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Agroforestry-based Livelihoods in the Face Of Cultural and Socio-economic Dynamics in Rural Gedeo, Southern Ethiopia

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Abstract

This paper analyzes the vulnerability contexts of the agroforestry-based livelihoods of smallholders in rural Gedeo, Southern Ethiopia. Being extracted from a broader study that investigated the livelihood and food security situations within the Indigenous agroforestry system of the Gedeo people, the paper sheds light on the broader cultural and socio-economic contexts in which the livelihood system under consideration operates. The study employed a mixed-methods research approach (i.e., household survey, key-informant interviews, focus group discussions, field observations, and secondary analysis). The study revealed that the agroforestry-based livelihood of smallholders in rural Gedeo is situated on identifiable vulnerability contexts: population pressure; gradual erosion of Indigenous knowledge, social values, beliefs, norms; market influences; crop diseases; the decline of productions (mainly *Enset*, coffee, livestock); and seasonality of production, price and labor markets. Being under the pressure of the aforementioned factors, this livelihood system is emerging less and less rewarding for the smallholders and transitioning in a direction that endangers the sustainability of the agroforestry system. Innovative approaches need to be designed to improve the livelihood outcomes that the smallholders derive from this agricultural system, thereby ensuring its sustainability. However, as there is a growing resource constraint in the study area (mainly farmland), the smallholders need to be enabled to diversify their livelihoods towards off-farm and non-farm activities.

Keywords: Agroforestry system, Gedeo, livelihoods, sustainability, vulnerability contexts

1.0 Introduction

Being intentional management (maintenance) of woody perennials on the same land as crops and/or animals, either in some form of a spatial mixture or in sequence, agroforestry systems have been a common practice in various parts of the world for centuries (Suryanata, 2017). It is among the age-old land-use systems, especially in tropical and subtropical areas (Weiwei, Wenhua, Moucheng, & Fuller, 2014; Abebe, 2005). As part of traditional agricultural systems, agroforestry systems have recently experienced a surge in interest from the research and development communities (Jiao & Min, 2017; Mbow et al., 2014). One of the important symbols of the renewed interest to conserve such traditional agricultural systems is the launching of the Globally Important Agricultural Heritage Systems (GIAHS) by the Food and

Agriculture Organization of the United Nations (FAO) in 2002. The initiative aims to establish important global agricultural heritage and their related landscape, biodiversity, knowledge, and cultural systems (FAO, 2013; Yang et al., 2017).

The recent increasing global recognition of agroforestry systems is mainly due to their biological diversity, ecosystem services, economic and socio-cultural benefits at local, regional, and global levels (Zhang et al., 2017; Lasco, Delfino & Espaldon, 2014; Weiwei et al., 2014). In the face of recurring food shortages, projected climate change, and rising prices of fossil fuel-based agricultural inputs, agroforestry is recognized as a cost-effective means to enhance food security, while at the same time contributing to climate change adaptation and mitigation (Mbow et al., 2014). More recently, agroforestry systems are gaining new ground in the quest for climate-smart agriculture practices due to their ability to sequester carbon and mitigate climate change (FAO & ICRAF, 2019; Hanif, Bari, & Rahman, 2015; Vignola et al., 2015; Lasco et al., 2014; Thorlakson & Neufeldt, 2012; van Noordwijk, Hoang, Neufeld, Oborn, & Yatich, 2011). By doing so, these agricultural systems are contributing to many of the "international conventions, frameworks and targets to which growing numbers of countries are committing" (FAO & ICRAF, 2019, p.1).

Agroforestry systems are practiced throughout Africa in a wide variety of shapes and forms (Mbow et al., 2014). Several studies evidence that agroforestry systems have been practiced in Ethiopia since time immemorial, and many traditional agroforestry systems are still conspicuous across most of the agricultural landscapes in the highlands of Ethiopia (Asfaw & Lemenih, 2012). Agroforestry homegardens are among the dominant land-use systems, particularly in the South and Southwestern parts of the country (Abebe, 2005; Jama, Elias, & Mogotsi, 2006; Gebrehiwot, 2013). Regardless of differences in their practices, most are characterized by a diversity of and interactions and synergies between crop, tree, and livestock components. Having a very long history of supporting the most densely populated areas of southern Ethiopia, agroforestry systems have been regarded as efficient farming systems in parts of Southern Ethiopia (Gebrehiwot, 2013; Mellisse, van de Ven, Giller, & Descheemaeker, 2017).

The Gedeo people, an ethnic group in Southern Ethiopia, have for generations depended on an Indigenous homegarden agroforestry system (Kippie, 2002; Koohafkan & Altieri, 2017). Debelo, Legesse, Milstein, & Oda (2017, p.2) described this agroforestry system as "a traditional system of land use in which humans, trees, and perennial and annual crops coexist and complement each other." In this agroforestry system, trees are integrated with staple crops, mainly *Enset*, cash crops, mainly coffee (*Coffea arabica*), supplementary crops, fruits, and vegetables on the same unit of land (United Nations University Institute for the Advanced Study of Sustainability [UNU-IAS] & University of Tokyo's Integrated Research System for Sustainability Science [IR3S/UTIAS], 2016; Sustainable Land Use Forum [SLUF], 2006). Livestock rearing and apiculture are also practiced as part of this complex system (Kippie, 2002).

Some previous studies (Negash, 2007; Negash, Yirdaw, & Luukanen, 2011; UNU-IAS & IR3S/UTIAS, 2016) categorized the Gedeo agroforestry system into three types based on the dominant component species. Accordingly, the first one is an *Enset*-tree-based agroforestry wherein *Enset* and trees dominate the agroforestry at the altitude above 2000 masl. The second one is E*nset*-coffee-tree-based agroforestry at altitudes ranging from 1600 to 2000 m where coffee and *Enset* co-dominate the forest. And, at lower altitudes (i.e., below 1600 masl), there is coffee–

fruit crops–tree-based agroforestry where *Enset* is rarely seen, and coffee and fruit occupy a wide area. Studies evidence that the arrangement of the components of this complex system is time-tested and entirely embedded in the Indigenous knowledge of the Gedeo people. UNU-IAS & IR3S/UTIAS (2016, p.30) argued that this "integration process reached evolutionary maturity, with beneficial interactions enhanced and hostile interactions nullified." Being integrated in this manner, the agroforestry area covers 89,239.7 ha, i.e., approximately 69.3% of the total area of the Gedeo Zone (UNU-IAS & IR3S/UTIAS, 2016; G/Hiwot & Maryo, 2015).

It is well established in farming systems literature that farming systems are dynamic, and the drivers of changes to farming systems are often heterogeneous and complex, varying between households, locations, and time (Tittonell, Vanlauwe, Misiko, & Giller, 2011). As true for other agricultural systems, agroforestry systems are no longer intact. Rather, they have always existed within the context of change and are currently experiencing major transitions. Weiwei et al. (2014) indicated that traditional agroforestry systems are confronted with many trends and challenges, such as population growth, migration, market penetration, and climate change, among others. FAO & ICRAF (2019) also underscored that agroforestry systems continue to face institutional and policy-related challenges such as unfavorable policies, legal constraints, and poor coordination among various sectors.

Consequently, age-old traditional agroforestry systems are evolving rapidly in response to changes in both their socio-economic and biophysical environments (Mellisse et al., 2017). In many parts of Ethiopia also, this traditional land-use system has been gradually dissolving and transforming towards monoculture production of cash crops (Gebrehiwot, 2013; UNU-IAS & IR3S/UTIAS, 2016). Some studies (Abebe, 2005; Gebrehiwot, 2013) evidence that these systems are encountering constant pressures emanating from demographic, economic, and social dynamics.

There is a good deal of studies on the biophysical and ecological aspects of the Indigenous agroforestry system of the Gedeo people. Likewise, the socio-ecological benefits and production potentials of the agroforestry system have also received relatively better research attentions. Nonetheless, the wider cultural, socio-economic, and politico-institutional contexts within which this agricultural system and the livelihoods established on it operate have received disproportionately little empirical research. Therefore, this paper is aimed at analyzing the vulnerability contexts of the agroforestry-based livelihoods of the rural households and how the same shape the practice of the age-old Indigenous agroforestry system of the Gedeo. Understanding the vulnerability contexts of this agricultural system contributes to our understanding of the socio-ecological dynamics of the farming system and the drivers of change in it. This understanding, in turn, is important for designing tailored interventions to safeguard and increase the sustainability of this agricultural heritage system.

2.0 Materials and Methods

2.1 Study Area

The study was conducted in the Gedeo Zone, located in the southern part of Ethiopia. The administrative capital of the Gedeo Zone, Dilla Town, is located at about 369 km south of Addis Ababa. The zone is bordered by the Sidama regional state in the north, and by the Oromia regional state in the south, east, and west. The total land

area of the zone is about 134,700 ha. Out of the estimated total population of 1,148,517, 82.9% are rural inhabitants. The Gedeo Zone has an average population density of 853 persons/km^2, with a population growth rate of 2.9% (Gedeo Zone Administration, 2017). Wonago *Woreda*[1], one of the most densely populated areas in the country with 1222 persons/km^2, is located in this administrative zone (Gedeo Zone Administration, 2017; Bureau of Finance and Economic Development [BoFED], 2016). The Gedeo Zone is one of the largest coffee and *Enset* producing parts of the Southern Nations, Nationalities, and People's Region [SNNPR] and the country. Enset is the main staple food of rural Gedeo, while high-quality *Arabica* coffee is their major cash crop.

2.2 Research Methods

The study employed a mixed-methods research approach involving a household survey, focus group discussions, in-depth interviews, key informant interviews, informal discussions, observations, and secondary analysis. A total of 150 rural households were selected from three *Woreda* administrations of the Gedeo Zone. From the sample households, household heads were contacted to respond to the survey questionnaire. While data collection through household surveys took place between September and October 2017, data collection through the aforementioned qualitative methods continued until February 2018. Officials and experts at *Woreda* level, administrators and government extension officers at *Kebele*[2] administration level, the elderly and community leaders, knowledgeable local persons, and the youth took part in the aforementioned qualitative methods. Furthermore, a desk review of available secondary data and government reports, and a literature review were conducted and attempts were made to scrutinize and synthesize shreds of evidence. The data collected through the survey questionnaire was entered into a Statistical Package for Social Science (SPSS, Version 20) and was analyzed using appropriate descriptive statistics while thematic analysis was employed for the data collected through the qualitative methods.

2.3 Analytical Framework

Livelihoods have been a focus of both research and policy since the 1990s (Agergaard, Fold & Gough, 2010). The livelihood concept was crystallized in the early 1990s by Robert Chambers and Gordon Conway (Ellis & Freeman, 2005). Currently, most of the definitions of the concept 'livelihood' used by various bodies are derived from the work of Chambers and Conway (1992, p.7–8), where the authors defined the concept as:

> Livelihoods consist of the capabilities, assets - both material and social resources - and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide net benefits to other livelihoods locally and more widely, both now and in the future, while not undermining the natural resource base.

[1] Woreda is an administrative division that is equivalent to a district.

2 Kebele represents a lower level administrative division /peasant association in rural Ethiopia.

In the above definition, the concept of livelihood is much broader than mere income-generating activities. It encompasses,

> Not just what people do to make a living, but the resources that provide them with the capability to build a satisfactory living, the risk factors that they must consider in managing their resources, and the institutional and policy context that either helps or hinders them in their pursuit of a viable or improving living (Ellis & Freeman, 2005, p. 2).

As far as the analysis of livelihood is concerned, the sustainable livelihoods (SL) framework is the well-known approach of deconstructing rural livelihoods. Among the many variants of the sustainable livelihoods framework, the one forwarded by the British Department for International Development (DFID) has been employed as a guiding conceptual and analytical framework for this study. It is a widely used framework for analyzing rural livelihoods, and it improves our understanding of livelihoods, particularly the livelihoods of peasant households (Department for International Development [DFID], 1999).

In this framework/approach,

> Resources are referred to as 'assets' or 'capitals' and are often categorized between five or more distinct asset types owned or accessed by households: human capital (skills, education, health), physical capital (produced investment goods), financial capital (money, savings, loan access), natural capital (land, water, trees, grazing, etc.) and social capital (networks and associations) (Ellis & Freeman, 2005, p.3).

These asset categories are put into use through certain strategies and activities to produce certain livelihood outcomes. The risk factors that surround making a living (such as a set of external social, economic, and political forces and stresses) to which people are subject to are summarized as the 'vulnerability contexts.' The policies, institutions, and processes ranging from the extended family and the local community to the larger context of the national state and beyond are summarized as the 'policy and institutional context.' People's livelihood efforts, conducted within these contexts, result in outcomes: higher or lower material welfare, reduced or raised vulnerability to food insecurity, improving or degrading environmental resources, and so on (Ellis & Freeman, 2005; Ellis, 2000; DFID, 1999). Accordingly, this framework establishes that within a particular vulnerability context, people deploy livelihood assets in variable combinations, within circumstances influenced by institutional structures and processes to pursue diverse livelihood strategies, with more or less measurable livelihood outcomes (DFID, 1999; Ellis, 2000). All in all, the framework provides an integrated view of how people make a living within evolving social, institutional, political, economic, and environmental contexts.

In this paper, the approach was employed to deconstruct the vulnerability contexts of the livelihood system under consideration. In this regard, however, the researcher's examination of the vulnerability contexts of the agroforestry-based

livelihoods is made putting in mind the other elements of the Sustainable Livelihood Framework.[3]

3.0 Results and Discussion

3.1 Population and Land Pressures

As revealed during the survey of the present study, the average family size of the sample households was 6.52, wherein the family size ranged from 2 to 17 (see Table 1). Thus, the average family size of 6.52 indicates that the rural Gedeo has continued to be characterized by large-sized families. Moreover, this finding signifies that high fertility is persisting in the study area. The high fertility that has been evident in the study area for the last couple of decades has undoubtedly contributed to some aspect of human capital, specially to the availability of labor force to the peasant households and the larger community.

Table 1. *Mean Family Size of the Sample Households*

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Family size	150	2	17	6.52	2.97

Source: Survey (September – October 2017).

It is well established in livelihood literature (Davis et al., 2007) that the availability of labor force is an important aspect of human capital for rural households, and it can significantly influence the range and type of livelihood activities in which households may participate. From this perspective, it would be fair to argue that households with larger family sizes are advantageous as each member can add an asset to a household. However, this is only true if the available labor force is healthy, skilled, and contributes to the household's economy in a meaningful way. In the case of rural Gedeo, there has been an economic reason for large-sized family. As revealed by the informants of this study, historically, large family size used to be highly valued among the Gedeo as agroforestry has been a mainstay of rural households of the study area. In this regard, informants identified coffee production, which involves various stages in each of which all members of peasant households (including school children) are highly involved. Currently, however, for the majority of rural households in Gedeo, agriculture is not in a state of demanding the involvement of a large labor force as the majority's landholding (51.7%) is below 0.5 hectares, as shown in Table 2.

[3] This paper is extracted from a larger study that investigated the livelihood and food security situations in the context of the Indigenous agroforestry of the Gedeo people, Southern Ethiopia. Thus, the study was comprehensive enough to address all important elements of the framework.

Table 2. *Distribution of Rural Households by the Size of their Farmland*

Size of Farmland (in hectares)	**Male-headed Households**	**Female-headed Households**	**Total**	**Percent**
No farmland at all	8,092	4,383	12,475	5.6%
Below 0.1	42,299	6,250	48,549	21.9%
0.1 - 0.5	40,424	13,104	53,528	24.2%
0.51 - 1.0	30,133	7,532	37,665	17%
1.01 - 2.0	22,592	7,080	29,672	13.4%
2.01 - 5.0	14,116	5,635	19,751	8.9%
5.01 - 10.0	8,751	4,700	13,451	6%
Above 10.0	4,007	1,946	5,953	2.6%
Total	170,414	50,630	221,044	100%

Source: Gedeo Zone Administration, 2017 (unpublished research report).

As shown in Table 2, two extremes are observed concerning farmland holding in the study area. While 12,475 (5.6%) households don't have farmland at all, 19,404 (8.6%) households possess farmland exceeding five hectares. Though indispensable for the practice of agroforestry, access to farmland is highly skewed in the study area. The informants disclosed that rural land in the study area has gradually become accumulated in the hands of the few relatively better-off households. The informants partly attributed this very reality to poverty-induced land selling which gradually left many poor households landless.

Table 3**.** *The Distribution of the Number of Farm Plots Among the Sample Households*

Number of farm plots	Frequency	Percent
One	16	10.7
Two	32	21.3
Three and above	102	68.0
Total	150	100.0

Source: Survey (September – October 2017).

Equally important to the much smaller size of farmland in the study area is farmland fragmentation. As shown in Table 3, of the total respondents, the overwhelming majority i.e., 102 (68%), reported that their households hold more than three farm plots in different localities. Whereas, 32 (21%) and 16 (10.7%) reported that their households hold two farm plots and a single farm plot, respectively. On average, the number of farm plots of land owned by sample households is about three (2.95) as shown in Table 4.

Table 4**.** *The Average Number of Plots Held by a Household*

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Number of plots possessed by the respondents' households	150	1	5	2.95	1.1

Source: Survey (September – October 2017)

Though the majority of the sample households reported holding more than one plot of farmland in different localities of the zone, the size of each farm plot is as small as 0.25 hectares and below for the overwhelming majority as reported during the survey. This signifies the extent to which the landholding of the rural Gedeo households is fragmented. In the same vein, the informants who participated in the interviews and focus group discussions stressed the steady decline in farmland size and the increasing fragmentation of land for the overwhelming majority of rural Gedeo households. According to the informants, the persistence of high fertility that characterizes most households in rural Gedeo, has continued to exacerbate the decline in land size and its fragmentation as parents have to share the already small and fragmented farmland of their household with their large number of sons when the later establish their own families. The positive correlation between the younger age of the household heads and the smaller land size of the households revealed by the household survey of the present study also reaffirms this reality. This finding goes in line with Mellisse et al. (2018), which found that the increasing population pressure has contributed to the decline in farm size and land fragmentation, thereby primarily contributing to homegarden system dynamics in Southern Ethiopia.

Thus, the present study reveals that the Indigenous agroforestry-based livelihood of rural households in the Gedeo Zone is situated on an ever-increasing population pressure that significantly challenges the inhabitants' access to the principal livelihood asset, i.e. farmland. On the one hand, the noticeable difficulty in accessing farmland is triggering livelihood transition among smallholders, thereby putting the sustainability of the agroforestry-based livelihood system at crossroads. On the other hand, the lack of opportunities in the rural non-farm economy is bottlenecking the rural household's livelihood transition from being positive. The finding of this study is in line with UNU-IAS & IR3S/UTIAS (2016), which pointed out that the population of the zone is growing beyond the carrying capacity of the system, creating an imbalance between consumption and maintenance.

3.2 Erosion of Indigenous Knowledge and Decay of Societal Values

During group discussions and interviews, the informants indicated that, for generations, there have been widely shared and established worldviews, environmental values, and practices governing human-environment relations among the Gedeo. Informants underscored that the Gedeo's Indigenous agroforestry system has been practiced and maintained for generations without a remarkable degradation

because it is based on the Indigenous knowledge, traditions, values, beliefs, and norms of the ethnic group. In this regard, the informants stressed that the Indigenous knowledge, skills, social norms, values, beliefs, and traditions of the Gedeo concerning nature and their Indigenous social institutions for enforcing the norms are the keys to the practice and maintenance of the agroforestry system. Debelo et al. (2017) also underscored that respect, reciprocity, keeping balance, and sustainability have been the major values in human-environment relations in the Indigenous agroforestry system of the Gedeo.

Previous studies (Kippie, 2002; Negash, 2007; Legesse, 2013) showed that the practice of the Gedeo agroforestry system highly relies on the Indigenous knowledge of the ethnic group. In the same vein, UNU-IAS & IR3S/UTIAS (2016, p. 28) strongly argued that the uniqueness of this Indigenous agroforestry system "emanates from its exclusive reliance on Indigenous knowledge (IK)." This is mainly because the selection of the component species of this complex system and the optimization of the spatial and temporal arrangement of the components are embedded in the Indigenous knowledge of the Gedeo, which is transferred orally along the chain of generations (Kippie, 2002; Legesse, 2013). Thus, based on the pieces of evidence obtained from the fieldwork of the present study and also previous studies, one can argue that the Indigenous agroforestry system of the Gedeo is the product of the broader culture of the ethnic group and its practice and maintenance is also embedded in the Indigenous knowledge, beliefs, values, social norms, traditions and customary institutions of the ethnic group.

However, the older informants of various parts of the zone reported that their Indigenous knowledge, beliefs, values, social norms, traditions on the agroforestry system are being gradually eroded. The key informants concernedly disclosed that their Indigenous knowledge, values, beliefs, and traditions on the agroforestry practice and biodiversity protection are not well-transferred unto their younger generations. One of the key informants concernedly exposed that "the younger generation is less interested in our culture. Our children don't want to learn from us (the older ones) about our agroforestry system as they don't aspire to be farmers." There was a strong agreement among the participants of focus group discussions that there is a worrisome problem of transferring the Indigenous knowledge and associated values, traditions, and belief systems to the younger generations.

Furthermore, the informants attributed the incipient commercialization of trees (cutting trees for firewood, charcoal, and construction materials) and the expansion of monocropping largely to the decay of societal values, norms, and belief systems. In the same vein, previous studies (Debelo, et al., 2017; Legesse, Teferi, & Baudouin, 2013) pointed out that the rate at which the Indigenous knowledge of agroforestry is transferred to the younger generation among the Gedeo is slowing down. Legesse et al. (2013) further indicated that the younger generation places more value on the knowledge obtained from formal education. This evidences that the socio-cultural pillars of the Gedeo agroforestry system are highly challenged by the incipient cultural change, leading eventually to a great loss of agro-biodiversity and socio-ecological benefits of the system unless innovatively addressed.

3.3 The Trends of Coffee, Enset, and Livestock Production, and Productivity

The production of perennial crops, particularly *Enset* and coffee, is central to Gedeo's homegarden agroforestry-based livelihood system. While all the sample

households reported producing *Enset*, about 94% reported producing coffee. This finding agrees with previous studies (G/Hiwot & Maryo, 2015) wherein the researchers indicated that *Enset* is cultivated across all the three agroecological zones of the study area through its production and productivity various across the agroecological zones.

The trend of Enset production. As revealed by the survey (Table 5), 56% of the sample respondents perceived that their households' *Enset* production had been increased for the last three years, while 39.3% perceived it showed a declining trend. Given the socio-economic and ecological importance of the *Enset* crop, it is worrisome to find its production declining for a significant share of households. According to the respondents, high dependence on *Enset* for human and livestock, unfavorable climatic conditions mainly frost, declining landholding, crop diseases affecting *Enset*, and land-use change (mainly gradual replacement of Enset by cash crops such as *Khat*) were identified as the major factors contributing to the decline in *Enset* production for a significant share of households. A significant share of sample households reported confronting the combinations of the aforementioned challenges. Informants pointed out that the continued decline in their households' production of *Enset* has also induced a shortage of livestock feed, which in turn adversely affected their livestock production, thus having adverse implications for the households' food security.

Table 5. *The Perceived Trend of Enset Production Among Households for the Last Three Years*

The Trend of Enset Production		
	Frequency	Percent
Increasing	84	56.0
Decreasing	59	39.3
No significant change	7	4.7
Total	150	100.0

Source: Survey (September – October 2017).

The trend of coffee production. As the result of the survey has shown (Table 6), almost half (49.3%) of the respondents said that their households' coffee production has shown an increasing trend for the last three years. Regarding coffee production in the zone, previous studies (Negash, 2007; G/Hiwot & Maryo, 2015) evidenced that coffee is dominantly found in the mid and low land areas and its production and productivity decrease with altitude. However, as the key informants of this study mentioned and as noticed during field observations, since recently, farmers even at higher altitudes (such as some parts of Bule *Woreda*) have started to produce coffee in an unprecedented manner. The informants associated this new trend with the climatic changes that fortunately made the high latitude conducive for coffee production than before.

Table 6. *The respondents' perception of the trend of their households' coffee production for the last three years*

The Trend of Coffee Production in the Last Three Years		
	Frequency	Percent
Increasing	74	49.3
Decreasing	67	44.7
Didn't produce coffee	7	4.7
No significant change	2	1.3
Total	150	100.0

Source: Survey (September – October 2017).

On the other hand, slightly less than half (44.7%) of the sample households responded that their households' coffee production had been declining for the last three years. This finding coincides with Wolde, Tefera, Yared, Gezahagn, & Tadesse (2017) that pointed out a declining trend of coffee production and productivity for smallholders in various parts of the Gedeo Zone. The households that reported a decline in their households' coffee production attributed it mainly to coffee diseases, soil fertility decline, unfavorable climatic conditions, land-use changes, low coffee prices, and declining landholding. For instance, the informants of the present study mentioned frost that plagued coffee in the main coffee producing parts of rural Gedeo in 2016 (i.e., a few months earlier to the fieldwork of this study). Moreover, there was strong agreement among participants of the focus group discussions that the low price of coffee in the local market is serving as a disincentive for coffee producers. Besides, Wolde et al. (2017) pointed out inadequate attention to the sector, lack of improved varieties, an insufficient supply of input for coffee productivity package enhancement, low yield, and decline of market prices as contributory factors for the declining trend of coffee production in the study area. The informants of the present study (both FGDs and interviewees) also recognized that a significant share of households in their locality often confronts a combination of the aforementioned factors.

As coffee is the dominant cash crop of the rural households of the study area, the declining trend of its products for a significant number of smallholders has direct detrimental implications for the livelihood and food security of coffee-producing rural households. For a significant number of households in some parts of the zone primarily rely on the cash income they generate from selling coffee, the declining trend of its production signifies a significant livelihood transition for the concerned households. Nonetheless, given the extremely limited alternative livelihood options in the study area, such livelihood transition is less likely to be rewarding for most households.

The trend of livestock production. Historically, as informants indicated, livestock has been a vital component of the Gedeo Indigenous agroforestry-based livelihood system. Thus, it is important to look into the current possession and trend of livestock production in the face of the changing agroforestry landscape and its relative importance in the livelihood system.

As shown in Table 7, a quarter of the respondents (24.7%) were not rearing any kind of livestock during the fieldwork. However, out of the remaining 75.3%—21.3%, 13.3%, 10 %, 7.3% combined the production of cattle, sheep, and chickens; cattle and chickens; sheep and chickens; and cattle and sheep/goats, respectively. Chickens, cattle, and sheep by themselves were raised by 10.7%, 7.3%, and 5.3%, respectively. The productivity of small livestock (such as sheep and chickens) and their contributions to the livelihood of the rural households were underscored by the informants. According to the informants, depending on the agroecology, pack animals like mule and donkey are reared to some extent to transport products to and from local markets.

Table 7. *The Distribution of Types of Livestock Reared by the Respondents' Households*

Type of Livestock being Reared by the Respondents' Households		
	Frequency	Percent
Doesn't rear livestock at all	37	24.7
Cattle, sheep, goats, and chickens	32	21.3
Cattle and chickens	20	13.3
Chickens	16	10.7
Sheep, goats, and chickens	15	10.0
Cattle	11	7.3
Cattle sheep, and goats	11	7.3
Sheep	8	5.3
Total	150	100.0

Source: Survey (September – October 2017)

However, as shown in Table 8, the average number of livestock possessed by the households in the study area is extremely low, i.e., cattle (2.54), sheep/goats/ (4.36), and chickens (6.53). Regarding the possession of cattle, sheep/goats, the finding of this study coincides with Debele & Habta (2015) wherein the average holding of cattle, sheep, goats, and chickens was reported to be 2.42, 5.33, 3.46, and 2.9, respectively. However, this study finds a significant difference in the possession of chickens.

Table 8. *The Size of Livestock Possessed by the Sample Households*

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Cattle	74	1	10	2.54	1.93
Chicken	83	1	60	6.53	7.61
Sheep and/or goats	66	1	20	4.36	3.5

Source: Survey (September – October 2017)

Concerning the sample households' trend of livestock production, as revealed by the present study's survey (see Table 9), while 64 (42.7 %) households reported it declining, 43 (28.7) rated it as increasing, and the remaining 6 (4%) reported that their livestock size hadn't shown significant change. Informants also unequivocally disclosed that livestock rearing in study areas is highly challenging, mainly due to the fragmentation of land in general and the shortage of grazing land in particular. Coinciding with Negash (2007), this study reaffirms that the contribution of livestock to the livelihood of rural households in Gedeo is minimal, especially in *Woreda* administrations characterized by high population pressure and land scarcity. This evidences that livestock production (mainly cattle) in the study area as a livelihood activity is at crossroads, especially for poorer households.

Table 9. *The Trend of Livestock Population in the Respondent's Household for the Last Five Years*

The Trend of Livestock Population		
	Frequency	Percent
Decreasing	64	42.7
Increasing	43	28.7
No change	6	4.0
Total	113	75.4

Source: Survey (September – October 2017).

3.4 Market Influences

Selling tree products plays an important role in the livelihood of the Indigenous agroforestry-based livelihood system of the rural Gedeo. The informants mentioned the prevalence of selling Indigenous trees for timber and fuelwood purposes for the local market. During the field observations, the researcher observed timber in the local markets and also stacks of fuelwood along the highway and roads crossing the rural areas. In this regard, informants indicated that households with poor asset portfolios and proneness to prolonged food insecurity sell fuelwood during their food-insecure seasons. More recently, however, it has become an important source of cash income even for households with relatively better livelihood assets and locations at mid-altitude, especially nearby the main asphalted road. This finding coincides with Negash (2007), who indicated that some households engage in selling firewood during food insecure seasons, which results in planting the eucalyptus tree as a new trend.

However, this same incipient tendency of commercialization of trees has posed a worry among the inhabitants, especially the elderly, that it may endanger the indigenous tree species and the very sustainability of the Gedeo' agroforestry system (Debelo et al., 2017). Being worried by the threats of the incipient tendency of commercialization of trees, in some rural areas of Gedeo, there are incipient social control mechanisms to contain the massive selling of trees. For instance, in a rural village named Hama, Kochere *Woreda*, informants indicated that the local government, in collaboration with the council of village elders (*Songo*), has put preconditions for selling a single tree for the inhabitants of the locality. An informant

named *Ato* Bekele Shalo (age 46) from one of the rural villages of Gedeo described it as:

> To sell a tree, a farmer has to get permission from the local authority by presenting convincing reasons that compel his household to do so. A farmer may be allowed to sell a tree once his case is investigated and approved by local authorities and the council of elders.

As the informant revealed, a farmer may be allowed to sell a tree if his household has a serious financial problem to educate its children, is a destitute older person, and the like. This evidences that the trend of commercialization of trees is conspicuously felt at the grassroots level, and consequently, the locals are devising strategies to counter it.

Apart from the commercialization of tree products, the expansion of monocropping of Khat (*Catha edulis*) and eucalyptus trees was mentioned by the informants. The researcher also noticed the proliferation of market-oriented monocropping during fieldwork in some parts of the study area, such as the Wonago and Kochere *Woreda* administrations. The informants disclosed their concern about the rapid increase of these cash crops and their detrimental impact on the age-old Indigenous agroforestry system of the Gedeo. The informants concernedly mentioned that the expansion of cash crops such as Khat (*Catha edulis*), sugarcane, and trees such as eucalyptus, at the expense of dominant crops such as Enset and coffee, is threatening the agroforestry system in general and the production of food crops in particular.

3.5 Seasonality of Production, Price and Labor Markets

It is well-established in the livelihood literature that all rural households confront seasonality as an inherent feature of their livelihoods. The seasonal factors apply just as much to landless rural families that depend on agricultural labor markets for survival, as they do to farm families (Ellis, 2000). The seasonality of production, price, and labor markets are among the central features of the agroforestry-based livelihood of the rural Gedeo. November and December are the months in which many households reported to get better incomes by selling coffee while a significant share also gets better cash income by engaging in coffee harvesting as wage laborers. Consequently, this season is commonly known among the coffee dominant part of the Gedeo as "the coffee season." It is the season of relatively higher-income not just for those who produce coffee but also for others who engage in various off-farm and non-farm economic activities such as trade and agricultural labor markets. Livestock and livestock products, and other agricultural products are supplied to local markets and sold at good prices for it is also the season of active exchange in the local market.

In contrast, the time ranging from April to September is regarded as a season of relatively lower-income for a significant share of the households and even a season of no income for some. This season is well-known among many parts of rural Gedeo as 'a rainy season /*Kiremt/*. An informant named *Ato* Gezahegn Genqe (aged 68) from one of the rural villages of Gedeo described it as:

> For it is not a harvest season, it is a time of incurring costs; the time using up what you have saved; and the time of spending for farm preparation than

> gaining additional cash income. For coffee is the main source of income, the households' cash income drops as the coffee product is used up. The farmers don't focus on getting additional income, rather they fully engage in farm preparation for the next season.

Savings in terms of cash run out, and savings in terms of kind (e.g., grain) deteriorate as the farm households strive to cope with the challenges of the rainy season, i.e., circular food insecurity. In this season, agricultural production prices, livestock products prices, tree products prices, and wages for labor work tend to fall in the local markets as exchanges in local markets regress and collapse. For the majority of the households that do not have access to cash income to buy products from the local market, the price of agricultural and nonagricultural products and services falls in the local market. Even where there are resources to sell in the local market (like small livestock, tree products, honey, and handcrafts), their price falls in local markets as local peoples' purchasing powers drop in this season.

As the survey results evidenced, about a quarter of the sample households reported that they rely on trade (of various types and sizes) in addition to agriculture. However, some of those who engage in trade as a supplementary livelihood activity indicated that it falls and rises with the local market situations. Informants indicated that the market in rural Gedeo is only hot during the coffee harvest season (i.e., mostly from October to January), wherein everybody's purchasing power is relatively good.

As to wage labor, it takes two different features, i.e., the one driven by agricultural productivity in the area and the one induced by periodic shocks (mainly seasonal food insecurity). Among the rural Gedeo, as revealed during interviews and FGDs, the former one is often conducted during coffee harvest season (i.e., mainly during November, December, and January). In this case, it is common for many households that have little coffee to be harvested from their farms to encourage their family members (often including the school children) to take advantage of wage labor opportunities (mainly harvesting coffee on the others' farms). During this season, it has been reported that engaging in daily labor serves a positive outcome of agricultural productivity in the area and is also gainful for those who engage in it. The laborers engage in this kind of wage work within the rural areas (some in their neighborhood and others commuting to main coffee producing parts of the zone). Consequently, a good deal of households consciously and willingly diversifies their livelihood towards it. The latter type of wage labor is the one in which some households engage mainly during insecure food seasons (i.e., for many April to September) as a coping/survival strategy. Though many do not consider this season as a gainful season for engaging in wage labor, households experiencing food insecurity are forced to adopt occasional wage labor as their coping strategy. This is often done by commuting to nearby urban areas to search for daily and casual work. The informants, however, indicated that demand for labor and its wage declines in nearby urban areas as there is surplus labor during this season. Thus, this evidences that the agroforestry-based livelihood of the rural Gedeo is significantly influenced by seasonality.

4.0 Conclusion and Recommendations

The agroforestry-based livelihood of the rural Gedeo is situated on clearly identifiable vulnerability contexts that are endangering the production and socio-ecological functions of this agricultural heritage system. The rapid population growth and the resultant land fragmentation, the gradual erosion of Indigenous knowledge, diffusion of urban culture and decay of rural values, the eminent commercialization of tree products, declining production and productivity of coffee (for smallholders), Enset crops, and livestock were found to be important trends significantly influencing this agricultural system and the livelihoods established on it. Crop disease that affects major cash and food crops, namely coffee and Enset respectively, was found to be an actual shock that puts the resilience of the agroforestry-based livelihoods under a question mark. Furthermore, the seasonalities of off-farm and non-farm livelihood activities, cash crop (mainly coffee) production, the price of the products of this agricultural system, and the wage of labor in the local market represent aspects of seasonality found affecting the households' livelihoods.

The pressure exerted by the aforementioned vulnerability contexts and other socio-economic dynamics evident in the study area is effecting noticeable change in the practice of the Gedeo's Indigenous agroforestry system. The incipient transformations raise critical questions about the future of rural livelihoods in general and coffee production in particular for the smallholders in the study areas.

The lack of robust policy interventions to build the capacity of the smallholders to help them diversify their livelihoods, generate supplementary income and add economic value to the goods and services of this agricultural system is leaving it less rewarding for its custodians. Based on the findings, it is fair to argue that the socio-ecological importance and the challenges experienced by this agricultural heritage system are underestimated at the national level.

The findings imply that attempts to conserve this Indigenous agroforestry system without progressively addressing the underlying causes of its growing vulnerability would be futile. Therefore, policy interventions that target this agricultural heritage system and the established ivelihoods must be based on sound understandings of their vulnerability contexts. Possible policy interventions should start with the public recognition of the Indigenous knowledge and value systems underlying this agricultural heritage system, thereby encouraging the custodians to maintain it. Secondly, the underlying causes of population growth (such as limited utilization of reproductive health (RH) services, polygamous marriage, youth's early entry into marriage, and others) need to be progressively addressed. Thirdly, innovative approaches need to be designed to improve the livelihood outcomes derived from this agricultural system. In this regard, the removal of constraints to and expansion of opportunities for livelihood diversifications are required. However, as there is a growing scarcity of farmland in the study area, enabling the smallholders to diversify their livelihoods towards off-farm and non-farm livelihood activities is imperative. In this regard, encouraging diversification towards apiculture and directing the younger generation towards non-farm rural and urban economic activities seems the only option in some parts. Furthermore, increasing people's access to appropriate rural financial services, strengthening market linkages, and ensuring a fair price for farm produce (mainly coffee, honey products, livestock, and vegetables like onions) is imperative to enable the households to achieve positive livelihood outcomes and thereby ensure the sustainability of the agricultural heritage system.

References

Abebe, T. (2005). *Diversity in homegarden agroforestry systems of Southern Ethiopia.* (Doctoral thesis, Wageningen University, Netherlands). Retrieved from http://edepot.wur.nl/121644.

Agergaard, J., Fold, N., & Gough, K. (2010). *Rural-urban dynamics: livelihoods, mobility, and markets in African and Asian frontiers.* New York: Routledge.

Asfaw, B., & Lemenih, M. (2012). Traditional agroforestry systems as a safe haven for woody plant species: A case study from a topo-climatic gradient in South-central Ethiopia. *Forests, Trees and Livelihoods*, *19*(4), 359–377 https://doi.org/10.1080/14728028.2010.9752678.

Bureau of Finance and Economic Development [BoFED]. (2016*). Annual statistical abstract (2014/15) of southern nations, nationalities, and peoples' regional state*. Hawassa, Ethiopia: The Bureau of Finance and Economic Development.

Chambers, R., & Conway, G. R. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century* (IDS Discussion Paper no. 296). University of Sussex, Brighton, England. Retrieved September 30, 2020, from https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/775/Dp296.pdf?sequence=1.

Davis, B., Winters, P., Carletto, G., Covarrubias, K., Quinones, E., Zezza, A., Stamoulis, K., Bonomi, G, & DiGuiseppe, S. (2007). *Rural income generating activities* (ESA working paper no. 07–16). Retrieved from http://www.fao.org/3/a-ah853e.pdf**.**

Debele, S., & Habta, M. (2015). Sheep and goat production practice in agroforestry systems of Gedeo Zone, Ethiopia. *International Journal of Environment*, *4*(2), 296–307 https://doi.org/10.3126/ije.v4i2.12658.

Debelo, A., Legesse, A., Milstein, T., & Oda, O. (2017). *"Tree is life": The rising of dualism and the declining of mutualism among the Gedeo of Southern Ethiopia*. *Frontiers in Communication, 2*(7), 1–13. Retrieved from https://doi.org/10.3389/fcomm.2017.00007.

Department for International Development [DFID]. (1999). Sustainable livelihood guidance sheets. Retrieved from https://www.eldis.org/document/A41739.

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. New York: Oxford University Press.

Ellis, F., & Freeman, H. A. (2005). *Rural livelihoods and poverty reduction policies*. New York: Routledge.

Food and Agriculture Organization of the United Nations [FAO]. (2013). GIAHS – Globally important agricultural heritage systems. Retrieved from http://www.fao.org/giahs/giahs/en/

Food and Agriculture Organization of the United Nations [FAO], & International Centre for Research in Agroforestry [ICRAF]. (2019). *Agroforestry and tenure* (Forestry Working Paper no. 8). Rome, Italy. Retrieved from http://www.fao.org/3/CA4662en/CA4662en.pdf.

Gebrehiwot, M. (2013). Recent transitions in Ethiopian homegarden agroforestry: Driving forces and changing gender relations (*Licentiate thesis*). Swedish University of Agricultural Sciences, Umeå, Sweden. Retrieved from https://pub.epsilon.slu.se/10499/

Gedeo Zone Administration. (2017). *The situation of low income rural households in Gedeo Zone* (Unpublished research report).

G/Hiwot, B., & Maryo, M. (2015). Evaluation of Land Use Patterns across Agro-Ecological and Slope Classes using GIS and Remote Sensing: The Case of Gedeo Zone, Southern Ethiopia. *International Journal of Advanced Remote Sensing and GIS, 4(1),* 1385-1399 http://technical.cloud-journals.com/index.php/IJARSG/article/view/Tech-464.

Hanif, M. A., Bari, M. S., & Rahman, M. A. (2015). Potentiality of carbon sequestration by agroforestry species in Bangladesh. *Research on Crops, 16*(3), 562–567. http://dx.doi.org/10.5958/2348-7542.2015.00080.7

Jama, B., Elias, E., & Mogotsi, K. (2006). Role of agroforestry in improving food security and natural resource management in the drylands: A regional overview. *Journal of the Drylands*, *1*(2), 206–211.

Jiao, W., & Min, Q. (2017). Reviewing the progress in the identification, conservation, and management of China-Nationally Important Agricultural Heritage Systems (China-NIAHS). *Sustainability*, *9*(10), 1698. https://doi.org/10.3390/su9101698

Kippie Kanshie, T. (2002). *Five thousand years of sustainability? A case study on Gedeo land use (Southern Ethiopia).* Heelsum, Netherlands: Treemail Publishers.

Koohafkan, P., & Altieri, M. A. (2017). *Forgotten agricultural heritage: reconnecting food systems and sustainable development*. London and New York: Routledge.

Lasco, R. D., Delfino, R. J. P., & Espaldon, M. L.O. (2014). Agroforestry systems: Helping smallholders adapt to climate risks while mitigating climate change. *WIREs Climate Change, 5(6),* 825–833. https://doi.org/10.1002/wcc.301

Legesse, A. (2013). The dynamics of indigenous knowledge pertaining to agroforestry systems of Gedeo: Implications for sustainability. (Doctoral thesis, University of South Africa, Pretoria, South Africa). Retrieved from http://uir.unisa.ac.za/handle/10500/14617.

Legesse, A., Teferi, B., & Baudouin, A. (2013). *Indigenous agroforestry knowledge transmission and young people's participation in agroforestry practices: The case of Wonago Woreda, Gedeo Zone, Southern Ethiopia.* Report, Series A, no. 26. Acta Geographica-Trondheim.

Mbow, C., Van Noordwijk, M., Luedeling E., Neufeldt, H., Minang, P. A. & Kowero, G. (2014). Agroforestry solutions to address food security and climate change challenges in Africa. *Current Opinion in Environmental Sustainability*, *6*, 61–67. http://dx.doi.org/10.1016/j.cosust.2013.10.014

Mellisse, B. T., van de Ven, G. W. J., Giller, K. E., Descheemaeker, K. (2017). Homegarden system dynamics in Southern Ethiopia. *Agroforestry Systems*, *92*(6), 1579–1595. https://doi.org/10.1007/s10457-017-0106-5

Negash, M. (2007). Trees management and livelihoods in Gedeo's agroforests, Ethiopia. *Forests, Trees, and Livelihoods, 17*(2), 157–168 https://doi.org/10.1080/14728028.2007.9752591

Negash, M., Yirdaw, E., & Luukanen, O. (2011). Potential of Indigenous multistrata agroforests for maintaining native floristic diversity in the south-eastern Rift Valley escarpment, Ethiopia. *Agroforestry Systems*, 85(1), 9–28. Retrieved from http://link.springer.com/journal/10457/85/1/page/1

Sustainable Land Use Forum [SLUF]. (2006). *Indigenous agroforestry practices and their implications on sustainable land use and natural resources management: The case of Wonago Woreda* (Research report no. 1, unpublished doc., pp. 15). Addis Ababa, Ethiopia.

Suryanata, K. (2017). Agroforestry. *International Encyclopedia of Geography: People, the Earth, Environment and Technology, 1–3.* https://doi.org/10.1002/9781118786352.wbieg0141

Thorlakson, T., & Neufeldt, H. (2012). Reducing subsistence farmers' vulnerability to climate change: Evaluating the potential contributions of agroforestry in western Kenya. *Agriculture and Food Security, 1***(**15). https://doi.org/10.1186/2048-7010-1-15

Tittonell, P., Vanlauwe, B., Misiko, M., & Giller, K. E. (2011). Targeting resources within diverse, heterogeneous and dynamic farming systems: Towards a 'uniquely African green revolution'. In A. Bationo, B. Waswa, J. M. Okeyo, F. Maina, & J. M. Kihara (Eds.), *Innovations as key to the green revolution in Africa* (pp. 747–758). Dordrecht, Netherlands: Springer. Retrieved fro https://link.springer.com/chapter/10.1007/978-90-481-2543-2_76

UNU-IAS, & IR3S/UTIAS. (2016). Socio-ecological production landscapes and seascapes (SEPLS) in Africa. United Nations University Institute for the Advanced Study of Sustainability. Tokyo. Retrieved from https://www.sprep.org/attachments/VirLib/Global/socio-ecological-production-landscapes-seascapes-africa.pdf

van Noordwijk M., Hoang, M. H., Neufeldt, H., Öbon, I., Yatich, T., (Eds.) (2011). *How trees and people can co-adapt to climate change. Reducing vulnerability in multifunctional landscapes*. Nairobi, Kenya: World Agroforestry Center (ICRAF). Retrieved from https://hdl.handle.net/10568/42109

Vignola, R., Harvey, C. A., Bautista-Solis, P., Avelino, J., Rapidel, B., Donatti, C., & Martinez R. (2015) Ecosystem-based adaptation for smallholder farmers: definitions, opportunities, and constraints. *Agriculture, Ecosystem and Environment, 211*, 126–132. https://doi.org/10.1016/j.agee.2015.05.013

Weiwei L., Wenhua L., Moucheng, L. & Fuller A. M. (2014). Traditional agroforestry systems: One type of globally important agricultural heritage systems. *Journal of Resources and Ecology, 5*(4), 306–313. Retrieved from http://www.jorae.cn/EN/10.5814/j.issn.1674-764x.2014.04.004

Wolde, Z., Tefera, A., Yared, S., Gezahagn, T., & Tadesse, T. (2017). A Review on Coffee Farming, Production Potential, and Constraints in Gedeo Zone, Southern Ethiopia. *Journal of Natural Sciences Research, 7*(23), 1–9 https://www.iiste.org/Journals/index.php/JNSR/article/view/40101

Yang, L., Liu, M., Lun, F., Yuan, Z., Zhang, Y., & Min, Q. (2017). An analysis on crop choice and its driving factors in agricultural heritage systems—a case of Honghe Hani Rice Terraces System. *Sustainability*, *9*(7), 1162. Retrieved from https://www.mdpi.com/2071-1050/9/7/1162

Zhang, Y., Min, Q., Li, H., He, L., Zhang, C., & Yang, L. (2017). A conservation approach of globally important agricultural heritage systems (GIAHS): Improving traditional agricultural patterns and promoting scale-production. *Sustainability*, *9*(2), 295. https://doi.org/10.3390/su9020295