

FOOD INSECURITY AND INDIGENIZATION OF AN ALIEN CEREAL CROP: EXPERIENCES OF SMALLHOLDERS IN THE GAMO HIGHLANDS

Getaneh Mehari* & Mamo Hebo

College of Social Sciences, Addis Ababa University, Ethiopia

*E-mail: getaneh.mehari@aaau.edu.et

ABSTRACT Enhancing food security among smallholder farmers has been the major goal of development intervention in Ethiopia. Thousands of development agents (DAs) have been assisting farmers to adopt new technologies and agricultural inputs to maximize production and productivity. Despite long-term and persistent efforts, however, still millions of people engaged in small scale farming are exposed to recurrent food insecurity. This article explores smallholders' responses to food insecurity situations focusing on smallholder farmers in the Gamo highlands, south-western Ethiopia putting triticale, an alien cereal crop imported from abroad, and apple at the center of the argument. Smallholders adopted improved cereal crops and potato seeds promoted by development agencies more easily than planting apple as a cash crop because apple requires more land, especial skills and knowledge to manage it, and a long-term commitment to adequately benefit from its yields. On the other hand, smallholders adopted and indigenized triticale despite the anti-triticale campaign launched by agricultural experts in the study district. Smallholder farmers make decisions considering local circumstances and realities, sometimes putting aside prescriptions of agricultural experts and development agents.

KEYWORDS: Ethiopia; Food insecurity; Gamo highlands; Smallholder farmers; Triticale.

INTRODUCTION

Agriculture is the dominant sector of the Ethiopian economy. It accounts for more than 40% of the country's GDP (Spielman et al. 2011; Kassahun & Poulton 2014) and more than 80% of the country's export earnings (Kassahun & Poulton 2014). The sector provides livelihood for over 80% of the country's population (Temesgen et al. 2008; Spielman et al. 2011). Smallholders' farming dominates Ethiopia's agricultural sector. It covers over 90% of the total cultivated land and accounts for about 90% of the overall agricultural production in the country (Temesgen et al. 2008). Yet, millions of people, including smallholder farming households, have been exposed to food insecurity in Ethiopia. The number of people that depend on food aid has been increasing in recent years. For instance, it increased from about 2.7 million in 1996 to 5.3 million in 1998, reaching 7.7 million in 2000. While the Government planned to assist 7.7 million food insecure households in its second five-years' (2015/16–2019/20) Growth and Transformation Plan (FDRE 2016), the number of people that needed food aid had already risen to 10.2 million in 2016 (USAID 2016). This figure was far beyond what the government planned for, which shows the magnitude of the problem.

Successive governments of Ethiopia have been formulating policies, programs, and strategies to address the problem of food insecurity. Agricultural extension programs have been implemented with the aim of enhancing agricultural production and productivity since 1960s (Kassa 2003; Spielman et al. 2011). For example, the Imperial government (1930–1974) implemented two agricultural extension programs, the Comprehensive Integrated Package Projects (COPPs) and the Minimum Package Program (MPP), in the 1960s and 1970s. After retaining the extension programs of the Imperial period, the military regime (1974–1991) introduced the Peasant Agriculture Development Extension Program (PADEP) in 1986 and executed it until its downfall. Government investment in the agricultural sector increased remarkably during the EPRDF government, the successor of the military regime (Lefort 2012; Kassahun & Poulton 2014). The government allocated about 15% of the country's annual budget to the agricultural sector from 2002 to 2012 while the annual budget allocated to the sector declined from 5% to 3.8% in Sub-Saharan Africa (Kassahun & Poulton 2014). The EPRDF government has also been implementing the Participatory Agricultural Demonstration Training Extension Program (PADTEP) since 1993. The program was later scaled-up and re-named the National Agricultural Extension Intervention Program (NAEIP) in 1995 (Spielman et al. 2011).

Despite decades-long intervention efforts, food insecurity remains a persistent problem in the country. Many researchers wondered: why has Ethiopia failed to achieve food security of its population despite such a long history of agricultural extension programs? Research findings tend to locate the problem, among others, in the approach adopted by the extension programs. Some researchers pointed to the top-down approach that disregarded farmers' opinions and their indigenous knowledge, and lack of a genuine participatory approach (Kassa 2003). Others are critical of agricultural extension programs' 'one-size-fits-all' approach that ignores local and regional diversities (Samuel 2006); their rigidity to consider local variations and failure to offer options to smallholders to "select and adopt practices appropriate to their particular field and seasonal conditions" (e.g., Byerlee et al. 2007: 38).

The above appraisal of Ethiopia's agricultural development approaches, the extension programs in particular, is reminiscent of the overall limitation of agricultural interventions in Africa. Smallholders' needs are homogenized regardless of their cultural, ecological, and agricultural diversity. Farmers are provided with similar, if not the same, package of agricultural technologies to be able to meet those needs. Furthermore, smallholder farmers are perceived as passive recipients of agricultural technologies disseminated by development agents. Contrary to such a perception, African smallholder farmers are active agents who can make choices, even when those choices appear to be against the interest of powerful governments and development agents (e.g., Kodamaya 2011; Takahashi 2011). Smallholders' response to policy change in Zambia is a case in point. When Zambian government reduced the fertilizers' subsidy and the prices of fertilizers increased, smallholders shifted from cultivating maize (which requires application of fertilizers) to planting root crops (e.g., cassava and groundnuts) that do not require application of chemical fertilizers. Subsequently, the share of maize in smallholders' crop production declined between 1990 and 2000 (Kodamaya 2011).

The findings discussed above show the importance of viewing (and recognizing) smallholders as active agents who can make decisions based on their assessments, choices, and experience-based knowledge. Such a perspective is essential when exploring responses of smallholder farmers to food insecurity and related agricultural interventions. In the same vein, this paper explores the nexus of food insecurity, agricultural interventions and smallholders' choices/responses considering the case of Chenchu district of the Gamo highlands.

FOOD SECURITY/INSECURITY: CONCEPTUALIZATION AND GLOBAL TRENDS

The definition of food security has been evolving since 1970s. The World Food Conference (1974) defined food security as ‘availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices’. This definition mainly focuses on availability and adequacy of basic foodstuffs at the global level. FAO’s 1983 definition of food security was essentially similar to that of 1974. The most comprehensive and widely employed definition is the one adopted at World Food Summit (1996). According to this definition, ‘Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their needs and food preferences for an active and healthy life’. This definition embraces various dimensions of food security including food availability, access, utilization, stability, and food preferences.

Then what is food insecurity? The World Bank document (1986) defines food insecurity as ‘the lack of access to enough food’, focusing on two major variables: access and adequacy. The document also introduces two important concepts widely used in the food security literature: chronic food insecurity, and transitory food insecurity. Chronic food insecurity is defined as ‘a continuously inadequate diet caused by the inability to acquire food’. It is caused by household’s inability to produce or purchase enough amount of food. Transitory food insecurity is ‘a temporal decline in a household’s access to enough food’. The major causes of transitory food insecurity are fluctuation of food production, food prices and households’ income (World Bank 1986: 8).

Food insecurity is a challenge for the Global South although its scale may vary from region to region. FAO’s 2015 report indicates that of the total estimated 795 million undernourished people in the world, the overwhelming majority (780 million) live in the developing countries. The proportion of people suffering from undernourishment has been declining globally, from 18.6% of the overall world population in 1990–92, to 10.9% of the global population in 2014–16. However, Sub-Saharan Africa (SSA), especially Southern and Eastern Africa, have made limited progress in reducing the problem. For instance, in the period 1990–92 to 2014–16, the proportion of undernourished people in Africa declined from 27.6% to 20% of the continent’s population, while the change in SSA was from 33.2% to 23.2% of its population. The rate of decline of malnutrition in Eastern Africa in the same period, from 47.2% to 31.5%, is generally higher than the changes observed in Africa and SSA though the proportion of East African population affected by the problem was also bigger. As the figures reveal, though the proportion is declining, the total number of undernourished people has been increasing in Africa. In general, SSA is the home of the highest proportion of undernourished population as compared to other regions of the world. Above 23% of the total population of SSA (nearly one in every four people) suffered from undernourishment in 2014–16 (FAO 2015).

Ethiopia, the second most populous country in Africa, is severely affected by food insecurity and malnutrition. Data on nutrition status of children and women reveal this situation. Although children under-nutrition has been decreasing since 2000, the percentage of malnourished children in Ethiopia is still high. According to demographic and health survey (CSA & ICF 2016) results, 38% of children under age 5 were stunted (they were short for their age), 24% were underweight (they were thin for their age), and 10% were wasted (they were thin for their height). The problem is considerable among women (mothers) too. Twenty two percent of women in their reproductive age (15–49 years) were underweight as a result of malnutrition.

ADOPTION OF CROP VARIETIES

Accelerating the adoption of improved crop varieties has been the major concern of agencies and offices of the Ethiopian government and its international partners and donors (Dawit & Zewdie 2016). Several researchers have studied the adoption of improved seed varieties such as maize (Alene et al. 2000; Shiferaw & Tesfaye 2006; Motuma et al. 2010; Moti et al. 2015; Zeng et al. 2018), chickpea (Solomon et al. 2011; Verkaart et al. 2019), *teff* (Susie & Bosena 2020), wheat (Bekele et al. 2014; Leake & Adam 2015), and potato (Mesfin et al. 2014). Despite considerable government efforts, however, the adoption of improved seed varieties has been constrained by various factors, among others, fluctuations of market prices (Shiferaw & Tesfaye 2006), poor access to market, lack of market-related information, limited and unequal access to agricultural extension services (Alene et al. 2000; Moti et al. 2015; Hailegebrial & Adane 2018; Verkaart et al. 2019; Susie & Bosena 2020), and limited access to improved seed varieties (Mesfin et al. 2014; Susie & Bosena 2020).

The proportion of smallholder farmers using improved seed varieties in Ethiopia has been low (Moti et al. 2015). According to some sources, the proportion of smallholders receiving improved seed varieties via formal channels was less than 20% (e.g., Zewdie et al. 2008; Dawit & Zewdie 2016). However, recent research findings indicate an increasing interest among farmers in the adoption of improved seed varieties. For example, Verkaart and colleagues (2019) found that smallholder farmers in three districts of Ethiopia are rapidly adopting improved chickpea varieties encouraged by desirable qualities of the new varieties (e.g., disease resistance and high yield potential), conducive market settings (e.g., high demand and prices), and access to frequent extension services. In addition to adopting improved seed varieties of widely cultivated cereal crops (e.g., wheat and maize), smallholders continue cultivating local crop varieties and adopting and indigenizing alien crops such as triticale, a cereal crop introduced into Ethiopia in 1970s and widely expanding across smallholder farms in different parts of the country since 1990s (e.g., Ashenafi 2008; Wasihun 2014).

The concept indigenization has been used in different contexts. For example, in post-colonial Africa, the concept has been widely used in the context of decolonizing, nationalizing and Africanizing of the economy (e.g., Uche 2012), and education and curriculum studies (Antal & Easton 2009; Grange 2018). The term has also been pervasive in the indigenous social work literature (e.g., Gray & Coates 2008; Yan & Tsang 2008). Indigenization is defined as a 'process of adapting, adjusting and modifying' imported knowledge to making it appropriate to local contexts and needs in developing countries (Gray 2008). Concepts such as indigenization, indigenizing, and indigenized have also been used in the field of agriculture. Mabhaudhi and associates (2017) define 'indigenized crops' as crops 'originated elsewhere but have undergone extensive domestication locally'. According to Jansen van Rensburg and colleagues (2007), a plant species is indigenized when it is introduced from external sources, locally adopted over an extended time, and 'incorporated in the local food culture'. In this article, we conceptualized indigenization as a process of adopting, (re)naming and incorporating an alien crop into the local farming system and food culture.

OBJECTIVES AND METHODS

I. Objectives

The major intention of this article is exploring responses of smallholders to food insecurity situations in the context of the Gamo highlands and state development interventions. The study focuses on selected sites of Chencha *woreda* (district) to observe the situation in some detail. The study specially aims at exploring 1) agricultural interventions aimed at enhancing food security; 2) smallholders' responses to agricultural interventions; and 3) smallholders' adoption of triticale, a foreign cereal crop locally known as *bashkala*, and apple as means of enhancing their food security. Other crop varieties cultivated by the farmers (e.g., potatoes, *enset*, and cereals) in the study area are briefly considered in this study to provide a broader context to our central questions.

II. Selection of study sites

The Gamo highlands provide the wider context of the study. The highlands are located in the Gamo zone of Southern Nations, Nationalities and Peoples Regional State (SNNPRS). Chencha, one of the 17 districts of the Gamo zone, was selected as the study *woreda* (Figure 1). The study sites are situated in Dorze and Doko. Dorze is traversed by the Arba Minch-Chencha road and located 7 kilometers to the south of Chencha town. It is divided into 15

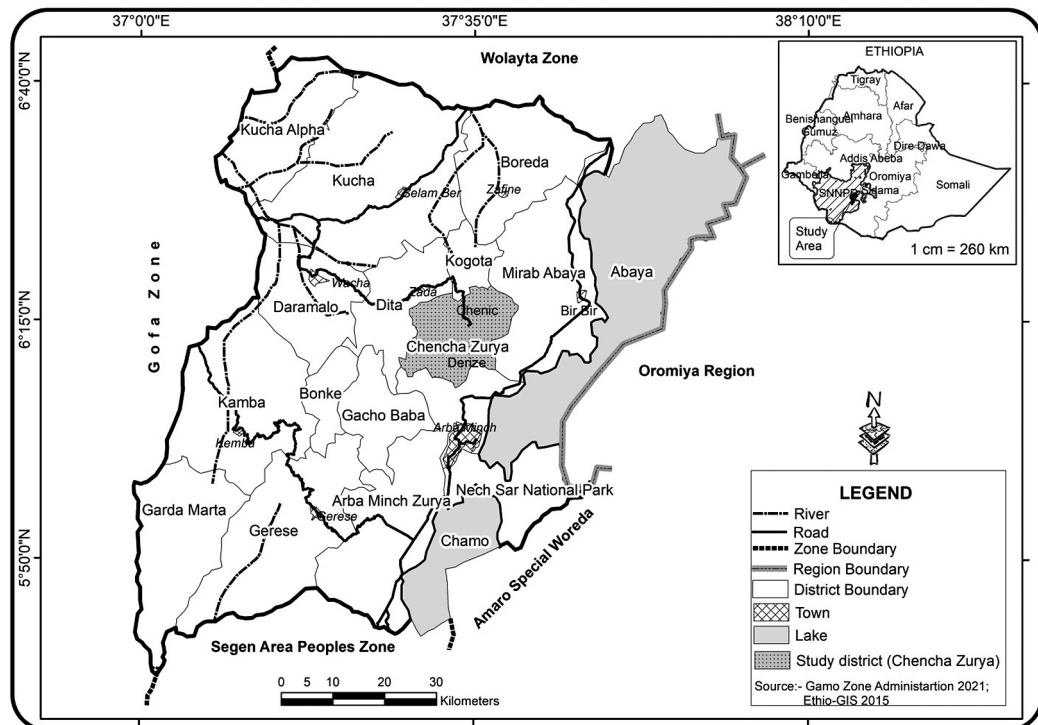


Figure 1 Location of Chencha district,⁽¹⁾ currently Chencha Zuriya, in the Gamo administrative Zone. Source: Gamo zone finance sector documentation department, Arba Minch.

kebeles including one small town. We selected two *kebeles*- Ayra and Bodo- as our study sites out of the 15 *kebeles* in Dorze. Ayra and Bodo had total population of 1,675 and 3,355 respectively. Our third study site, Doko Shaye, was selected out of the 14 *kebeles* of Doke area. Doke Shaye, located at the outskirts of Chenchu town, had population of 2,120 in 2018. Dorze and Doko sites have some remarkable differences. Dorze is predominantly inhabited by Orthodox Christians whereas the population of Doko is mainly Protestant Christians. While most of Dorze men are engaged in weaving, the number of Doko men involved in weaving is relatively small. According to oral sources, triticale was first introduced to Doko area in the 1960s by Catholic missionaries. One of the purposes of selecting Doko Shaye as a study site is to explore the origin and expansion of triticale across the Gamo highlands.

Several factors motivated us to conduct this study in the Gamo highlands. Some of them are our previous fieldwork experience in the highlands; the food insecurity situation we observed in the seemingly ever-green highland environment; and smallholders' adoption of triticale, an alien crop, that has not been promoted by the agricultural extension program. The other motivating factor is our growing interest in food security-related research. The persistence of food insecurity in Ethiopia despite the extraordinary government efforts to improving agricultural production and productivity has triggered us to conduct this study in Chenchu *woreda*, one of the food-insecure districts in the Gamo highlands.

III. Research methods

Qualitative methodology fits to the purpose of the study which is intended to explore multiple realities within a given socio-cultural setting, approach the research questions in a holistic manner, and investigate the perspectives and lived experiences of study participants through a close researchers-participants relationship. Ethnographic method was used to collect data from smallholder farmers and study participants from government agencies and other development partners (e.g., non-governmental organizations). Three categories of informants, 15 women and 12 men, participated in the study. The following data collection techniques were employed to gather field data: in-depth interviews, focus group discussions, informal conversations, and observations that involved different levels of participation. Nine key informant (6 men, 3 women), including development agents, agricultural experts, and NGO representatives, participated in key informant interviews. Twelve smallholders (6 men, 6 women), participated in in-depth interviews; whereas 6 women from smallholder families were engaged in group discussions.

Two rounds of fieldwork were conducted to collect data from the study district: (1) from January 5 to February 6, 2017; and (2) from November 10 to 30, 2018. In-depth interviews were carried out with community members and key informants including agricultural experts, and development agents, and representatives of NGOs running projects to enhance smallholders' food security. Observation of market places, farm sites, and households were also used as a data gathering method. Group discussions that involved women were carried out to collect data on how they experience food shortages and how they manage household food allocation during seasons of food insecurity. The discussions were not formally organized focus group discussions; they were informal discussions carried out during coffee ceremonies that involved from 5 to 6 women living in the same neighbourhood. The women engaged in the discussions knew each other very well and were comfortable to share their views freely. Most of the women were *de facto* and *de jure* household heads engaged in managing the family as well as farming activities. Furthermore, data were gathered through informal conversations in different contexts: in local bars, tea rooms, market places, and while walking to different places.

THE RESEARCH CONTEXT

I. Geographic, demographic and political settings

This research was conducted in the Gamo highlands located in the Gamo Zone, SNNPRS. The zone is bordered with the Gofa zone in the west, Dawro, and Wolayita zones in the north, South Omo zone in the south, and the Oromia Region in the east. The zone is divided into 17 districts. According to projection for 2018, the population of the Gamo zone is slightly more than 1.5 million (Gamo Zone Finance and Economy Office). The overwhelming majority of the Gamo people are settled in the densely populated highlands whereas the number of people settling in surrounding lowland areas is increasing in recent decades. The Gamo people speak Gamotstso (the Gamo language) that belongs to the Omotic linguistic family. The Gamo share linguistic and other cultural similarities with other north Omotic peoples: Gofa, Dawro, and Wolaita. Despite this, the Gamo have a unique historical route. For example, unlike the Dawro and Wolaita, the Gamo did not have a centralized political system (e.g., a kingdom) that embraced the entire Gamo area. Prior to the incorporation of the highlands into the expanding Ethiopian Empire in 1898, the Gamo people were organized into several tiny autonomous states locally called *dereta* (singular, *dere*). Although their autonomy ended a century ago, the *dereta* have maintained some of their identities to date. The Gamo culture is characterized by a considerable internal diversity (e.g., Freeman 1999; Getaneh 2016) perhaps because of this historical setting.

The study sites are located in Chenchä district which is situated about 30 kilometers to the North West of Arba Minch town, the administrative center of the Gamo zone. The population of the district was 111,686 based on the 2007 census report (CSA 2007); the figure increased to 134,920 based on the population projection from 2014–2017 (CSA 2013). According to data gathered from the district agricultural office in 2018, the total land area of the *woreda* is 37,360 hectare of which 26,195 hectares of land is cultivated. In terms of land use patterns most of the land is used for cultivation of seasonal crops (22,485 hectares) while 3,710 hectares is covered by perennial crops. Land size used for grazing is 2,478 hectares whereas 241 hectares is covered by natural forest. The land holding size is generally very small even compared with the national average. The average holding size in the district was 0.25 hectares (Mesfin et al. 2014).

II. Socio-cultural settings

Social structure among the Gamo is predominantly patriarchal. Descent is traced through the father's line. Landholdings are dominated by men's ownership. Only male descendants inherit land and other non-movable resources from their father. The inheritance system curbs women's rights to key family resources (e.g., land). Although women enjoy land use rights under certain circumstances, they are not allowed to inherit land from their father and transfer it to their children. It is also difficult for widows to have a full control over land. The widow's sons would have more rights to take over key household resources. The widow must move away from her deceased husband's house if she decides to enter into another marriage (Getaneh 2006; Mamo & Getaneh 2016).

Gamo communities are organized into caste-like social categories despite some differences from community to community. For instance, the majority of the Dorze (e.g., mainly farmers and weavers) belong to the highly respected social group called *mala*. The second social category is called *ayle* constituting a group of people who are considered as descendants of slaves. The third social group constitutes artisans, mainly potters and

tanners, locally known as *mana* and *dogala* respectively. The *ayle* are ranked lower than the *mala* but higher than the artisan groups (*mana* and *dogala*) who are the most marginalized groups. Considered as impure, they are excluded from a wide range of social relationships and communal activities. For instance, they are not allowed to own farmland and cultivate crops, and eat together from the same plate with the *mala* and *ayle*.

III. Livelihood strategies

Agriculture is an important source of livelihood in the Gamo highlands. Agricultural productivity has been low due to high population density, poor soil fertility, and small landholdings (Freeman 1999). Unlike most of the central, western and northern Ethiopian highlands, oxen drawn farming is a rare practice in the Gamo highlands. Men use two-pronged hoes to prepare small and fragmented plots for cultivation of crops. Cereal crops, mainly wheat and barley, are widely planted whereas *teff*, maize, peas, beans, potatoes, cabbage are also cultivated. In addition to annual crops, perennial crops, especially *enset*, and apple, are widely planted. The significance of *enset* (*ensete ventricosum*) is quite unique among the Gamo people. Each Gamo homestead is surrounded by an *enset* grove which is an important source of staple food for smallholder households. *Enset* is a drought resistant plant that can be harvested anytime of the year and stored for several months. As a result, resource poor households mainly rely on *enset* as a major source of food during lean seasons. According to oral narratives, apple and triticale are plants introduced to the highland in the 1960s by Protestant and Catholic missionaries respectively. Triticale (*X Triticosecale Wittmack*), known as *bashkala* in the Gamo highlands, is a hybrid of rye (*cecale cereal L.*) and wheat (see Ammar et al. 2004; Solomon et al. 2007). The crop is widely cultivated in the Gamo highlands in recent decades. Some people adopted apple as a cash crop and benefited a lot by selling apple seedlings and fruits while many others plant a small number of apple trees for household consumption.

The Gamo highlanders do also engage in off-farm activities to augment their food security and agriculture-based livelihood. Weaving and petty trading constitute important off-farm activities. Weaving is predominantly men's occupation in the Gamo highlands. In some communities (e.g., Dorze) an overwhelming majority of men are engaged in weaving. Most of the young weavers migrate to urban areas to get a better income from the weaving business. As a result, female population constitutes the majority of residents in several Dorze villages; in some cases women constitute up to 65% of the population (Getaneh 2006). Male weavers' out migration has serious implications for agricultural activities as it drains out labor from rural villages. Weaving-induced migration produces very small amount of cash flow back to rural villages to compensate the out flow of labor.

Food shortage in the study district is seasonal. The lean season extends beyond the period of *masqalla* festivities (last week of September) and continues until the beginning of crop harvesting in December. In addition to depletion of savings and food resources due to the *masqalla* celebrations, food shortage occurs due to limited availability of food crops on local markets and subsequent rise in the prices of major cereals during this period. According to data collected from women's group discussions, prices of wheat and barley at the Dorze Bodo market rose from about 10 Birr in the normal times of the year to about 15 Birr per kilo in the lean season of 2017. People cope up with the shortage of food during the lean season by buying maize from lowland markets; increasing income from off-farm activities such as weaving, petty trading, and labor sale; shifting consumption from cereals to *enset*; and selling small livestock (e.g., sheep and calf). Some informants emphasized the

importance of *enset* as a fallback crop but expressed concern that their livelihood security is being threatened by a widely spreading *enset* disease in the area.

DISCUSSION OF FINDINGS

This section discusses the major findings of the study focusing on current situation of food security, food security programs implemented in the study district, experts' perspectives and smallholders' strategies to enhance food security.

I. Present situation of food security

As noted earlier, the Gamo highlands, including the study sites, are affected by recurrent and seasonal food shortage. The study sites are located in Chenchä district, which is divided into 45 rural *kebeles*. As the *woreda* agricultural office sources indicate, 33 rural *kebeles* (73% of the rural *kebeles* in the district) are food insecure. According to data gathered from smallholders and development agents working in the study district, most households face food shortages in the lean season locally called *ofintsa*, which falls between late September and the end of November. It comes mid-way between the major crops planting and harvesting season known as Meher, which covers the period from June to December. The beginning of this time also corresponds with *masqalla*, an annual celebration of great socio-cultural and religious significances for the adherents of the Ethiopian Orthodox Church. Celebration of *masqalla* involves expensive and extensive festivities held from the mid to the end of September. Most of the Gamo migrants return from urban areas to their villages of origin to celebrate *masqalla* with their families, relatives and friends. As *masqalla* attracts a large number of migrants to rural villages, it entails extra-ordinary food consumption, which exhausts the already thin food resources of households. Expenses related to *masqalla* celebrations (e.g., purchasing meat, clothes, drinks, and migrants' round trip expenses) also exhaust peoples' (including migrants') savings and resources.

II. Agricultural interventions

As the field data reveal, different actors have been implementing agricultural interventions aimed at enhancing smallholders' food security in the study district. The *woreda* agricultural and natural resources development office, the major agent of agricultural intervention in the district, implements the agricultural extension program in all rural *kebeles*. Its efforts are backed by NGOs such as Vita, an Irish NGO, and World Vision, working as development partners of government.

1. Government interventions: Agricultural extension program

The main government-led intervention programs implemented in the study district are the agricultural extension program and the productive safety net program (PSNP). PSNP is being implemented in the district since 2005 (Guush et al. 2014). Figures from the district agricultural office indicate that 11,388 food insecure households (about 58% of the total households in the district) benefited from food/cash transfer of the program. The majority of these households (6,194 or 51%) were female headed households. The performance of this program seems dismal. Only 106 households managed to graduate from the program between 2005 and 2017, whereas another 512 households were expected to graduate some time in 2018/2019 (Chenchä district agricultural office).

The most pervasive agricultural intervention program, however, is the agricultural extension program. According to data gathered from Chenchu district agricultural development office, 135 DAs were assigned in the 45 rural *kebeles* of the district. The responsibilities of the DAs include making on-farm visits, encouraging farmers to adopt agricultural inputs and, accomplish farming activities on time, assisting smallholders in disease and pests' prevention and control activities, and collecting agricultural data and sending reports to district agricultural office. Chenchu district office of agricultural extension program had 120 (81 male and 39 female) office-based staff including agricultural experts trained in fields such as crop production, horticulture, crop protection, and natural resource management.

The extension program in the district mainly focused on improving the production and productivity of major cereal crops (e.g., wheat and barley). Recently, however, agricultural development experts and development agents have also been encouraging smallholders to plant high value crops (e.g., apple) to diversify and increase their income. Smallholders are also encouraged to adopt improved potato varieties to enhance household food security and boost their earnings.

Data from the field revealed both achievements and challenges of the extension program. One of the achievements, according to agricultural development experts, is the attitudinal changes of smallholders toward adopting new agricultural technologies. For example, misconceptions about chemical fertilizers including the widely held belief that '*UREA would multiply weeds*' has been vanishing. Smallholders' demand for agricultural inputs has also been increasing in recent years, and that several farmers have improved their food security consequently. The case of Doko Shaye, the *kebele* reported as largely food secure by informants, supports this view. One female informant said:

Five to six years back we struggled to have one proper meal a day. Now we are eating three meals. The extension program has helped us a lot to improve our lives. Now we get 'modern' potatoes and wheat seeds and profiting from them. We have apple trees and other garden vegetables. These have improved our food security in the recent years.

Improved food security in the *kebele* has been attributed to increased engagement in small scale commercial agriculture and income diversification, which is particularly depicted as the contribution of the extension program by female study participants. Smallholders, particularly women, are engaged in alternative ways of generating income to ensure their food security. Another female informant from the same *kebele* remarked:

When what we produce at home is insufficient, we work for other people and earn money to ensure our food requirements. We also receive money on credit from microfinance associations. Some of us [women] engage in different trade activities. For instance, I bought wheat and *bashkala* [triticale] when the price was low, stored them for few months and sold them when the prices got higher. Some of my friends bought sheep and calf, fed and fatten them for few months and sold them for good price.

In an environment where land scarcity is a major problem, intensification of agriculture and income diversification are vital sources of livelihood security. Commercialization of small scale farming is possible through intensification of agriculture. In this regard, smallholder farmers and members of the *kebele* administration emphasized the contribution of extension services and adoption of improved seeds and productivity enhancing inputs to improving food security. Potatoes and wheat appear to be important crops encouraged and

supported by governmental and non-governmental actors. Apple was mentioned as a major contributor to food security-serving both as a food and enabling households to increase their income and access food from market.

These positive appraisals of the achievements of the extension program, as perceived by the agricultural development experts, local government officials and farmers could be scrutinized from two angles. First, the positive changes as claimed by informants do not seem to equally apply to villages across the district. The field data indicate that local variations in history of livelihood strategies and activities, availability of labor, landholding size, access to or availability of financial resources to purchase modern agricultural inputs appear to affect the degree to which farmers accept extension program packages and embrace improved crop varieties. For instance, informants in Doko Shaye, more established agriculturalists and who are less involved in weaving and rural-urban migration, tended to positively view the extension program. They attributed their improved food security to the benefits they gained from adopting extension packages and advices of agricultural development experts. On the other hand, informants from Dorze *kebeles* that traditionally combine agriculture with weaving, and with a significant labor out-migration, tended to engage in the program half-heartedly. They also tended to cling to traditional (e.g., *enest*) and recently adopted crops (e.g., triticale) that require relatively lower labor and financial cost. Labor appears to be a critical issue here. Not only because out-migration of the youth removes large labor force from the villages but also due to the fact that weaving takes away part of the labor of those who still remain in the villages.

Second, the changes brought about by the intervention are facing challenges even in villages where such changes seem apparent and appreciated by the participants. A major challenge, as emphasized by farmers and experts alike, is the rising prices of inputs (improved seeds and chemical fertilizers). This is said to be discouraging farmers who have already adopted agricultural inputs and technologies and those who are considering adopting them. Some farmers also complained about the distribution of poor quality seeds by some local cooperatives as a recurring problem. In this regard, they pointed to the financial loss they incurred due to the distribution of bacterial wilt infected potato seeds. Another challenge raised by farmers was susceptibility of improved/new crop varieties (e.g., potatoes, wheat, and maize) to diseases, and the difficulties they face to prevent and control the diseases on time. The problem is exacerbated by the smallholders' difficulty to be able to make closer supervision of their crops on daily basis due to the distance of some of their farm plots from their residence, and because of shortage of equipment to apply pesticides as soon as they discovered the problem.

Some informants also alluded to challenges of sustainability associated with intervention modalities and experts' perception of or attitude towards farmers' local knowledge and choices. Apparently, the DAs and agricultural development experts predominantly employ the conventional top-down approach while implementing the extension program. These actors often point to the superiority of scientific knowledge and argue that smallholders would achieve their food self-sufficiency if they apply the extension packages as designed or prescribed by state development agencies. In this regard, they tend to underestimate farmers' experience-based knowledge and discoveries without examining their validity. They also tend to undermine some of the choices that smallholders make based on their resource constraint or endowment, experience and specific needs. This is particularly apparent when such choices appear to disregard extension packages and experts' recommendations; or deviate from experts' perceptions of production and productivity.

Local farmers were critical of the superiority of experts' scientific knowledge and technology packages as promoted by agricultural experts and development agent on a

number of grounds. Informants complained that the use of chemical fertilizers has been imposed on them first, and then highly promoted by state agents. This happened, according to several informants, without making proper study of the soils at different localities, and the type of chemical fertilizers suitable for different types of crops. For these farmers, application of chemical fertilizers as recommended by DAs is either arbitrary or based on broad generalizations. An informant's assessment of the effects of the application of chemical fertilizers on different crops may indicate concerns expressed by the farmers:

When you apply modern [chemical] fertilizers to potatoes, the result is really good. It greatly increases productivity. But chemical fertilizers are not good when applied to barley fields. They make barely grow too tall that it doesn't develop strong stem as a result of which the crop finally falls down.

In a similar vein, but in a way of expressing uncertainties associated with the adoption of extension packages, another informant from Doko Shaye wondered, if the adoption of chemical fertilizers is a right choice in their particular context:

We were told that once chemical fertilizers are applied to a farm field, you have to keep on applying it. Otherwise one has to leave the land fallow for three consecutive years and treat it with organic fertilizers to make it regain its natural fertility ... How could we do that! Given the small size of the land we have ..., how could one leave land fallow for three consecutive years?

Informants' critical comments are not entirely confined to packages of the agricultural extension program. They also challenge the campaign launched by the district agricultural office to discourage smallholders from cultivating triticale, a food crop widely planted across the Gamo highlands. Agricultural experts consider this crop as an obstacle to their efforts to enhancing food security of farming households in the district. Controversies associated with this crop are discussed in the next sections of the article.

In this intervention process and development agents' interaction with smallholders, traditional crops such as *enest* has been left out both at the level of development discourses and actions intended to ensure food security. In this regard, it is important to note that *enest* is one of the major crops essentially produced by all households in the district; that it is drought resistant and harvested in all seasons of the year; it requires less input cost and is more suitable for areas with high population density and small landholding size as is the case in the Chenchu district.

2. NGO interventions

Non-governmental organizations have also been engaged in implementing projects aimed at enhancing smallholders' food security. Vita is a small Irish NGO working in Ethiopia and Eritrea. It was founded in 1989 with the aim of assisting rural families to achieve sustainable livelihoods. Vita has been implementing a food security programs in five districts (including Chenchu) of the Gamo zone. In Chenchu district, Vita has been running a food security project under the following banner: Livelihood Enhancement through Agriculture for Resilience Network (LEARN), which promotes improved seeds of potatoes and highland maize. The implementation of the potatoes project started in 2011 with the aim of increasing smallholders' income and improving their food security by promoting improved potato seeds locally named *debulbul denich*—literally round potatoes.

Eleven *kebeles* of the district were included in the potatoes project during our field study. According to the figure obtained from Vita-Chenchu office, 265 farmers of three *kebeles* were participating in the scheme of producing potatoes for household consumption and

to generate income from the surplus product. On the other hand, 482 smallholders in the remaining eight *kebeles* were organized in cooperatives to multiply and distribute (in a form of rotating seeds) improved potato varieties to other farmers. Smallholders who participated at the initial stage of the project received some training and got 2.5 quintals of potato seeds from Vita, reproduced the seeds, and transferred the same amount of potato seeds to the next groups of farmers.

The achievement of the potatoes project is mixed. As Vita staff reported, four out of the eight potato seeds multiplying cooperatives had been successful. They managed to be recognized as qualified multipliers and distributors of improved potato seed since they satisfied all the necessary steps in the potato seeds production process (land preparation, planting, weeding, harvesting, and proper storage). These cooperatives have managed to produce quality potato seeds, transfer the rotating seeds to other farmers, and generate income by selling the remaining potato seeds. Some farmers reportedly earned a considerable amount of income from potatoes sales and boosted the dissemination of improved potato seeds to wider areas.

Vita runs its project in collaboration with district agricultural office and DAs working in the project *kebeles*. Vita's staff, agricultural experts, and farmers cultivating project potatoes alike viewed the potato project as successful. A female household head who has been engaged in the cultivation of potatoes asserted that planting the crop has enhanced their food security and increased the 'cycle of production' and the 'cycle of money'. She claimed that

Many of us are now planting improved potatoes twice a year. The cycle of production is made possible with the cycle of money [income that they earn at each round of production]. We plant potatoes in *belg* [a short rainy season, around March and April], use some for food at home and sell some on market. We use the money earned from selling the potatoes to buy fertilizers and seeds to plant other crops in the *meher* [a long rainy season: June-July-August]. We keep this cycle and maintain our food security at home.

The participant quoted above indicated that smallholders who engaged in planting project potatoes have managed to: generate better income, which they use to purchase inputs (improved cereal seeds and fertilizers) for the next rainy season; increase the productivity of cereal crops and improve their food security. Data gathered from members of one of the potato seeds producers' cooperative, however, indicate mixed results of the project. Potato seeds multipliers obtained high yield in the first two years of the project; improved their income and food security; and potato has become one of the main food stuff in many local communities. Yet, the scheme soon run into trouble when rotating potato seeds among smallholders was interrupted as a result of a wide spread of potato diseases and the distribution of poor quality potato seeds. Above all, the distribution of infected potato seeds accelerated the expansion of the potato disease [bacterial wilt] to wider areas and negatively affected the potato project by discouraging both early adopters and potential adopters of the crop. This problem has forced Vita to bring in a new variety of potato to sustain the project. This development also negatively affected the attitude of smallholders planting project potatoes. A leader of a potato seeds producing cooperative portrayed the shortcomings of project potato seeds in the following words: "... although it brings benefits, planting improved potato seeds entails some problems ... it makes farmers lose what they have [local/indigenous potato varieties] and eventually it also vanishes" as it is easily destroyed by diseases.

In addition to the potatoes' project, Vita introduced a new maize variety called Hora

Dega Maize, a highland maize variety, in 2014/15. Although it is an important ingredient of traditional foods, cultivating maize is a new experience in the study district and across the Gamo highlands. Historically, highlanders relied on maize cultivated by smallholders of the nearby lowlands. A drastic shift to cash crops has been observed in the lowlands districts (Arba Minch Zuria and Medab Abaya) bordering Chench district. Prior to the recent shifts to cash crops such as banana, smallholders of the lowlands districts cultivated maize as the main food crop followed by sorghum and sweet potatoes (Freeman 2002; Habtamu et al. 2017; Molla 2017; Girma et al. 2020). The Arba Minch State Farm is pioneer in introducing large scale banana farming. The state farm had banana plantation since the 1980s. Gradually, smallholders around the state farm adopted banana as a cash crop with the support of agricultural expert. According to recent figures, irrigation banana farms owned by investors and smallholders in the above mentioned two districts cover about 11,000 hectare of land. Currently, banana has become the major source of income and employment for most of the stallholders in the districts (Molla 2017). Although not well studied, the shift from food crops (e.g., maize) to cash crops (e.g., banana) would have implications for the traditional balance of local market exchanges whereby highlanders supply crops such as barley and *enset* products while lowlands provide maize and sweet potatoes. Vita introduced highland maize variety to Chench district in this broader setting. According to Vita staff, the seeds were distributed to farmers in 13 *kebeles* in Chench district and the adoption rate was good. Smallholders continue cultivating the seed to 2017. Vita staff reported that the productivity of Hora Dega Maize was encouraging (26 quintals per ha on average). The distribution of the maize variety was initially good but interrupted afterwards. Challenges related to the maize scheme included: shortage of rain, plant disease, bird and monkey attack while the crop is in the field, and high labor demand since the crop is harvested after six months. Vita was finalizing preparations to distribute another highland maize variety to continue the project.

3. Households' strategies to enhance food security

Smallholders' households do not entirely rely on the prescriptions of development agencies. In some cases, they adopt crops that are not promoted (even despised) by agricultural experts. For example, a substantial number of smallholders in the district cultivate triticale, a crop discouraged by agricultural experts. Smallholders have continued planting this crop and making it an important element of household foodstuff. Our field observations revealed that smallholders responded to newly introduced inputs, technologies, and successful experiences in different ways. In the following we will discuss smallholders' responses to crops promoted by the agricultural extension program and projects implemented by partner organizations. We will also explore smallholders' experience related to adopting and indigenizing triticale. The discussion mainly focuses on: 1) cereal crops, 2) potatoes and apple, and 3) triticale.

1) Diversification of crops

The agricultural extension program in Chench district focuses mainly on wheat and barley. Wheat is the first priority cereal crop promoted by the extension program followed by Barely. Development agents reported that different wheat varieties including Lakech, Hidasie, and Danda'a have been widely cultivated in Chench district. Lakech, a wheat variety released in 1970 (Shimelis & Pretorius 2005), was one of the popular wheat varieties in Ethiopia (Dawit & Zewdie 2016) and in the study district (Getachew & Biruk 2018). Hidasie and Danda'a, dust resistant varieties released in 2010 and 2012 respectively, are among the top ten wheat varieties widely accepted and cultivated in Ethiopia in recent

Table 1 Main food crops cultivated in Chencha district (2017/18)

Type of crop	Land under cultivation (ha)
Wheat	5,159
Barley	4,361
Pea	1,375
Beans	1,295
Debulbul dinich [Round potatoes]	1,150
Teff	139
Kidney beans	111

Source: Chencha District Agricultural Development Office, Chencha

years (Hodson et al. 2020). Barley is the second widely cultivated cereal crop in Chencha district. According to the district agricultural office's plan for 2017/18, wheat and barley cover about 9,520 has (Table 1), 70% of the total farmland expected to be covered by seven food crops.

Potatoes have also been promoted in the district. Vita has been encouraging and assisting smallholders to plant improved potato seeds as a source of income and for household consumption. Smallholders engaged in the cultivation of potatoes, agricultural experts and development agents claimed that the project has helped several households to enhancing their food security. In this regard, smallholders who successfully engaged in planting potato seeds generated a considerable income by selling potatoes (the price ranged from 800.00 to 1,000.00 Birr per quintal). One of the limitations of the potatoes project was that it covered a small number of smallholders' households in 11 out of the 45 rural *kebeles* in the district.

2) Adoption of apple and triticale

Apple and triticale, fruit and cereal crop respectively, are adopted by smallholders at various levels. The two plants were introduced to the Gamo highlands in the 1960s reportedly by Protestant and Catholic missionaries respectively. In this section we focus on the adoption of apple (a plant promoted by development agents) and triticale (a crop demonized by development agents) to explore smallholders' responses to crops promoted by agricultural development agencies and other options available on the local context.

Adoption of apple

Apple has been promoted in the district as a cash crop in the last two decades. Oral sources suggest that, apple was introduced by Protestant missionaries in the 1960s. However, it was confined to a few places, mainly in the compound of the Kale Hiwot Church of Chencha town, for decades. Despite long presence of apple in Chencha district, the plant received official attention only recently when the number of apple adopters started to increase in the 1990s. The district agricultural development office started promoting apple as an important source of income since 1999. Agricultural experts argue that planting apple would help smallholders generate income, which could help them purchase food and then achieve their food security. One informant from the *woreda* agriculture office put apple's contribution for food security as follows:

Apple plant is seen as an important asset ... it was even considered as a part of the household asset building efforts. It is important for farmers in the Gamo highlands where landholding size is small and soils of the highlands have been exhausted as people have been cultivating it twice a year for decades.

Smallholders who adopted apple as a cash crop are relatively few in number. Most of those who adopted the plant are adherents of the Protestant Church. This is partly due to the historical linkages of apple and the Church. A young man, a member of Rehoboth Apple Cooperative, enthusiastically and proudly portrayed the connection between the introduction of apple and the evangelism as follows:

When missionaries came they came with two things. That is what we heard from our fathers. They came with the ‘Word’ and the ‘Fruit’. They came not only with spiritual teachings but also with a thing that could be of benefit for people’s livelihood.

This depiction of the missionaries as coming with the ‘Word’ as ‘food’ for people’s soul and the ‘Fruit’ (apple) as food for people’s body, was expressed in almost identical fashion by informants in Doko Shaye, a predominantly Protestant *kebele*. Such depictions not only help us understand the historical association of the plant with the Kale Hiwot Church but also (even more importantly) the present attachment of members of the Church and the apple plant.

The number of people planting apple is gradually increasing. Chench *woreda* was once attracted a national attention as a source for apple adoption to all over the country.⁽²⁾ Yet, as indicated by several informants and based on our field observations, the plant is not evenly distributed (adopted) throughout the district. A number of reasons have been suggested by smallholders and development agents interviewed for this study.

One of the challenges is theft. Apple is susceptible to theft at two stages: as seedlings and as fruits upon maturity. Hence, guarding apple requires an additional effort compared to other crops. This situation not only discourages new adopters but also causes some losses to those who have adopted the plant. Study participants in the latter category insisted that because of fear of theft they sometimes are forced to harvest the crop before it fully matures. This action affects the quality and the price of apple fruits. This in turn harms not only the farmer concerned but also the reputation of the quality of apple produced in this pioneering district.

Some smallholders engaged in planting apple, however, tend to downplay the problem of theft by pointing to those localities that successfully managed to deal with the problem. A smallholder in Dorze Ayra, one of the study *kebeles*, claimed that people in a certain neighborhood introduced ‘a curfew’, banning any movement of people in and around apple fields after the sun sets. According to his view, as most of the people in that particular area have planted apple, the curfew works well because the local people observe the collective rules to protect their apples. Yet, it is important to mention that these localities tend to be areas where apple is adopted by several households and where the people have common interest to create rules and mechanisms to protect their crops; and where individuals may not be tempted to theft as they already have some. In contrast, theft remains a major problem in localities where only few people plant apple.

The other challenge is that producing apple requires more commitments—more labour, time and money—compared to cultivating other crops. It particularly requires intensive knowledge-based management including, the knowledge of apple varieties and related skills (e.g., of planting and trimming). Since most of the farmers lack the required resources, knowledge and skills; and since their time is divided between many other commitments, several people find it difficult to invest all (most of) their time and resources on apple production alone. This appears to be particularly true among the Dorze—who are labeled by some informants as ‘semi-farmers’ because of their commitment to weaving—for being reluctant to adopt the crop.

There are still other factors that constrain the adoption of apple. Some participants argue

that apple does not help them meet their urgent food needs. For resource poor households with urgent food needs, it would be difficult to planting apple and waiting for years for its fruits to come. Participants have also noted that apple competes for land with *enset* plantation. This appears to be a serious matter since *enset* is a plant with economic, cultural, and historical significance for most of the smallholder households across the highland communities. The dilemma for farmers is this: planting apple in plots located far away from homesteads is difficult as it exposes the plant for theft and wild animal attack; planting near and around homesteads is also a difficult decision since Gamo homesteads are surrounded by *enset* plants. Using the same land for apple requires replacing *enset* with apple, which most of the households cannot afford.⁽³⁾

Yet, some study participants associated apple planting with personal attributes of individual farmers. They characterized those who adopted the crop as hard workers and entrepreneurs, and those who are reluctant to adopt it as ‘lazy’ and ‘lacking a business spirit’ or as individuals who are stuck in the tradition. Our view, however, is that a number of other factors (mostly practical and partially historical) might have influenced people’s decision. Apple’s historical association with the Protestant Church is often mentioned as one of the reasons for followers of Protestantism to enthusiastically adopting apple.

Adoption of triticale

As the introduction and expansion of apple in the study district is associated with the Protestant Church, the historical roots of triticale are located in the Catholic Church at the town of Chench. Triticale is a wheat-like crop which was seemingly alien to the Gamo highlands but widely expanding across highland districts in recent decades (Figure 2). Although widely considered as a foreign crop in the study district, triticale has been known as *bashkala*, a local name sometimes given to people and plants with extraordinary physical features. The name could be given to children growing faster in terms of height or weight. Triticale as a food crop has unique features as compared to other cereal crops. For example, some triticale varieties in the study district grow from 1.5 to nearly 2.0 meters in



Figure 2 Triticale on a farm field, Chench district, Gamo highlands

height; and give high grain yields per unit area as compared to other cereal crops. In the following sections we highlight the origin and expansion of triticale, views of its proponents and opponents, and the lived-experiences of women actively engaged in cultivating triticale and using it as an ingredient of food items at the household level.

Origin and expansion of triticale

We could not find recorded documents about the origin of triticale in the context of the Gamo highlands. Questions about who brought it to the study district, why it was brought, where it originally came from are still not clearly known. A study participant in Doko reported that “The Catholics gave us red potato, *chiqunu sindie* [a type of wheat], and *bashkala* [triticale].” A dominant local narrative is that triticale was brought to Doko area (located near Chencha town) in the 1960s by a Catholic priest that almost all informants remember as ‘Father Owen’. It was allegedly introduced as livestock forage and later smallholders gradually cultivated it as a human food. Staff of the Catholic Church headquarters at Arba Minch and farmers and agricultural experts in Chencha *woreda* narrated a similar story. Our attempt to get some information from Father Owen via email was not successful.

Seen in its boarder experimental origin, triticale was developed to get a cereal crop that embraces good qualities of wheat (e.g., superior grain quality) and rye (e.g., resistance to disease) (Ashenafi 2008). The first fertile triticale seedlings were produced in Europe in the first half of the 20th century whereas better quality seedlings emerged in the 1950s and 1960s (Hulse & Spurgeon 1974) and spread to different parts of the world. Currently, triticale is cultivated in several countries in North America, Europe, Asia, and Africa (Hulse & Spurgeon 1974; Ammar et al. 2004; Salmon et al. 2004). The crop was introduced to Ethiopia in the 1970s but not widely distributed. It was reintroduced in the 1990s (Solomon et al. 2007) as a component of an Integrated Food Security Program in collaboration with the University of Stellenbosch (South Africa) and rapidly expanded in different districts of North Gondar (e.g., Farta, Estie, Lay Gaint, and Simada) through the efforts of development agents, market exchanges, and farmer-to-farmer distribution (Ashenafi 2008).

As the field data reveal, agricultural experts and farmers in the study district are not aware of these developments in other parts of Ethiopia. While triticale has been promoted by development agents in northern Ethiopia, the same crop has been despised and demonized by agricultural experts in the Gamo highlands. The crop has been expanding across the highlands through the efforts of smallholders who have gradually experimented on it for decades. In recent years, the crop has consistently been discouraged by state development agents (development agents and agricultural experts) on the ground that it is nutritionally poor and that it is expanding at the expense of more nutritious crops (e.g., wheat and barley). Despised by agricultural experts, triticale has not been covered by agricultural extension services, and not officially included in the list of crop production reports of the *woreda*.

Merits and demerits of triticale: Claims and counter claims

Smallholders who participated in the study argue that they plant triticale (*bashkala* in local discourses)⁽⁴⁾ for practical reasons. As compared with other cereal crops, they claimed, triticale gives more grain yields per unit area without the application of artificial fertilizers; and it does not incur cost to acquire improved seeds. Moreover, triticale grows well on poor and marginal soils, which are not suitable for planting other crops. These findings resonate with the qualities of triticale portrayed in the literature (e.g., Ashenafi 2008). In addition to these qualities, smallholders claim that wild animals (e.g., monkeys and apes) do not

attack triticale as it is difficult for them to remove the seed from the thorny hair-like husk cover. This is an essential quality of triticale for the smallholders who complained the loss they often encounter when other cereal crops (e.g., wheat) are attacked by monkeys upon maturity.

The advantages of triticale are not limited to those mentioned above. Study participants (smallholders in particular) reported that the crop has an extra ordinary ability to resist crop diseases and that its cultivation requires less labour as compared with other cereal crops. It was also claimed that a given unit of farm land requires smaller amount of triticale seeds during planting when compared to other cereals. Women in the study sites also insisted that food prepared from a small volume of triticale flour can feed many people. Women who participated in a coffee ceremony discussion used different Amharic expressions to describe the perceived quality of the crop as follows:

Bashkala sefa yale neger naw [*Bashkala* is a plentiful crop]

Bashkala hod yiyizal [*Bashkala* occupies the belly/*bashkala* keeps the belly full]

Bashkala lijoch yiyizilnal [*Bashkala* keeps children full].

There were, however, other study participants who had a different view. They argue that food prepared from triticale flour inhibits appetite as it is tasteless; as a result, one cannot eat as much as one would have liked to consume; hence, small amount of food could be served to many people.

Our field observation reveal that, despite people's varying perception of triticale, triticale is not only making a significant presence in the farm fields of the study area but also has become part and parcel of the food culture either in its own right or being blended with other crops. It has become a major component of such local foods and drinks as *injera* (Ethiopian flat bread), *dana* (local beer), *kinche*, and snack served with coffee at home. Women who are engaged in cultivating the crop in the field and processing food at home have many things to say about this controversial crop. The following is quoted from an elderly woman (about 70 year-old) in Dorze:

We plant *bashkala* because it helps us in a variety of ways. *Injera* has become a common food of the day. We bake a good quality *injera* by mixing a small amount of teff with a large amount of *bashkala*. Do you know how *bashkala* is helping us? It can be cooked as *kashka*, it can be used to brew *dana*, it can be baked as *injera*, it can be used in other variety of ways. We are poor people; for us, *bashkala* is teff of the poor.

The multi-purpose qualities of triticale outlined by study participants are similar to the qualities of triticale portrayed as suitable for the preparation of various traditional food items such as *injera*, bread, *kita* (thin flat bread), *kolo* (roasted grain), and *nifro* (boiled grain) and a tradition alcoholic beverage, *araqe* (Ashenafi 2008).

Our observations reveal that, because of the above benefits, triticale has got thousands of 'friends' among smallholder farmers across the Gamo highlands. Yet, it also has powerful opponents. The crop has become a target of 'anti-triticale campaign' by state agents in recent years. The district agricultural office has officially discouraged smallholders from planting the crop. Agricultural experts claimed that the number of smallholders cultivating triticale has been declining as a result of the campaign. Our field observations reveal situations to the contrary. Smallholders either turned a deaf ear to the campaign or openly resisted the anti-triticale campaign. Resource-poor farmers embrace triticale as a vital means of ensuring their food security, contrary to development agents' portrayal of the crop as an obstacle for food security.

The crop has been thriving amid the company of its friends (resource-poor farmers) and an adversarial campaign of its foes (agricultural development experts and development agents). Agricultural experts are running concerted campaign against the crop which included denying it: (1) official supports (e.g., agricultural extension services) provided to other crops (e.g., wheat, potatoes, and apple) in the context of agricultural development efforts to ensuring food security; (2) recognition of its food or nutritional value; and (3) cultural recognition as human food by spreading rumors that it was originally introduced as animal feed or was a ‘laboratory escape’. Let us portray arguments associated with each of these characterizations.

Agricultural development experts interviewed for the present study mentioned some points of argument to justify their decision not to support triticale. Their points include the following: (1) triticale degrades the land or diminishes the fertility of the soil; hence, planting the crop has more problems than benefits; (2) triticale occupies land for several months (up to 9 months); and (3) triticale’s nutritional content is poor. These characterizations are articulated in scientific guise, but none of them have been supported by research findings. The following excerpt illustrates experts’ accusations that lack any scientific evidence.

As professionals, we do not say that *bashkala* has benefits. We discourage the cultivation of *bashkala*. We do not allow farmers to plant *bashkala*. However, they sow it secretly. We do not also say it is productive. It competes for land that could be cultivated twice or three times per year, which is good to enhance household food security. So, it aggravates food shortage. My parents used to cultivate *bashkala*. I have convinced them to stop it. They do not sow *bashkala* now. (An agricultural expert, Chenchaworeda)

The claim that *bashkala* (triticale) is nutritionally poor resonates with the views of the relatively well-off people, a small social group, in the study area. Individuals from this social group tend to portray triticale as having low nutritional value. A man in his late 60s in Dorze complained about triticale in the following way:

Our sexual desire has died after the so called *bashkala* comes to our country. It kills our sexual desire. It is not food at all. It fills up the belly and then it goes out without nourishing and warming our body. People with a big family size plant it to feed their children. The government prohibits planting *bashkala*; however, people plant it as they believe that it feeds their family.

Another man from the same social group supported the view reflected by the person quoted above. He portrays triticale as ‘the food of the poor’ and further argues that ‘*bashkala* has no benefit except filling up the belly, and that it diminishes men’s sexual desire. Those who eat barely are strong; those who eat *bashkala* get weaker’. However, the claim that triticale is nutritionally poor is contrary to high nutritional value of triticale (Salmon et al. 2004).

The other negative characterization of the crop is related to the myth of origin. The plant is labelled as a ‘laboratory escape’ that was brought to the area before it finishes the full process of laboratory experimentation. It is alleged that triticale is an ‘incomplete’ plant that cannot be trusted as human food and that the crop was originally introduced for possible animal feed and hence doesn’t deserve a ‘human food’ status. These allegations appear to be based more on the myth of origin and perception than on any concrete evidences. These perceptions are indeed shared by different categories of study participants, agricultural experts, and smallholders alike, despite their difference on the implication

of those perceptions. Agricultural experts present them to demonize the plant while smallholder farmers narrate them without giving much attention to the story.

The portrayal of this alien crop as a ‘laboratory escape’, a hybrid of two other crops, and a crop planted as a livestock fodder have some similarities to the characterization of triticale in the literature. As noted earlier, triticale had been in laboratory experimentation and, it is a hybrid of wheat and rye (Ammar et al. 2004; Ashenafi 2008). Although it was developed as a human food, it has also been planted in different parts of the world as a grazing and forage crop (Salmon et al. 2004).

‘*Bashkala* is a ‘sign of plenty’’: Voices of women

The heading of this section, *bashkala* is a sign of plenty, is quoted from a female study participant. Although men and women alike appreciated the merits of triticale generally, women tend to highly favour the crop. Unlike experts’ who despise triticale, farmers, women in particular, tend to positively view the crop based on their experiences of cultivating and consuming it for years. They claim that *bashkala* and *enset* share some common qualities in that both: have multifaceted benefits; are highly productive; and serve more people with less quantity.

Smallholders also have responses to some of the claims of agricultural experts mentioned earlier. One of the participants (a woman in her early 50s) in Doko reacted to the anti-triticale campaign launched by district agricultural development office as follows:

Bashkala was introduced around 1950 [most participants said 1960’]; now it has spread as far as Bonke [a town located 97 kilometres from Chenchaj]. We know its benefits very well. We plant it in a small amount as we fear government influence. The government instructs us to stop cultivating *bashkala*. But we are asking them [government people] to give us something to replace it. The government has one point: ‘*Bashkala* stays on the field for many months, from 8 to 9 months’. It has no more convincing reasons.

The participant quoted above capitalizes on the benefits of triticale without denying the grain of truth in the claims of government agencies. For example, she acknowledged that ‘*bashkala* stays on the field for many months’. However, she noted that the merits of the crop outweigh its demerits. She also reveals her readiness to stop planting the crop if the government brings another crop that could replace triticale. This is a critical question of which government agencies had no answers. Smallholders who cultivate the crop do also have a counter argument to the claim that triticale stays on the field for almost a year hence, it denies chance to farmers from obtaining crop yields twice a year. One study participant, a smallholder, had this to say against such an argument: “*Bashkala* grows well on poor soils that cannot be used for other crops.”

Women participated in the study vividly reflect the merits of triticale relying on their experience-based knowledge. Female participants emphasized that triticale helped them maximize the availability of food for their family by mixing it with other relatively expensive crops such as wheat and *teff*. They also insist that triticale can be easily blended with all other food crops available at home. It could also be used alone to bake bread, to cook *qinche*, and to be served as *qolo*.

As discussed above, the major quality of triticale lies in its suitability to be mixed with relatively expensive crops such as *teff*. For resource poor households in the study area, baking *injera* (a staple food for the better-off and urban people) using *teff* alone is too expensive. They also know from experience that triticale alone is not good enough to bake a high-quality *injera*. Women overcome this challenge by making *injera* mixing large amount

of triticale with a small amount of *teff*. A woman in Dorze reported that she manages to bake a good quality *injera*, brew a good local beer, and bake a good quality bread mixing triticale with other crops. According to her report,

- She bakes a good quality *injera* mixing 10 kilo of triticale with two kilo of *teff*, that is 83% triticale and 17% *teff*. Due to such changes in the ‘chemistry’ of *injera*, women often say that ‘*bashkala* is *teff* of the poor’.
- She mixes 10 kilo of triticale with 10 kilo of maize or 3 kilo of red/black wheat (a local wheat variety) to brew a good quality *dana*, local beer.
- She uses *buluso*, a recently evolving triticale variety, alone to bake a good quality bread (according to women participated in a group discussion, *buluso* has an increasing wheat quality).

In addition to their continuous effort in indigenizing triticale, female study participants disproved some of the ideas raised by critics of the crop. We raised some questions to women during our discussion on a coffee ceremony. One of the questions was: “Agricultural experts say that *bashkala* has no nutritional value. What is your response?” A woman replied:

It is false! For us *bashkala* is a sign of plenty. It keeps our children fed. It is available amply. We sow a small amount of *bashkala* and harvest a lot of yield. If we invest more money and sow *qey sinde* [literally red wheat, local wheat variety], monkeys would eat it up. It is also expensive on the market. The price of one *tasa*⁽⁵⁾ [around 1 kilo] of *qey sinde* is 16 Birr. We could buy a *tasa* of *bashkala* with 7 or 8 Birr. *Bashkala* is good for us; it is suitable for everything-to brew *dana* [local beer], to bake *injera*, to cook *kashka*, it fits to everything that we need.

The women didn’t address the question of nutrition directly but pointed to other advantages of triticale over other crops grown in the area. In response to this follow up question: “It is also reported that planting *bashkala* is not good as it occupies the land for nine months. Do you agree?” Another woman (who was in her late 40s and received formal education to grade 10th level) asserted that

Bashkala is productive. People prefer to plant *bashkala*. Although it stays up to 9 months on the farm, we sow it believing that we would collect a yield equivalent to what could be obtained in two seasons if we cultivate barley. Currently, the time of harvesting *bashkala* is reduced to 7 months.

For this woman the productivity of triticale offsets the time it occupies the land. Moreover, she noted that new varieties of the crop are harvested in a relatively shorter period of time thereby potentially overcoming the challenge often mentioned by agricultural experts. The following short excerpt shows women’s assertive position and their determination to continue cultivating triticale despite the ban imposed by government agricultural experts. A woman exclaimed:

We will not stop planting *bashkala* bowing to agriculture experts’ intimidation and ridicule. We have named the crop ‘the broad thing’ [abundance]. Hence, we will continue planting it. We do that because we know how it helps us.

This reveals the extent to which triticale is indigenized and utilized in the Gamo highlands. Similar indigenization of triticale has also been reported in northern Ethiopia where the crop has got several Amharic names in different districts of North Gondar, viz., *addis sinde* and *logaw shibo* in *Estie* and *Farta*; *mogn aybelash* in Amba Giyorgis;

and *tekalign*, *wassie*, and *kibre* in other parts of North Gonder (Ashenafi 2008). A close examination of these Amharic names shows that triticale has been warmly welcomed by smallholders in the Amhara Region. The literal meaning of *addis sinde*, new wheat, indicates that farmers consider triticale as a new variety of wheat. *Mogn aybelash*, literally means a crop that is not eaten by the foolish, implies that only wise people cultivate and eat triticale. *Kibre*, on the other hand has an equivalent meaning to 'my pride'. *Logaw shibo*, the other Amharic name of the crop, portrays how tall/big triticale appears in the field before harvest. *Logaw shibo* has a similar meaning to the Gamo term *bashkala*, a name given to people/plants with an extra ordinary size and productivity.

CONCLUSION

Ethiopia, a predominantly agrarian country, is persistently affected by food insecurity. Millions of farming households, the major food producers in the country, have been exposed to recurrent food shortages. The Gamo highlands, seemingly ever-green landscapes, are among the regions often affected by food insecurity. Smallholders have been struggling to ensure their food security under challenging circumstances, among others, small and fragmented landholdings, poor soil fertility, and shortage of labor. In this context, government agencies and NGOs have been undertaking development interventions, including the agricultural extension program, across the highlands to enhance agricultural production and productivity.

The diverse actors involved in food security discourses and practices have varied perspectives and intensions. Agricultural experts and development agents have a strong conviction that adoption of extension packages alone would improve smallholders' food security. Their efforts are appreciable, but they tend to see adoption of improved seeds and chemical inputs (e.g., fertilizers, insecticides, and pesticides) as panacea for food insecurity. This 'package-based' approach to food security, however, has left little space for other options available for smallholders. For instance, agricultural experts tend to disregard smallholders' experience-based knowledge and socio-economic realities, whereas giving much attention to promoting official approaches, specifically agricultural extension packages, to enhancing food security (e.g., Kassa 2003; Baudron et al. 2012). In this regard, agricultural experts in the study district launched 'anti-triticale campaign' mainly because triticale is not incorporated in the agricultural extension packages. Moreover, agricultural experts in the district were not aware that triticale has been disseminated and promoted by development agents in northern Ethiopia to improve smallholders' food security. Paradoxically, a crop officially promoted to enhance food security in northern Ethiopia is labeled as 'an enemy of food security' in southern part of the same country. This shows a huge information gap among development agents, agricultural experts, and agricultural development offices in some parts of the country.

Findings of this study reveal that smallholder farmers tended to adopt pragmatic and more diverse approaches in their efforts to overcome food insecurity. They adopted crop varieties that involved lesser risks, demanded lower inputs (including labor), and provided relatively higher yields. It is in this context that smallholders in the study district adopted triticale, a cereal crop demonized by agricultural experts, based on experience-based 'cost-benefit' assessment of the crop. Farmers paid more attention to the crop's high yields per unit area without application of modern inputs, and its resistance to diseases and extreme weather conditions. Similarly, smallholders in the study district made conscious decisions to selectively adopt from among the crops promoted by development agents.

For instance, they adopted improved cereal crops, potato seeds, and inputs promoted by development agencies more easily than planting apple as a cash crop. This mainly is due to the fact that apple requires more land, especial skills, and knowledge to manage it, and a long-term commitment to adequately benefit from its yields. These findings confirm and support a major argument in development discourses that smallholder farmers in Africa are not passive recipients of agricultural technologies prescribed by development agents (Kodamaya 2011; Takahashi 2011). In this regard, the adoption, indigenization and expansion of triticale by smallholders across the Gamo highlands, regardless of the anti-triticale campaigns, could be considered as a lesson for researchers, agricultural experts, and development agents engaged in food security related discourses and practices.

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NOTES

- (1) Significant changes have been observed in the political map of Southern Nations, Nationalities, and Peoples' Regional State since the 2018 political changes in Ethiopia. For example, the former Sidama Zone has emerged as a new regional state after a referendum held on November 20, 2019. The former Gamo Gofa Zone is divided into two administrative zones: Gamo and Gofa. The number of Woredas (districts) has also been increasing after the political reform. For instance, the former Gamo Gofa Zone had 15 districts whereas the current Gamo Zone alone has 14 districts. Our study district, Chench, is renamed Chench Zuria Woreda.
- (2) Early apple adopters used to sell apple seedlings to people from other highland areas (including people who came from northern Ethiopia). The market for apple seedlings has dwindled in recent years as the former purchasers managed to produce their own seedlings. Currently, the major source of income is the fruit.
- (3) In addition to serving as a staple food across the highland communities, *enset* is widely serves many purposes during funeral ceremonies, used as livestock fodder, serves as household materials such as a tradition seat (stool).
- (4) Smallholder farmers and agricultural experts of the study district did not use the term triticale when they talk about the crop. Generally, triticale is identified with *bashkala*. We did not find a single person familiar with the term triticale, including development agents and agricultural experts working in the study district.
- (5) The term *tasa* refers to a small container prepared from used food/edible oil tin with the capacity of holding around a kilo of food crops used to measure cereal crops in local markets.

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