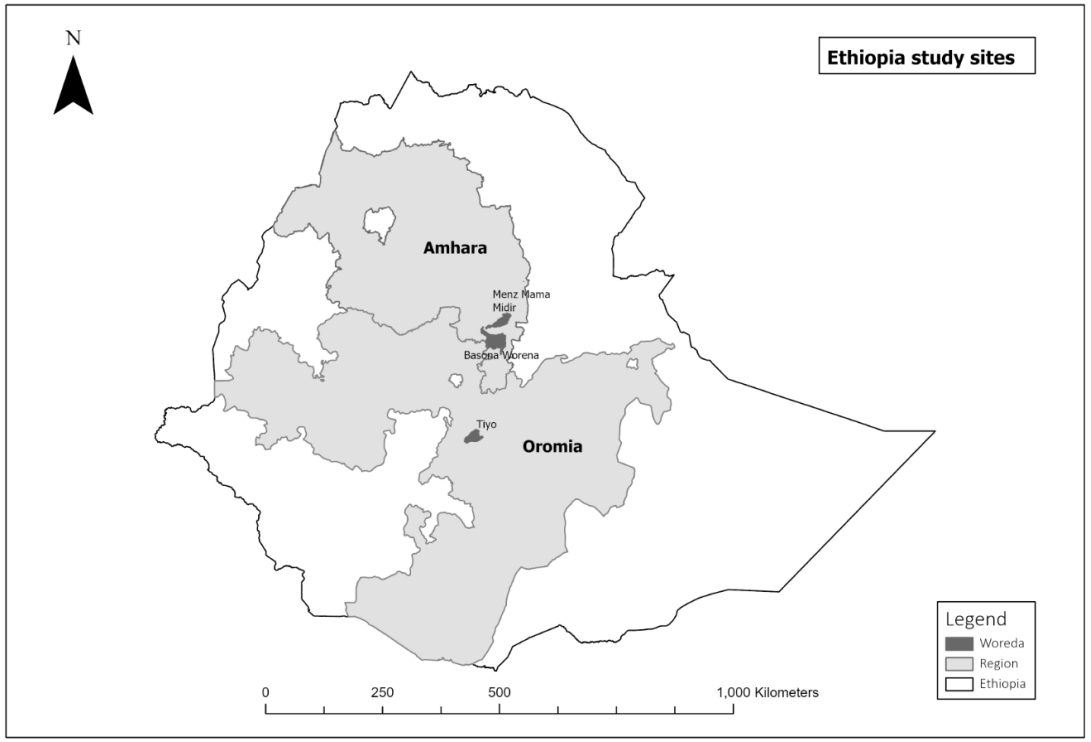

Genfo-Beso-Chuko




Source: Mohammed, J., Seleshe, S., Nega, F., & Lee, M. (2016). Revisit to Ethiopian traditional barley-based food. *Journal of Ethnic Foods*, *3*(2), 135-141.

# Accomplishments

**A gender and age-based participatory survey (WP4) will be conducted to study gender and age-specific farmers' needs and preferences. Identified trait preferences will be integrated into the genomic analysis to ensure the developed varieties will meet the market demands and needs of both women and men, children and adults.**




| | | Women | Men | Total |
|---|---|---|---|---|
| Quantitative Farmer Survey | | 231 | 196 | 427 |
| Agri-processor | | 57 | | 57 |
| Breeders | | 1 | 8 | 9 |
| Panelists | Injera panelist | 10 | | 10 |
| | Injera panelists | 10 | | 10 |
| | Tela panelists | 10 | | 10 |
| Consumers | Injera Consumers | 45 | 30 | 75 |
| | Kolo Consumers | 45 | 30 | 75 |
| | Tela Consumers | 45 | 30 | 75 |
| Malt factory experts | | | 4 | 4 |
| Shop keepers | | 8 | 1 | 9 |
| Experimental barley growers | | 5 | 10 | 15 |
| Experiment Processors | Experimental Injera processors | 20 | | 20 |
| | Experimental Kolo processors | 20 | | 20 |
| | Experimental Tela Processors | 20 | | 20 |
| Straw evaluation | | 45 | 30 | 75 |
| Total | | 572 | 339 | 911 |

## Stakeholders & Methods

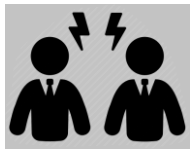
| | | |
|---|---|---|
| 427 Women and men farmers | 231 | 196 |
| 57 Agri-processors | 57 | |
| 9 Breeders | 1 | 8 |
| 30 Panelists (10 Injera, 10 Kolo and 10 Tela) | 30 | |
| 225 Consumers (75 Injera, 75 Kolo and 75 Tela) | 135 | 90 |
| 4 Malt factory experts | | 4 |
| 9 Shop keepers | 8 | 1 |
| 15 Experimental barley growers | 5 | 10 |
| 60 Experiment Processors(20 Injera, 20 Kolo and 20 Tela) | 60 | |
| 75 Straw evaluators | 45 | 30 |
| 911 | 572 | 339 |

## Findings

Good adoption of improved barley varieties

Trait preferences influence adoption

Gendered differences and similarities in trait preferences



Disconnect between farmer preferences and breeding priorities

Colour is an important trait

V1= *Agegnehu* (Crossbreed food barley released in 2007), V2= IBON 174/03 (Malt barley released in 2012), V3= *Misirach* (Cross food barley released in 1997/98), V4= Holker (Malt barley released 1979), V5= Local (General and mixed from many landraces), V6= HB 1964 (Malt barely released in 2016), V7= HB1307 (cross food barley released in 2006), V8= *Hagere* (cross, food barley released in 2018).

Kolo –worked with Debre Sina women group
Tela –worked with women sellers in Dedra Berhan
Injera –worked with women sellers too

# Farmers' Varietal and Trait Preferences

1. Women farmers Preferences

N=231

2. Men farmers Preferences

N= 196

**Food value and white grain** are the first two preferred traits for both men and women farmers. Most men (65.3%) grow **Traveler** (Malt barley, released in 2013), Most women (59.7%) also grow same malt barley variety. Men (87.2%), and women (90.9%) also in parallel grow local landrace varieties.

# Injera Varietal Preferences

## 1. Panelists

N=10
Women

**IBON 174/03** is first preferred variety for its white color trait by women Injera agri panelists. **Same variety,** is also preferred for its smell trait. The color of *Injera* is culturally likeable when it is white. The smell of *Injera* is considered good when it smells pungent/strong.

## 2. Consumers

N Total= 75
45 Women
30 Men

**IBON 174/03** is first preferred for all traits (color, sweetness, texture, flavor, and smell) by both women and men *Injera* consumers whereas ***Hagere* (land race)** is second preferred for its color, sweetness, texture, flavor, and smell.

## 3. Experiment Processors

N=20
Women

**Local (landraces including *Salayish, Ferike, Tegadime, Mawige* and *Demoye*),** are the first preferred varieties for their mold resistance, short fermentation time and ability to fit with other grains when baked among few traits. **HB1307** second preferred variety by *Injera* processor women for its white color and higher market value.

# Kolo Varietal Preferences

## 1. Panelists

N=10
Women

**HB1307** is preferred for all traits including color, sweetness, texture, flavor, and smell in preparing *Kolo*. **mixed landraces, particularly, *Senef*** is the second preferred variety for its color, flavor, and texture traits

## 2. Consumer

N Total= 75
45 Women
30 Men

**HB1307** is first preferred variety for its color, texture, flavor, and smell and sweetness traits among both men and women *Kolo* consumers. **Local (General and mixed from many landraces)**, are second preferred varieties for all mentioned traits by men and women *Kolo* consumers.

## 3. Experiment Processors

N=20
Women

IBON 174/03 is the first preferred variety for Kolo for its **easy** and uniformly roasting quality, **easy husk removal** and large grain size. Local landraces, specifically, Senef is second preferred by Kolo processor women for its attractive colour, good flavour, long shelf life, big size seeds, could easily be roasted, demands less labour and husk removes easily.

# Tela Varietal Preferences

## 1. Panelists

N=10
Women

**Local (General and mixed from many landraces),** are the first preferred varieties for their dark color trait, whereas ***Agegnehu*** and **IBON 174/03** are **equally second preferred** varieties for their texture trait (thick).

## 2. Consumer

N Total= 75
45 Women
30 Men

***Hagere*** is first preferred for its dark color, texture, flavor, and smell traits specifically by women *Tela* consumers. **HB1307** is second preferred by women for its sweetness, and texture. Men *Tela* consumers, on the other hand, first preferred *Agegnehu* for its dark color and sweetness traits.

## 3. Experiment Processors

N=20
Women

Local landraces, specifically, Mawige and Ferike are the first preferred varieties by Tela processor women, for their dark brown colour, dense seed, short fermentation, and shorter purification time etc. HB1307 is second preferred variety by Tela processor women for its big grain size for more amount of Tela.

# Straw Evaluators Preferences

N Total= 75
45 Women
30 Men

***Misirach*** is first preferred for its texture, palatability, and smell traits, followed by **general and mixed from many landraces,** for these three all traits by both men and women farmers.

# Experimental barley growers Varietal Preferences

N Total= 15
5 Women
10 Men

**HB1307** is preferred by both men and women growers for their white color and high yielding traits followed by **IBON 174/03** which is preferred for its frost resistance and soft straw.

# Shop keepers varietal Preferences

N Total= 9
8 Women
1 Men

**HB1307** is most preferred by shop keepers as its white, which is preferred for preparing local foods and has higher market demand. **Local (General and mixed from many landraces)** are second preferred, specifically *Salayish* and *Semereta* landraces are preferrable to prepare local foods.

| Varieties | Price |
|---|---|
| | Whole seed |
| HB1307 | 42-48 birr |
| Semereta (local land race) | 45 birr |
| Salayish | 42-48 |

# Breeders Varietal Preferences

N Total= 9
1 Women
8 Men

Barley breeders breed for earliness, high yield, lodging, disease/insect resistance, nutritional quality (protein), biomass

# Malt factory experts Varietal Preferences

N= 4
Men

**Traveler** is first preferred by malt factory experts as it fit with factory requirements such as high starch level and lower protein content. **IBON 174/03** is second preferred for similar reasons.

# Activities Planned (3rd year)

## In each of the four regions in Ethiopia

**100 Women & 100 Men for on-farm trials**

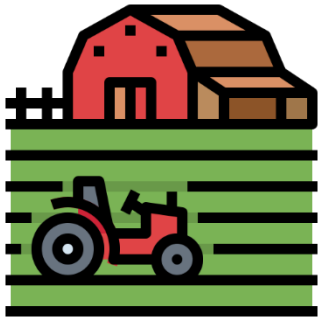
**100 Landless processors**

**10 Traders**

**100 Consumers**

**Involved to evaluate the selected 20 advanced lines for different products**

**For On-farm demonstration trials**



About **ten farmers per location (half men and half women)** will evaluate these 20 candidate varieties for **feed and production (fertilization, weeding, etc.)**.

Then a **field day** will be held on these **farmers' fields**.

**Women farmers** will invite 20 **other women farmers**

&

**men farmers** will invite 20 **other men farmers**.

# Other Planned Activities

1. Prepare learning brief/ fact sheet to summarize findings
2. Regional workshop in Addis with breeders
3. Check prices for different varieties and reasons (security situation)
4. Interview traders for their trait preferences
5. Seeds available by second year?
6. What quality traits do we need to analyze? (protein, etc.)

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# THANK YOU!

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