



Living income gap in Tigray Regional State of Ethiopia

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SWRE-RAISE-FS-working paper # 024

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This document presents a recent living income study in Tigray Region, which assessed the living income gap among smallholder farmers in Tigray, Ethiopia, focusing on Enderta, Raya Azebo, and Tseada Emba *woredas*. Survey data showed that the annual real income per adult equivalent per day was below the necessary living income benchmark in all areas. Off-farm activities were a major income source, while remittances varied, with overseas remittances prevalent in Raya Azebo and local ones in Enderta and Tseada Emba. The significant living income gap indicates that current incomes fall short of providing a decent standard of living.

Key words: living income, income, gap, productivity, Tigray, Ethiopia

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Preface

Rural households have engaged in various livelihood activities to enhance both the quantity and quality of life. The main sources of income for farmers include crop production, livestock rearing, and off-farm or non-farm activities. However, there is limited information available about decent living standards for household members in rural areas. A decent standard of living encompasses not only food and housing but also non-food, non-housing (NFNH) expenses, which include education, healthcare, social responsibilities, transportation, and more.

This study aims to assess living income gaps by comparing households' actual incomes with the income necessary for a decent standard of living. It utilized household surveys and focus group discussions (FGDs) conducted in the Enderta, Raya Azebo and Tseada Emba *woredas* in the Tgray region of Ethiopia. To determine the living income gap, the study measured the difference between actual household income and an established living-income benchmark across the three *woredas*. Income data were collected through surveys to determine farmers' actual earnings. The living income benchmark was developed using insights from FGDs to estimate indicators of decent living standards. The study ultimately calculated the living income gap by subtracting actual income from the established benchmark, providing context-specific recommendations to improve the living standards of rural households.

The research received financial support from the Dutch Embassy in Ethiopia for the Resilient Agriculture for Inclusive and Sustainable Ethiopian Food Systems (RAISE-FS) project. It is being hosted by Stichting Wageningen Research Ethiopia, based in Addis Ababa, to transform the Ethiopian food system across three food system typologies. The study would not have been possible without the collaboration of enumerators, *woreda* experts, development agents, and *kebele* administrators.

The study has a limited geographic scope. It focuses on three food system typologies and agro-ecologies, particularly within the already selected *woredas* for the RAISE-FS project, which considers commercial, food-insecure, and high-potential food system typologies. The findings will serve as valuable input for policymakers, researchers, scholars, and students in designing interventions, generating further information, improving living standards, and transforming food systems in rural areas.

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List of abbreviations and acronyms

AME	Adult Male Equivalent
ETB	Ethiopian Birr
CSA	Central Statistical Agency
FAO	Food and Agriculture Organization of the United Nations
FGD	Focused Group Discussion
ha	Hectare
KII	Key Informant Interview
km	Kilo meter
M.a.s.l.	Meter above sea level
mm	milli meter
NGO	Non-Governmental Organization
PPP	Purchasing Power Parity
PPP/AME/day	Purchasing Power Parity per Adult Male Equivalent per Day
PPP/RH/day	Purchasing Power Parity per Rural Household per Day
RAISE-FS	Resilient Agriculture for Inclusive and Sustainable Ethiopian Food Systems
SPSS	Statistical Package for Social Sciences
SWRE	Stichting Wageningen Research Ethiopia
TLU	Topical Livestock Unit
WSER	Wageningen Social and Economic Research
WHO	World Health Organization
WUR	Wageningen University & Research

Summary

There is little information on the living income gap's assessment by comparing smallholder farmers' yearly actual income to the living income benchmark. Understanding the income gap among rural households is crucial as it empowers stakeholders to take appropriate measures to bridge these differences. This study assessed the living income gap among smallholder farmers in three *woredas* of Tigray, Ethiopia: Enderta, Raya Azebo and Tseada Emba.

A household survey was carried out with a total 371 rural households using a structured questionnaire. Data on crops, livestock, remittance, off-farm, and non-farm income sources were collected and benchmarked against the living income standard, defined as the minimum income required for households to afford a decent standard of living.

The real income was expressed per adult equivalent per day (AME/day). The annual real income for Enderta *woreda* was 120.36 ETB (US\$ 5.43) per AME/day; for Raya Azebo *woreda* it was 180.93 ETB (US\$ 8.16) per AME/day; and for Tseada Emba it was 82.69 ETB (US\$ 3.73) per AME/day. These are all below living income benchmark. The income from off farm activities accounted for 41.9 to 53.2% of the total income. In the three *woredas* the contribution of income from both livestock and crops to the total income did not vary. Raya Azebo's overseas remittances comprise 84% while local remittances make up 84% in Enderta *woreda* and 68% in Tseada Emba. The living income gap in Enderta was 52.9% while it was 26.8% and 58.8% in Raya Azebo and Tseada Emba *woredas*, respectively.

This indicates that the real income farmers currently generate in Enderta and Tseada Emba accounts for 47.1% and 41.2 of the income needed for a decent life while it accounted for 73.2% of the income needed for a decent life in Raya Azebo *woreda*.

Introduction

Eradicating poverty and ending hunger are the first two Sustainable Development Goals (SDGs) that are intended to be accomplished by 2030 (UN, 2015). As it is vital to improving food security and creating jobs, the agricultural sector is closely related to SDGs (Otsuka, 2013). To ensure a better food supply, increasing agricultural output and diversifying the uses of agricultural land could be part of a plan to end hunger (Smyth et al., 2015). Ethiopia and other low- and middle- income countries have made significant efforts to reduce poverty, but the percentage of people living below the poverty line remained at 23% in Ethiopia (World Bank, 2022). Increasing production and productivity have been the major priority area in Ethiopia with the aim to bridge the yield gap and ensure food and nutrition security.

The worldwide extreme poverty level for low-income nations was set in 2017 at Purchasing Power Parity (PPP) of 2.15 US dollars per capita per day (World Bank, 2022). Based on the national poverty thresholds of the 15 poorest economies in the world, it was changed in 2017 to from 1.9 to 2.15 US dollars per capita per day, to account for a growing price levels (World Bank, 2022). The Worldwide poverty line has served as a gauge for evaluating the effectiveness of initiatives to combat poverty (Debebe & Zekarias, 2020). However, the World Bank poverty benchmark indicator (PPP) is very broad and does not take country or region specific realities into account. For hired workers, a more context specific poverty line known as the living wage was developed (Anker, 2008). Also, this indicator is not applicable for self-employed farm households. Because of that, a new indicator, called living income , was introduced to measure a decent standard of living for East African smallholder farming households (van de Ven et al., 2021).

Because there are few indicators that can be used to determine whether the income of farming households is enough to afford a decent living, a recent study by van de Ven et al. (2021) developed the idea of using a living income to benchmark income of self-employed smallholder farmers in East Africa.

A living income is defined as 'the net annual income required for a household in a particular place to afford a decent standard of living for all members of that household' (Anker & Anker, 2017). A 'decent standard of living' includes: a nutritious low-cost diet based on nutritional requirements and local food preferences, housing that meets local norms and common international standards of decency, essential needs including healthcare, clothing, education, and transport, and a margin for unforeseen events (Anker & Anker, 2017; Waarts et al., 2021). The margin for unforeseen events anticipates and plans for resilient livelihoods. Whereas living wages focus more on wages from a single source (e.g., factory workers), the living income concept considers all sources of income for the entire household.

A living income benchmark, in contrast to the poverty line, is more context-specific and more accurately captures the true cost of living in the area. It answers the question: 'How much does a typical household in a particular place need to earn from all income sources in order to achieve a decent standard of living?' (van de Ven et al., 2021) This creates an opportunity of comparing living income benchmarks to the total annual household incomes of agricultural households. The living income benchmark would help to calculate the living income gap and it is helpful in understand how much more farming households need to earn to achieve a living income (IDH, 2023; Oxfam International, 2021).

Cognizant of this fact, RAISE-FS, a project funded by The Netherland Government through its Embassy in Addis Ababa, is working on food system transformation in the food insecure, high potential and the commercial food systems. To determine whether the project contributes to closing the living income gap, the living income gap was assessed in three food systems of three *woredas* (Enderta, Raya Azebo, and Tseada Emba) found in the Tigray region in northern Ethiopia.

A first step in closing the living income gap, is calculating the living income benchmark in different study *woredas* of Tigray of Ethiopia. That was followed by assessing the annual real income of farm households in the three food systems of the region. The living income benchmark was calculated for the same study area

where the real annual income of the farm households was collected. The living income gap was calculated by subtracting the mean total household income from living income benchmark for small-scale food producers in the intervention areas of RAISE-FS.

The study was guided by the following specific objectives:

- To obtain insights in the annual real income and their main sources of income of smallholder farmers of the three *woredas* Enderta, Raya Azebo, and Tseada Emba;
- To obtain insights on how the real income vary across *woredas*;
- To assess the living income gap by comparing the living income benchmark with real income in the target food systems of these *woredas*.

Materials and Methods

2.1. Description of the study area

The study was conducted in Tigray Regional State of Ethiopia. From the Tigray region, three *woredas*; Raya Azebo, Tseada Emba and Enderta were selected. These *woredas* were categorized into different food system typologies: Raya Azebo with commercial food system type, Tseada Emba with a high potential food system type, and Enderta with food insecure food system type respectively. Within each *woreda*, two *kebeles* where a baseline survey for the RAIS-FS project had already been conducted were chosen: Tsigia and Kara Adishebo from Raya Azebo *woreda*; Tsankanet and Hangoda from Tseada Emba *woreda*; and Mahbere genet and Arato from Enderta *woreda*. Detailed descriptions of these *woredas* are given in Table 1. The living income benchmark was calculated at *woreda* level.

Table 1 Detailed description of the study areas

Variables		Raya Azebo <i>woreda</i>	Tseada Emba <i>woreda</i>	Enderta <i>woreda</i>
Number of <i>kebeles</i>	Rural	10	12	24
	Urban	1	3	6
Distance from regional capital-Mekelle (KM)		125	76	13
Area(square kilometre)		2,132.83	51,552.20	141,052.00
Average annual rainfall (mm)		550	500	450
Average altitude (m.a.s.l)		1000-1660	2,200 to 2,800	1750 and 2780
Latitude		12.66° N	14°11'N	13°30'N
Longitude		39.75° E.	39°33'E	39°40'E
Population size	Male	76,987	85,131	116,660
	Female	74,925	40,686	114,815
	Total	151, 912	125,817	231,475
Agroecology (%)	Highland	0	2	38
	Midland	90	98	39
	Lowland	10	0	23
Cultivated land (ha)	Rainfall	26,723	10,481	31,570
	Irrigated	3,240	1,012	3,704
Major crop produced		sorghum, teff, maize and chickpea	Teff, maize, barley, finger millet, wheat, potatoes, faba beans, grass peas, and field peas	wheat, barley, teff, sorghum, and grass pea
Major livestock reared		Cattle, Shoats, Poultry, camel, bee.	Cattle, Shoats, Poultry, bee	Shoats, cattle, poultry, Donkeys, bee

A total of six *kebeles* (two rural *kebeles* from each *woreda*) were selected for the household survey. Altogether, a total of 371 households (122 in Raya Azebo, 122 in Tseada Emba and 127 in Enderta *woredas*) participated in the survey. The respondents for the baseline survey were selected using random sampling techniques. It is noteworthy that the household survey was administered to determine the real income of households involved in innovation/pilot's trials as well as those who participated in the baseline survey.

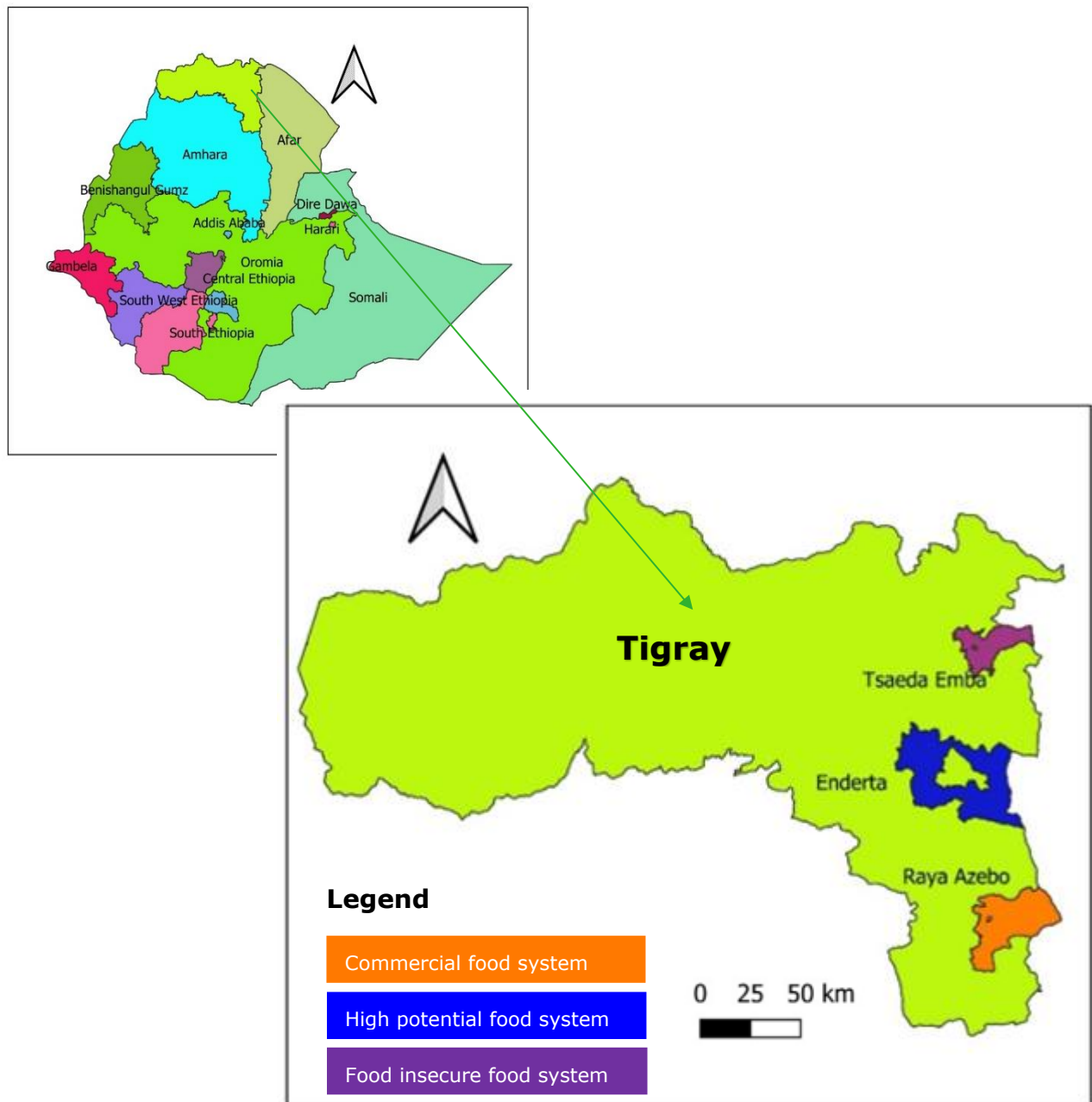


Figure 1. Map of the study area

2.2. Sampling design

This study employed a multi-stage purposive and random sampling method with probability and non-probability sampling techniques. The Raya Azebo, Tseada Emba, and Enderta *woredas* of the study areas were purposefully chosen because they are the sites where the project is being implemented.

2.3. Data collection

The primary data gathering tool used for the study was a household survey, in the form of a structured questionnaire. The questionnaire was designed to collect data on household characteristics (family size, age, and gender), resource endowment (farm size, livestock herd size), income sources (crops, livestock off farm), types of crops grown and their production. Enumerators who can speak the languages of the study

areas (i.e. Tigrinya) were recruited and trained for two days on the contents of the questionnaire and on how to collect data. The data were collected using Kobo Toolbox. For analytical consistency, livestock holdings were converted into Tropical Livestock Units (TLU), using standardized conversion factors provided by Storck and Doppler (1991). The questionnaire was developed and adjusted and refined based on the format and indicators used in the National Income Survey conducted by Ethiopia's Central Statistical Agency (CSA, 2016), ensuring alignment with national data standards and comparability of findings.

2.4. Data analysis

The data collected through the survey questionnaire were analysed using the Statistical Package for Social Sciences (SPSS version 20) and Microsoft-excel 2013. Descriptive statistical techniques were employed to summarize the findings, which are presented in the form of means, percentages, tables, and graphs for ease of interpretation.

In calculating annual household income, the monetary value of physical assets such as houses, land, and livestock holdings was excluded, focusing solely on actual income streams. To estimate crop income, all of the harvest in 2023/2024 cropping season was multiplied by its prevailing market price at *woreda* capital town.

Similarly, livestock income was estimated by multiplying the self-reported number of livestock sold within the year by the corresponding market prices reported during the same reference period. The survey also yielded information on the off-farm and non-farm income including earnings from wage labour, petty trade, and other non-agricultural sources, accrued during the agricultural season of 2022/2023. Finally, the living income gap was calculated as described by (COSA and KIT, 2020).

$$\text{Living income gap} = \left(\frac{\text{mean living income benchmark} - \text{Mean total household income}}{\text{mean living income benchmark}} \right) * 100$$

Results

3.1. Farm size and livestock herd size

The total farm size per household showed a significant difference among the three *woredas* of the study area (Table 2). With an average farm size of 0.39 ha, farmers in Enderta had significantly lower farm size than those in Raya Azebo (0.54 ha) and Tseada Emba (0.51 ha) *woredas*. However, farmers in Raya Azebo had significantly larger number of livestock (3.06 TLU) than those in Enderta (1.45 TLU) and the herd size in Tseada Emba (1.68 TLU) *woredas*.

Table 2 Mean $\pm$ SE of farm size and livestock herd size per household for the three *woredas*

Variables	Woredas			P-value
	Raya Azebo (n=122)	Tseada Emba (n=122)	Enderta (n=127)	
Farm size	0.54 $\pm$ 0.38 ^a	0.51 $\pm$ 0.37 ^a	0.39 $\pm$ 0.04 ^b	0.005
Livestock size	3.06 $\pm$ 0.19 ^a	1.68 $\pm$ 0.19 ^b	1.45 $\pm$ 0.19 ^b	0.000

Values with different letter across the rows represent significantly different at $P < 0.05$

3.2. Sources of income

3.2.1. Income from livestock

Smallholder farm households in the three *woredas* generated revenues from a variety of animal production categories (Table 3). In Raya Azebo *woreda*, income from cattle accounted for more than 40% of the livestock income while it was less than 40% for the other two *woredas*. Income from honey accounted for half of the total livestock income for all the three *woredas* while the contribution of dairy products such milk, butter, and cheese were almost negligible in the three *woredas*. When compared to the income from livestock in Enderta and Tseada Emba *woredas*, the overall income from livestock in the Raya Azebo was almost twice as high. For the Raya Azebo *woreda*, the daily income per adult male equivalent (AME) was 50.8 ETB (US\$ 2.3), while it was 27.2 ETB (US\$ 1.23) and 25.0 ETB (US\$ 1.13) per AME per day for both Enderta and Tseada Emba *woredas*, respectively.

Table 3 Income from livestock and livestock products for 2022/23 cropping season

Description	ETB (US\$PPP)/RH/year (mean)			F, (P)-value
	Raya Azebo (n=122)	Tseada Emba (n=122)	Enderta (n=127)	
Cattle	35,874 (1618) (43%)	13,967 (630) (31%)	17,242 (778) (38%)	
Small ruminant	3,485 (157) (4%)	5,291(239) (12%)	3641 (164) (8%)	
Chicken	1,065 (48) (1%)	1,829 (83) (4%)	1459 (66) (3%)	
Equine	777 (35) (1%)	1,100 (50) (2%)	436 (20) (1%)	
Cattle products	547(25) (1%)	175 (8) (0.4%)	72 (3) (0.4%)	
Honey	41,747 (1883) (50%)	22,362 (1009) (50%)	22,849 (1031) (50%)	
Total	83,494 (3766) (100%)	44,723 (2017) (100%)	45,699 (2061) (100%)	9.857 (0.001)
Total income from livestock (ETB (PPPUS\$)/AME/day)				
	50.8 (2.29)	25.0 (1.13)	27.2 (1.23)	10.497 (0.001)

Exchange rate: the year 2023 average exchange rate was used, 1USD=51.945 ETB

USD one PPP is equal to 22.17 ETB

3.2.2. Income from crops

The three *woredas* differed in how much each crop type contributed to the farm household income (Table 4 Error! Reference source not found.). Cereals accounted for the more than half of the three *woredas'* crop production revenue. Farmers in Tseada Emba *woreda* generated more income from root crops (36%) than the two *woredas*. In Raya Azebo *woreda*, other crops contributed 18% of crop income, compared to less than 5% in both *woredas*. The daily income per adult male equitant for the Raya Azebo was 51.6 ETB (US\$ 2.33), compared to 29.2 ETB (US\$ 1.31) for Enderta and 23.1 ETB (US\$ 1.04) for Tseada Emba *woredas*. The statistical tests also confirmed that total income from crops for Raya Azebo was significantly different from Tseada Emba and Enderta *woredas*. This suggests that farming households in Raya Azebo received more money from crop production than in Enderta and Tseada Emba *woredas*.

Table 4 Income from crops for 2022/23 cropping season

Description	ETB (US\$PPP)/RH/year (mean)			P-value
	Raya Azebo	Tseada Emba	Enderta	
Cereals	88,598(2192)(57%)	22,771(1027)(55%)	31,070(1401)(63%)	
Pulses	1,671(75)(2%)	2,014(91)(5%)	2,267(102)(5%)	
Root crops	0(0)(0%)	14,726(664)(36%)	412(19)(1%)	
Fruits	1,927(87)(2)	1,025(488)(3%)	0(0)(0%)	294 (0.001)
Vegetables	16,949(764)(20%)	241(11)(1%)	14,577(658)(30%)	
Other crops	15,520(700)(18%)	425(19) (1%)	621(28)(1%)	
Total	84,655(3819)(100%) ^b	41,252(1861)(100%) ^a	48,947(2208)(100%) ^a	
Total income from crops (ETB (US\$PPP)/AME/day)				
	51.6 (2.33)	23.1(1.04)	29.2 (1.31)	10.742 (0.001)

3.2.3. Remittances

Local remittances made up about 84% and 68% of the total remittance revenue in the Enderta and Tseada Emba *woredas*, respectively. In contrast, Raya Azebo's local remittance revenue only made up 16% of the *woreda*'s total remittance revenue (Table 5 Error! Reference source not found.). This suggests that whilst farmers in Raya Azebo received their remittances from diaspora, those in Enderta *woreda* received nearly all of theirs from local sources. In the Raya Azebo *woreda*, the total daily remittance per adult male equivalent was 20.3 ETB (US\$ 0.92) /AME/day, however in the Enderta and Tseada Emba *woredas*, it was 4.5 ETB (US\$ 0.2) and 3.7 ETB (US\$ 0.17) /AME/day respectively.

Table 5 Income from remittance for 2022/23 fiscal year

Remittance	ETB (US\$ PPP/RH/year)			F-test (P-value)
	Raya Azebo	Tseada Emba	Enderta	
Local remittance	5340(241) (16%)	4547(2015) (68%)	6264(283) (84%)	
International remittance	28013(1264) (84%)	2136(96) (32%)	1214(552) (16%)	
Total	33352(1504) (100%)	6683(301)(100%)	7478(337) (100%)	17.187(0.001)
Remittance	ETB (US\$PPP) /AME/day			
	20.3 (0.92)	3.7(0.17)	4.5 (0.2)	14.897 (0.000)

3.2.4. Off farm income

While the income from salary activities were accounted for less than 5% of the total income from off farm in three *woredas* the wage accounted for 14% in Enderta, 19% in Raya Azebo and 24% in Tseada Emba *woredas*. Other off farm activities, including petty trade, handicraft, land rent, house renting, and livestock rent, accounted for over 65% of off-farm income in the three *woredas* (Table 6). In Enderta *woreda*, the daily off-farm income per adult male equivalent was 59.52(2.68 ETB (US\$), whereas in Raya Azebo and Tseada Emba *woredas*, it was 58.3 (2.63) ETB (US\$)/AME/day and 30.9 (1.39) ETB (US\$)/AME/day, respectively.

Table 6 Off farm income for 2022/23 fiscal year

Off farm income	ETB (US\$PPP)/RH/year			F-test (P-value)
	Raya Azebo	Tseada Emba	Enderta	
Salary	2649(119) (3%)	622(28) (1%)	4077(184)(4%)	
Wage	17749(801)(19%)	13036(588)(24)	14015(632) (14%)	
Safety net	3258(147)(3%)	4655(201)(8%)	2406(109) (2%)	
Other off farm	72076(3251)(75%)	36920(1665)(67%)	79430(3583)(79%)	
Total	95731(4318)(100%)	55233(2491)(100%)	99928(4507) (100%)	18.007(0.000)
Off farm income	ETB (US\$PPP) /AME/day			
	58.3(2.63)	30.9(1.39)	59.5(2.68)	18.419(0.000)

3.2.5. Share of income sources

In Enderta, Raya Azebo and Tseada Emba *woredas*, income from off farm activities contributed for respectively 53.2%, 43.4% and 41.9% of the total income. In the three *woredas*, the contribution of crop farming was less than 30% to the total income (Figure 2). The contribution of livestock to total income was 22.6% in Enderta, 28.1% in Raya Azebo and 30% in Tseada Emba.

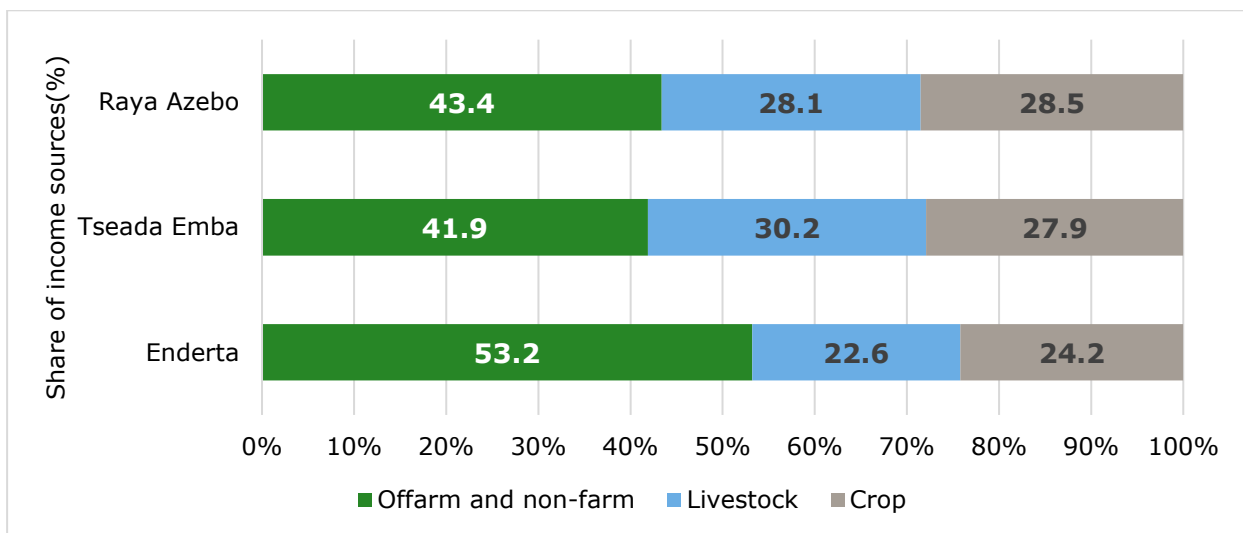


Figure 2. Share of crops, livestock and off farm income to the total income for the three *woredas*

3.3. Living income gap

Based on the living income benchmarking report, a daily income of US\$ 11.15 per AME in Raya Azebo, US\$ 9.05 per AME in Tseada Emba and US\$ 11.53 per AME in Enderta, is required for a household to achieve a decent standard of living (Figure 3). The actual income generated by households was US\$ 8.16 per AME per day in Raya Azebo compared with US\$ 3.73 in Tseada Emba and US\$ 5.43 per AME per day in Enderta (Figure 3).

The resulting living income gap was higher in Tseada Emba (59%) followed by 53% in Enderta and 27% in Raya Azebo. This indicates that households currently generate only 47% of the living income required in Enderta, 73% in Raya Azebo, and 41% in Tseada Emba. Overall, the findings demonstrate substantial income gaps across all three *woredas*, with the largest gaps observed in Tseada Emba and Enderta.

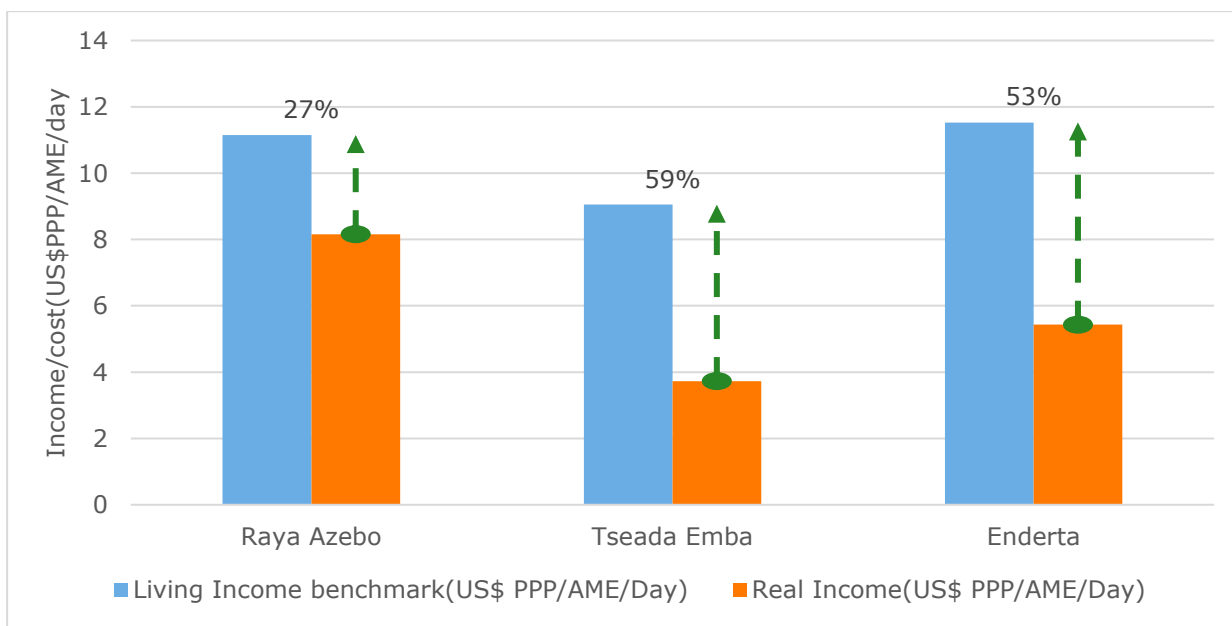


Figure 3. Living income gap for the three *woredas* of the study area

Conclusion and recommendations

The annual real income per farm household varied among the three study *woredas*. Farmers in the three *woredas* earn from 41.9 to 53.2% of their income from off farm activities while the contribution of income from crops and livestock did not substantially vary among the three *woredas*. Other off farm activities, including petty trade, handicraft, land rent, house renting, and livestock rent programs, accounted for over 65% of off-farm income and is the major off farm income contributor in the three *woredas*.

The real income in Enderta and Tseada Emba covered 47.1% and 41.2 of the income needed for a decent life, respectively while it accounted for 73.2% of the income needed for a decent life in Raya Azebo *woreda*. The income gap was the biggest in Enderta followed by Tseada Emba *woredas*. This necessitates customized development alternatives for every *woreda* in order to close the disparity in living income.

The variation in living income gap across *woredas* indicate that uniform interventions will be ineffective. Therefore, we recommend targeted livelihood package for each *woreda*, prioritizing social protection and strengthen off farm activities in Enderta *woreda* due to its larger share of income sources while capitalizing on livestock production in Tseada Emba *woreda* and enhance market linkage and business development skills in Raya Azebo *woreda*. The latter to efficiently utilize the larger income generated from off farm activities, including petty trade, handicraft, land rent, house renting, and livestock rent programs. Since off farm income contributes the largest share of household earnings in all *woredas*, strengthening rural enterprises, skill development, and access to markets is just as critical as improving income sources.

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