



BACKGROUND BRIEF / 2021

Teff farming in Ethiopia: a literature review

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Context

The Impacting Gender & Nutrition through Innovative Technical Exchange in Agriculture (IGNITE) mechanism is a five-year investment implemented by Tanager, Laterite, and 60 Decibels to strengthen African institutions' ability to integrate nutrition and gender into their way of doing business and their agriculture interventions.

Within the IGNITE framework, Laterite and Tanager designed a research project with a partner to identify key gender factors that influence decision-making on the adoption of good agricultural practices in teff farming households in Ethiopia. The study will focus on farming households who have been trained through an extension program.

This brief was written by Tessa Ahner-McHaffie and summarizes the literature review conducted by Laterite in preparation for the project. The literature review is complemented with insights obtained from qualitative interviews with four teff farmers and two Development Agents (government extension agents), done in preparation for a larger quantitative study (results forthcoming).

The aim of this brief is to share what we have learned about teff farming in Ethiopia with organizations and institutions working with teff farmers, and researchers focused on agricultural practices and teff.



Teff (*Eragrostis tef*), known in Amharic as ቲፍ, in Afan Oromo as xaafii, and in Tigrigna as ቲፍ, is an annual grass from the family Poaceae, native to Ethiopia and Eritrea. It was one of the first plant species domesticated as a crop.

Image: plantillustrations.org

Teff in Ethiopia

Teff is a staple crop in Ethiopia and Eritrea, where it is used mainly to make injera - a spongy flatbread that is eaten with most meals. Teff products accounted for 12% of Ethiopian food expenditures in 2011, making it the most important cereal crop in the country.^[1]

Approximately 20% of all cultivated area in Ethiopia is occupied by teff.^[2] Oromia produces about 48% of teff nationally, followed by Amhara with 39%.^[2] There has been an increase in teff production over the past few decades, which has been attributed to the increase in the amount of land planted with teff.^[3]

Teff is valued for home consumption and as a cash crop due to its higher price per kilogram, compared to other cereals.^[1] Teff is also valued for its fine straw which is used for animal feed and as a construction material.^[1]

Compared to other cereals, teff is a resilient crop – it can withstand periods of drought and flood.^[4] It is easily intercropped with other crops and can be grown in many agro-ecological zones and altitudes. Further, it attracts few insect pests and diseases, and post-harvest loss is minimal given low intrusion by storage insect pests.^[1]

Despite its importance in Ethiopia, teff is an 'orphan crop' and remains relatively understudied, compared to wheat, maize or rice. This is probably

due to the research agendas of international crop research and governmental bodies, which tend to prioritize work on high yield cereal crops that are grown internationally. As a result, teff has not yet benefited from decades of research focused on increasing its yields, and there is still much to be learned about every stage of the value chain.^[4]

Nutritional value

Teff is made up of complex carbohydrates and has a similar protein content to wheat. Compared to other cereals, teff is a good source of fatty acids, fiber, calcium, and iron.^[1]

Teff is gluten free, and there is a growing market for it outside of Ethiopia.^[5] Teff was also long thought to be rich in iron, but recent studies have shown that this is due to soil mixed with the grain, not the grain itself.^[6]

Teff grains. Photo: Wikimedia Commons



Traditional agricultural practices

Ethiopian farmers usually grow teff as part of a rotation with other crops, and on multiple plots of land. One study reported four plots, on average, used for growing teff.^[1] Farmers do not usually plant teff two years in a row; it is often rotated with onions, chickpeas, common beans, and lentils.^[7] Family labor is the primary labor used to produce teff (63%), while hired labor accounts for 11%, and reciprocal exchange of labor makes up 22%.^[8]

Gender roles in teff farming tend to vary by location, household, and according to who was interviewed in each study. If only household heads (usually men) are interviewed about time use or labor, they often over-report their own activities on a plot, and underreport the activities of other household members.

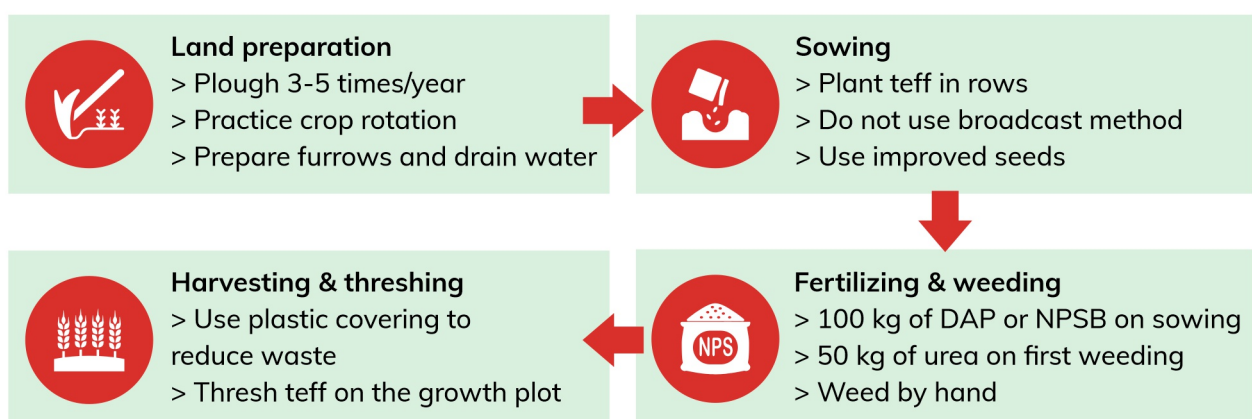
On average, 70% of plots are planted with traditional seeds, while 30% of plots receive improved seeds. Of the seeds used, 78% were obtained from a farmer's own harvest in previous years.^[8]

Teff seeds come in different color varieties, in descending market value: magna (very white), nech (white), sergegna (mixed white and red), and key (red).

Nech seeds are the most common, making up 52% of plots, followed by key (20%), magna (17%), and mixed seed combinations (11%).^[1] Red and mixed teff are often used for home consumption, although there is a growing market for them in Ethiopia as they are thought to be healthier.^[1] White teff is primarily sold as a cash crop to wealthier consumers.

The teff farming cycle

and some of the best practices recommended by Development Agents





Land preparation

Land preparation is important for teff. The seeds are quite small, and this means that the soil needs to be loose to allow seeds to germinate.^[9] Plowing is completed before sowing, and generally occurs before July.

Each plot is plowed before planting, in most cases with the help of animals (usually oxen, but also horses or donkeys) owned by the farmer.^[9] Men generally lead this activity – one study found that 96% of labor on land preparation was carried about by men.^[10,11]



Sowing

Sowing is traditionally done by ‘broadcasting’ – scattering the seeds by throwing them onto the surface of plowed soil. This system uses a high quantity of seeds per hectare (44 kg/ha). Sowing traditionally occurs from the second week of July to the first

week of August, with slight variation based on soil quality, altitude, and region.^[1]

An alternative to broadcasting is planting in rows, or transplanting seedlings.^[4] The advantages of this method include using fewer seeds (10-15 kg/ha) and allowing for easier weeding and fertilizer application. Experiments in controlled environments where teff was planted in rows showed a three-fold increase in productivity.^[12,13] In 2012, a scaled-up version of this program with 70,000 farmers demonstrated a 70% increase in yields.^[14] In 2013, the government of Ethiopia expanded the program to reach 2.5 million teff farming households.^[11]

The average teff farmer may not reap the benefits of row planting, largely due to increased labor requirements. In a study with farmers (although not in a controlled environment), broadcasting one hectare of teff took 42 person-hours; while row planting took three times longer (139 person-hours).^[1]

A farmer plowing a teff field with two cows. Field photo: Keriyah Ibrahim



These additional hours fell mostly on the women in the household, who are largely responsible for sowing in rows (although men and children are also involved in this activity).^[1,10]

Almost all farmers who went through the extension program were aware of the benefits of row planting, but after one season only a small portion planned to continue the practice.^[11]

Fertilizing & weeding

Teff farmers primarily use urea (a crystalline solid nitrogen fertilizer) and/or Nitrogen Phosphorus Sulphur (NPS) blends with some micronutrients in the form of NPSB, NPSZn, NPSBZn to fertilize their fields. Only 10% of farmers use organic materials or manure on teff. In one study, 89% of teff plots received NPS and 79% received urea. Fertilizing the land is a



Image: Esayas Ayele, via Wikimedia Commons

task traditionally carried out by both men and women.^[10]

Weeding is done usually once or twice a season for a teff field, although herbicides are used by 65% of farmers.^[1] Row planting may reduce weeding times, but reports vary. In a controlled setting, weeding time is reduced, but in some settings broadcasting may reduce weeding needs as a high number of teff seeds may out-compete weeds.^[11] Both men and women are involved in weeding.^[1,10]

Harvesting & threshing

The harvest season traditionally lasts from the beginning of October to the end of January, depending on the region, rainfall, altitude, and other local features. The average growing season of teff is 17 weeks. Farmers harvest teff by mowing with sickles after the crops are matured and dried in the field. The crops are piled in the field and then transported to the threshing area.^[10] Some studies report that men are responsible for harvesting, and some report that women are more involved than men.^[1,10]

Teff dries for an average of 40 days between harvesting and threshing. Traditionally, farmers prepare the threshing area by coating it with a layer of cattle dung. Once the teff has been brought to the area, the teff is threshed by oxen trampling the teff. Further separation of seeds and cleaning is done by hand with traditional tools.^[9] There are some new technologies in this area that some farmers have started using, including multi-crop threshers and seed cleaners.^[1]



Post-harvest handling & storage

Once the teff has been threshed, farmers either sell the teff grains or consume them themselves. Farmers rarely sell the straw; instead they use it for animal feed or construction. Teff can be stored in traditional storage structures called *gotera* or *gota*, or in synthetic sacks^[9], or in traditional 'mounds'. Teff grains can be used up to three to five years after threshing without large losses.^[1]

The Development Agents (DAs) report that that most farmers consume less than half of their harvest and reserve the rest to be sold. The price farmers can receive for teff is high in comparison to other grains, so farmers view it as valuable crop. One kilogram of teff is sold for up to 50 birr (1.11 USD) although the price will vary by season and location.

Teff straw mounds. Field photo: Keriya Ibrahim



Labor structure

Wonfel (ወንፈል) or debo (ደቦ) is a practice where farmers take turns working on each other's plots of land. Farmers exchange work mostly for sowing (if applying the row method) and threshing, but wonfel can be used at any point of the agricultural season. Farmers report preferring wonfel over hiring laborers, both because it is traditional and does not cost additional money, but also because it is social. While practicing wonfel, it is common for farmers to discuss the best practices for the plot they are working on.

If money is available, farmers may also hire day laborers, at a rate of 120 to 150 birr (2.66 to 3.32 USD) per day. This is often done for weeding and for harvesting. Female-led farms are more likely to use either laborers or wonfel, as women are often labor constrained.

Gender and teff

On average, 77% of teff-farming households are headed by a man.^[1] This is in line with the findings reported by our preliminary survey of teff farmers in 16 kebeles, where 74% of households were led by men.

Researchers have found that teff plots managed solely by women are less productive.^[15] This can be explained by women having less access to and less control of resources and information, and by household labor being concentrated on plots managed by men in male-headed households. Hailu et al.^[16] noted “that teff output could be increased by approximately 25 percent with the available inputs and technology through investments directed to improved gender-sensitive extension service and infrastructure development.”

Like in many other value chains, women in teff-farming households have limited access to resources such as land, rural organizations, irrigation, credit.^[8] When asked about extension services, 97% of men had accessed some compared to 67% of women.^[10]

Gender is a large driver of adoption of best practices for many value chains, and teff is no exception. Experience with teff farming, farm size, distance to the market, participation in the farmers’ association, access to extension, and availability of credit are all correlated with the adoption of teff best practices.^[17] These variables are also highly dependent on gender, both the

Application of new, more time-consuming technologies, such as row planting, require women and children to supply the additional labor.

gender of the household head and for individuals within households.

To summarize traditional gender roles in teff production: men are traditionally responsible for preparing and applying fertilizer in teff fields; women and children are more involved in weeding, threshing, and post-harvest processing activities.

Sources differ on who is most responsible for sowing, and practices seem to vary by region, household, and sowing method used.

Weeding is the most labor-intensive activity, followed by threshing.^[11] Application of new, more time-consuming technologies, such as row planting, require women and children to supply the additional labor at other stages of teff production. This means that there is some risk in promoting labor-intense technologies if farming households are labor constrained, or if the added labor is predicted to fall disproportionately on women and children.^[11]

A study in Oromia found that while both men and women participate in teff production, processing and selling, men control the cash generated from it. Men dominated land preparation and marketing, while women dominated weeding and harvesting activities.

References

- [1] Minten, B., A. S. Taffesse, and P. Brown. 2018. The economics of teff: Exploring Ethiopia's biggest cash crop. International Food Policy Research Institute (IFPRI).
- [2] Ethiopia, CSA (Central Statistical Agency). 2020. Agricultural Sample Survey 2019/2020. Area and Production of Major Crops. (Private Peasant Holdings, Meher Season). Addis Ababa: CSA
- [3] Demeke, M., and F. Di Marcantonio. 2013. Analysis of Incentives and Disincentives for Teff in Ethiopia. Technical notes series. Rome: Monitoring African Food and Agricultural Policies (MAFAP), FAO.
- [4] Fufa, B., B. Behute, R. Simons, and T. Berhe. 2011. Strengthening the Tef Value Chain in Ethiopia. Mimeo, Agricultural Transformation Agency (ATA), Addis Ababa.
- [5] CBI. (2020). The European market potential for teff. <https://www.cbi.eu/market-information/grains-pulses-oilseeds/teff/market-potential>
- [6] Baye, K. (2014). Teff: nutrient composition and health benefits. Ethiopia strategy support project, IFPRI.
- [7] Gizaw, B., Tsegay, Z., Tefera, G., Aynalem, E., Abatneh, E., & G. Amsalu. (2018). Traditional Knowledge on Teff (*Eragrostis tef*) Farming Practice and Role of Crop Rotation to Enrich Plant Growth Promoting Microbes for Soil Fertility in East Showa: Ethiopia. Agricultural Research and Technology. Wachemo University, Ethiopia.
- [8] Ogato, G.S., Boon, E.K., & J. Subramani. (2009). Improving Access to Productive Resources and Agricultural Services through Gender Empowerment: A Case Study of Three Rural Communities in Ambo District, Ethiopia. *Journal of Human Ecology*, 27(2).
- [9] Ebba, T. 1969. Teff (*Eragrostis tef*): The Cultivation, Usage, and Some of Its Known Diseases and Insect Pests. Part I. Experiment Station Bulletin 60. Haile Selassie I University (HSIU), Ethiopia.
- [10] Tekalign, S., Eneyew, A., Mitiku, F. (2020). Gender roles in teff value chain in Borecha District of South Western Ethiopia: husband and wife comparisons. *J. Agribus. Rural Dev.*, 1(55), 93–105.
- [11] Vandecasteele, J., Dereje, M., Minten, B., Taffesse, A. S. (2018). Labour, profitability and gender impacts of adopting row planting in Ethiopia, *European Review of Agricultural Economics*, Volume 45, Issue 4, September 2018, Pages 471–503.
- [12] Berhe, T., Z. Gebretsadik, S. Edwards, and H. Araya. 2011. "Boosting Teff Productivity Using Improved Agronomic Practices and Appropriate Fertilizer." In *Achievements and Prospects of Teff Improvement*, 133–140. Proceedings of the Second International Workshop, November 7–9, 2011, Debre Zeit, Ethiopia.
- [13] Agricultural Transformation Agency. (2012). Annual Report: Transforming Agriculture in Ethiopia. Addis Ababa, Ethiopia.
- [14] Agricultural Transformation Agency. (2013). Results of 2012 new teff technologies demonstration trials draft report VF. Agricultural Transformation Agency, Addis Ababa, Ethiopia.
- [15] Gender and Agricultural Advisory Services. (2020). Issue Brief. BMGF.
- [16] Hailu, G., Weersink, A., Minten, B. (2015). Rural Organizations, Agricultural Technologies and Production Efficiency of Teff in Ethiopia. International Conference of Agricultural Economists.
- [17] Milkias, D. (2020). Factors Affecting High Yielding Teff Varieties Adoption Intensity by Small Holder Farmers in West Showa Zone, Ethiopia. *International Journal of Economy, Energy and Environment*, 5(1).

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