



Constructing a Coping Strategies Index for Agro-Pastoralists: Assessing food security in Nyangatom, Ethiopia

July 2021

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Introduction

Food systems in Ethiopia's Lower Omo region have been disrupted in recent years due to environmental and infrastructure changes, with resulting impacts on food security. For the agro-pastoralists who call the Lower Omo home, farming has been negatively affected by a series of shocks including the end of the annual flood of the Omo, and invasions of locusts. At the same time herding has been compromised by zoonotic disease. Previous Briefing Notes have described these changes at a macro-scale; here we report on their impacts on food security, and explain the approach we took to measuring this construct in a way that is appropriate to the agro-pastoralist context.

Food security can be described as the ability for all people, at all times, to have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2002). The Household Food Insecurity Access Scale (HFIAS) and the Coping Strategies Index (CSI) are surveys commonly used to assess food security by asking respondents how regularly they utilize a coping strategy. However, some of the strategies addressed in these surveys are not relevant to agro-pastoralist households. Therefore, to answer the question, *"How food secure are members of the communities in Nyangatom?"*, we first carried out focus groups at which participants described a range of coping strategies that they had employed. We used this data to develop a hybrid questionnaire with locally relevant frequency *and* severity weightings – the Coping Strategies Index – Agro-Pastoralist (CSI-AP).

Methods

Devising a locally appropriate measure of food security

There are many questionnaire-based tools designed to measure behaviours and experiences related to food security. These questionnaires are usually administered directly to the person most responsible for food provision in the household, but are considered indirect measurements of food insecurity, indicating a level of household vulnerability from which food insecurity may reasonably be inferred (Radimer et al., 1990). Two of the most common indirect measures are described below.

Box 2. Existing food security measures

- Household Food Insecurity Access Scale (HFIAS): 9-question survey that focuses on perceptions and behaviours of households regarding access to food. Scores based on frequency.
- Coping Strategies Index (CSI): 12-question survey that asks about how households manage shortfalls in food and how often they use these strategies. Scores based on frequency and (unspecified) severity.
- Coping Strategies Index - Agro-Pastoralist (CSI-AP): 7-question survey based on HFIAS and CSI and adapted for an agro-pastoralist context. Scores based on frequency and severity.

Box 1. Summary

- Our survey found 90% of households across Nyangatom were food insecure.
- In more than half of households, adults had gone without food for at least one day in the past month.
- Due to variation in livelihood strategies, some coping strategies (e.g., eating seed) were not available to all communities.

The Household Food Insecurity Access Scale (HFIAS; Coates et al., 2007) assesses the impacts of access to food through questions about reactions and responses to food insecurity that are common across many cultural contexts. The nine questions fit into three categories of (1) anxiety and uncertainty surrounding the food supply, (2) perceptions of insufficient quality of food, and (3) insufficient food intake and its physical consequences. If a respondent indicates that they utilized a strategy in the past 30 days, a follow-up question is asked regarding how frequently it was utilized (rarely, sometimes, or often). When responses to these questions are aggregated, a household may be placed into a food insecurity category based on how frequently they use the strategies. For example, a "mildly food insecure" household worries about not having enough food but would rarely have to forgo eating preferred foods or eat a limited variety of foods. By contrast a "severely food insecure" household often runs out of food and members of the household often go to sleep hungry or go a day without eating.

The Coping Strategies Index (CSI; Maxwell & Caldwell, 2008) is frequently used for food security monitoring in African and Middle Eastern countries. Originally developed in Ghana, the survey consists of 12 questions about how households cope with shortfalls in food consumption. The questions fall into the categories of dietary change, short-term measures to increase food availability, short-term measures to decrease the number of people fed, and rationing or managing the loss of food. For each coping strategy there is a corresponding frequency score based on the number of days the strategy is used in a week. Like the HFIAS, the CSI does not have any specified severity weightings for the strategies; however, these may be developed in focus group discussions to reflect local context. Once strategies are weighted for severity, they are multiplied by their frequency and added together to determine a household’s food security score.

To inform our food security survey, we first carried out in-depth qualitative research regarding coping strategies (see OTuRN Briefing Note #4) which informed a locally-relevant measure of food security, the **Coping Strategy Index – Agro-Pastoralist (CSI-AP)**. The CSI-AP has three sections – (1) worry, (2) adjustment of food consumption, and (3) strategies to ensure alternate sources of food. Table 1 compares survey questions from the three tools to demonstrate how the CSI-AP builds on HFIAS or CSI questions; although many of the questions are worded slightly differently, they convey a similar coping strategy. The CSI-AP combines some strategies (e.g., eat smaller meals and eat fewer meals), removes others that are not relevant in the local context (e.g., purchase food on credit), while adding others that are locally relevant (e.g., feed children less).

Table 1. Overlap between the HFIAS, CSI, and CSI-AP questions. Italics indicate questions from the HFIAS survey; non-italicized questions are specific to the CSI; the underlined question is particular to the CSI-AP.

Coping Strategy	HFIAS	CSI	CSI-AP
<i>Worry that your household would not have enough food?</i>			Question 1
<i>Not able to eat the kinds of foods you preferred because of a lack of resources?</i>			Question 2
<i>Eat a limited variety of foods due to a lack of resources?</i>			Question 2
<i>Eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?</i>			Question 2
<i>Eat a smaller meal than you felt you needed because there was not enough food?</i>			Question 3
<i>Eat fewer meals in a day because there was not enough food?</i>			Question 3
<i>Was there ever no food to eat of any kind in your household because of lack of resources to get food?</i>			Question 7
<i>Go to sleep at night hungry because there was not enough food?</i>			Question 7
<i>Go a whole day and night without eating anything because there was not enough food?</i>			Question 7
Borrow food from a friend or relative?			Question 5
Purchase food on credit?			
Gather wild food, hunt, or harvest immature crops?			
Consume seed stock held for next season?			Question 6
Send children to eat with neighbors?			
Send household members to beg?			
Restrict consumption by adults in order for small children to eat?			Question 3
Feed working members of household at expense of non-working members?			
<u>Have children in the household eaten less?</u>			Question 4

Frequency of recourse to coping strategies, and severity of food insecurity

CSI-AP questions were accompanied by follow-up questions regarding frequency of occurrence, which were scored as 0-2 (0=never, 1=sometimes, 2=often). Based on focus group discussions and existing literature, the index was also weighted for severity of food insecurity on a scale of 1-4. In recent research from Ethiopia, a four-category rating of severity is common (Bekele & Abddisa, 2019; Dessalegn, 2018; Gebrehiwot & van der Veen, 2014; Negash & Alemu, 2013). We use the ratings from Bekele & Abddisa (2019), in which one is least severe, two is moderately severe, three is very severe, and four is most severe. For question 1, worrying about having enough food, we recommend a severity of one, as there is no impact yet on actual behavior. Question 2, eating the same food or food not normally eaten, we weight as a two, as per eating less preferred foods in the CSI, which is ranked as less severe by studies conducted by Maxwell & Caldwell (2008), Murendo et al. (2020),

and Gebrehiwot & van der Veen (2014) but has implications for diet and health. Question 3 on adults eating less we weight as a three as it has health implications but is not as severe as reducing quantity for all members of the household. Maxwell et al. (2008), Gebrehiwot & van der Veen (2014) and Negash & Alemu (2013) also rate this strategy as a medium severity. Thus, because limiting adult intake is often seen as less severe as limiting children’s intake, question 4 on children eating less is given the highest severity (4). Given the potential long-term impacts on social capital, we follow Gebrehiwot & van der Veen’s (2014) recommendation for question 5 on borrowing food and recommend a medium severity weighting (3). Question 6 regarding eating stored seeds and grains can also be weighted a three, finding middle ground between weightings in Gebrehiwot & van der Veen (2014) and Negash & Alemu’s (2013) studies – such a strategy removes assets that can be used to ensure productivity in the future and is therefore classed as very severe. Question 7 on not eating for a day is viewed as a severe coping strategy given the risk to health by Dessalegn (2018), Gebrehiwot & van der Veen (2014), and Negash & Alemu (2013); we weight this as highest severity (4).

Table 2. The Coping Strategies Index – Agro-Pastoralist: Questions and associated severity and frequency weightings

Coping Strategy	Severity	Max frequency	Max score
1. Do you ever worry (are you concerned) that your household will not have enough food?	1	2	2
2. Have household members had to eat either the same thing every day or something you don’t usually eat because there is no other food?	2	2	4
3. Have adults in the household eaten less?	3	2	6
4. Have children in the household eaten less?	4	2	8
5. Have you borrowed food from anyone?	3	2	6
6. Have you eaten stored seeds or grain (intended for cultivation)?	3	2	6
7. Has anyone in the household gone without eating for a day?	4	2	8
			40

The HFIAS raw food security score ranges 0-7, with 0-1 indicating high food security, 2-4 for low food security, and 5-7 for very low food security. Based on a 4-level categorization of severity (1-4) multiplied by the frequency weightings, the maximum food security score is 40. Borrowing the proportions of each category of food insecurity from the HFIAS, the “high” food security score ranges from 0-5.71, “low” food security from 5.72-22.85, and “very low” food security from 22.86-40.

Study population

We carried out research in Nyangatom *woreda* (district) within Ethiopia’s South Omo Zone. Within the district, the three *kebeles* – the smallest administrative unit of Ethiopia – participating in the research were Kopriay, Ayepa, and Napasmuria, communities that represented a range of livelihood types along the agro-pastoralist spectrum (Hodbod et al., 2019):

Ayepa—historically more reliant on flood-retreat agriculture;

Kopriay—historically more reliant on pastoralism with larger cattle herds;

Napasmuria—largely poor households who have lost animals and been resettled, with higher dependency on state resources such as safety net programs.

Population sizes were calculated by counting settlements within the communities, according to data from Google Earth in 2016, ground-truthed in 2018. Following a period of focus groups and interviews in July-August 2018, a household survey was constructed, adapted to the context of the Nyangatom social and ecological system. The survey was conducted in early 2019 and contained sections regarding traditional measures of wealth (household size, herd size, and crop yields), food security, environmental security, social networks, and demographics.

In Ayepa and Kopriay, a 2-stage cluster sampling strategy was employed. Settlements were randomized and visited in this order, with the goal of surveying one household per settlement. Though aiming for 100% coverage of all settlements, time constraints and logistical challenges meant that we reached 22 out of 24 settlements in Ayepa and 20 out of 26 settlements in Kopriay. In each settlement, a household was randomly selected for the survey; overall, we surveyed 10% of all households. In a subset of surveyed households, both male and female heads of household were interviewed to ascertain whether there were systematic differences in patterns of response by gender. In initial data analysis, no systematic differences were found, so the dataset was honed down to include only one survey per household. To determine which respondent’s data to use, we

relied on data quality measures ascribed by the enumerator following each survey, reflecting his opinion of the respondents’ knowledge and openness. Where there were differences between respondents in knowledge and openness scores, the survey with the higher knowledge and openness score was included.

Sampling in Napasmuria reflected the different structure of the settlement. Napasmuria is a villagization settlement established in 2011/2012. An aerial view shows the settlement is laid out in rectangular sections, each surrounded by a perimeter fence. Within these large sections there are a variety of different types of buildings: small circular settlements similar to the traditional layout seen elsewhere in Nyangatom; groupings of huts with partial fencing, sometimes with associated animal enclosures; and individual huts (which may be independent households). There are also a number of settlements outside the rectangular planned boundaries of the ‘village’. Given this variety, it was not possible to carry out cluster sampling here. Instead, we consulted the General Secretary and the Chief Administrator of the kebele, who provided a list of 211 households. The enumerator aimed for 42 households (20% coverage) from the randomized list, of which 39 surveys were completed (one per household).

Table 3. Sub-samples in the study.

Community	Ayepa	Kopriay	Napasmuria	Total
Total households (N)	241	217	418	876
Sample before data cleaning (n)	32	30	39	101
Sample after data cleaning (n)	21	19	39	79
Margin of error (95% confidence level)	20.5%	21.5%	15.0%	10.45%

Key Findings

Food insecurity is high

The mean score for the whole sample was 17.8, representing “low” food security. Across the sample, only 10.1% were food secure, with 65.8% experiencing “low” food security, and 24.1% experiencing “very low” food security in 2019. The average scores for Kopriay (17.5) and Napasmuria (16.4) were similar to the whole sample average, with Ayepa showing a higher score (20.8), although not significantly different (Kruskal-Wallis H Test = 4.785, p = 0.091).

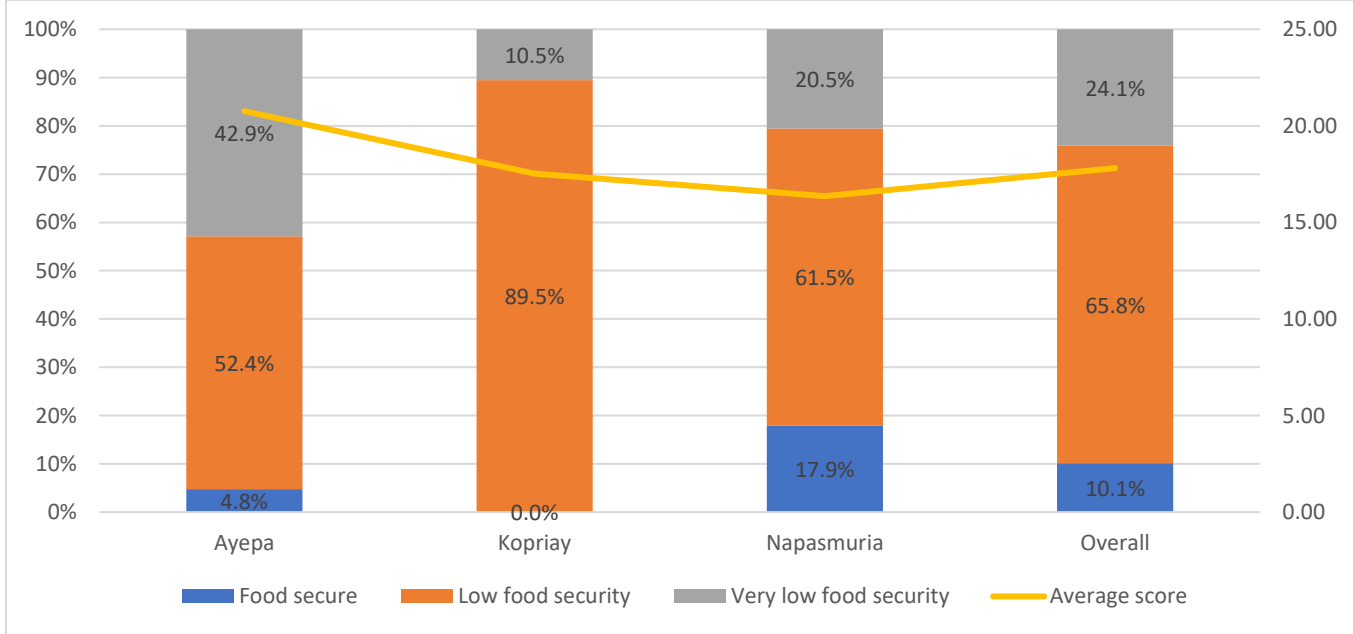


Figure 1. Distributions across the food security spectrum (according to CSI-AP) for the three communities and overall.

Ayepa reported a minimum score of 2.0 and a maximum score of 34.0. Of the three communities, Ayepa reported the highest percentage of “very low” food security at 42.9% of households. Kopriay reported the smallest range of scores (7.0 to 26.0) and also the lowest proportion of “very low” food security (10.5). However, no households in this community reported being

food secure. Napasmuria had the widest range of scores (0.0 to 40.0) and most households experienced “low” food security (61.5%) but Napasmuria also had the largest proportion categorized as food secure (17.9%).

Reliance on a wide range of coping strategies

To provide context for these results, we explored household-level coping strategies. 90-100% of respondents in each kebele worried about not having enough food to eat and were practicing multiple coping strategies to respond to this worry. The most common coping strategy across all three kebeles was adults eating less, followed by households reducing the diversity in their diets by eating the same foods. In Ayepa this was followed by eating stored seeds or grain (80% of households, severity score of 3), an important indicator of food insecurity as consuming these seeds means they are not available to support livelihoods in the coming season. Eating seeds was more available to Ayepa households because of their greater reliance on subsistence agriculture, and thus households here were more likely to have seeds to consume than those in the other communities. The marked difference between kebeles for this strategy contributed to Ayepa’s significantly higher food security score and including this coping strategy in the CSI-AP may therefore lead to underestimation of food insecurity in Kopriay and Napasmuria (given it is not as available to them), which should be considered in future work.

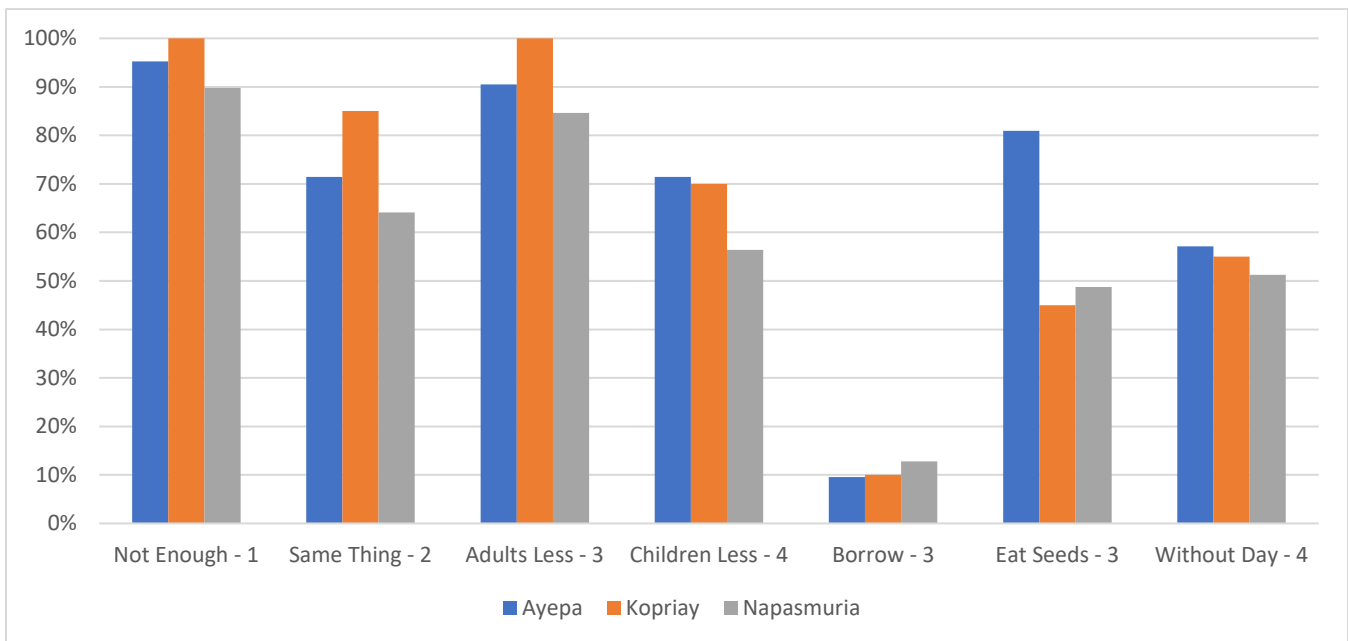


Figure 2. Reported frequency of individual coping strategies within the CSI-AP, by community.

Children eating less was a strategy used in all three communities (56% in Napasmuria, 70% in Kopriay, 71% in Ayepa). To our knowledge, other studies assessing coping strategies in Ethiopia (Bekele & Abddisa, 2019; Dessalegn 2018; Gebrehiwot & van der Veen 2014; Negash & Alemu 2013) have not included questions about children eating less, and only mention reducing household consumption as a whole. However, our data justifies its inclusion, given that most households tend to prioritize feeding working members of the household and children first (Tebeje et al., 2020). High rates of children skipping meals may indicate that food insecurity is at its most severe. Further demonstrating this is that all three kebeles had at least 50% of households going without food for the day, most commonly seen in Ayepa (57%, severity score of 4).

Borrowing food was the least prevalent coping strategy among the communities – assumed to be because the high levels of food insecurity throughout the region severely limits opportunities to borrow from neighbours who are also food insecure.

The CSI-AP reflects the agro-pastoralist context but still masks some local differences

Adapting food security measures for agro-pastoralist contexts is important to reduce the potential for research to misrepresent reality by a) asking about strategies that are irrelevant, thus artificially deflating results or b) missing important strategies that might increase scores. However, agro-pastoralism exists on a spectrum, and our data shows that the same coping strategies differ across local contexts. For example, consuming seeds is only an option for those practicing cultivation. One option would be to customize severity weightings for each community. This, however, would limit the comparability of the CSI-AP scores. Therefore, we argue for the importance of accompanying qualitative work to demonstrate how local context influences which coping strategies are available in a community, to explain any artificially low scores.

Recommendations

In the short term, there is an immediate need for increased food aid to these communities to bridge the gaps in food security caused by the reduction in their own food production and barriers to food access given a lack of supplemental livelihoods.

The continued use of coping strategies by households diminishes their future ability to cope with change, i.e., adaptive capacity, as households utilize assets like their health and seed. In the long term, there is therefore a need to move beyond food aid and support livelihoods so households can replenish their adaptive capacity. Otherwise, households become increasingly vulnerable to further shocks and stresses.

Further methodological innovation is also needed to adapt the CSI-AP further to the local context in the Lower Omo and study the implications of including different strategies (or not). Further qualitative work should be used to ground the resulting scores in the local context.

References

- Bekele, A. & Abdisa, F. (2019). Vulnerability to Food Insecurity and Households' Coping Strategies. *Journal of Rural Development*. 34. 529-542.
- Coates, J., A. Swindale and P. Bilinsky. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, August 2007.
- Dessalegn, B. (2018). Transitory coping strategies of food-insecure smallholder farmer households: The case of Ilu Gelan District, West Shoa Zone, Oromia Regional State, Ethiopia. *Agriculture & Food Security*, 7(1), 1-11. 10.1186/s40066-018-0204-2.
- FAO. (2002). *The State of Food Insecurity in the World 2001*. Rome.
- Gebrehiwot, T. & van der Veen, A. (2014). Coping with Food Insecurity on a Micro-Scale: Evidence from Ethiopian Rural Households, *Ecology of Food and Nutrition*, 53:2, 214-240, DOI: 10.1080/03670244.2013.811387.
- Hodbod, J., Tebbs, E., Chan, K., & Sharma, S. (2019). Integrating Participatory Methods and Remote Sensing to Enhance Understanding of Ecosystem Service Dynamics across Scales. *Land*, 8(9), 132.
- Maxwell, D. & Caldwell, R. (2008). *The Coping Strategies Index: Field Methods Manual*. Second Edition.
- Murendo, C., Aziz, T., Tirivanhu, D., Mapfungautsi, R., Stack, J., Mutambara, S., Langworthy, M. & Mafuratidze, C. (2021). Dietary Diversity and Food Coping Strategies in Zimbabwe: Do Resilience and Food Insecurity Status Matter?, *Ecology of Food and Nutrition*, 60:1, 116-136, DOI:10.1080/03670244.2020.1808784
- Negash, T., & Alemu, S. (2013). Determinants and coping strategies of household food insecurity in rural areas of Tigray: The case of Rural Adwa Woreda. *Ethiopian Journal of Agricultural Sciences*, 23(1-2), 119-144.
- Radimer, K. L., Olson, C. M., & Campbell, C. C. (1990). Development of indicators to assess hunger. *The Journal of nutrition*, 120(suppl_11), 1544-1548.
- Tebeje, N., Biks, G., Abebe, S. & Yesuf, M. (2020). Magnitude of Child Food Insecurity, Its Association with Child Immunization and Household Wealth Status, and Coping Strategies in Dabat Demographic and Surveillance System North West Ethiopia. *International Journal of Pediatrics*. 2020. 10.1155/2020/3746354.

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Citation: OTuRN Briefing Notes are freely available, but please cite accordingly: Slinkman, S., Hodbod, J., Merchant, C., Dessalegn T., Pertaub, D-P. and Stevenson, E.J.G. (2021). Constructing a Coping Strategies Index for Agro-Pastoralists: Assessing food security in Nyangatom, Ethiopia (Briefing Note #7). In *Omo-Turkana Research Network Briefing Notes*, edited by J. Hodbod & E.G.J. Stevenson. East Lansing, MI: OTuRN.

Acknowledgements: This material is partly based upon work carried out as part of the ESRC/DFID funded project 'Shifting In/equality Dynamics in Ethiopia: from Research to Application' (SIDERA) (Grant Ref: ES/R002460/1), which aims to understand the links between environmental change, poverty, and conflict in the Lower Omo. We are also grateful to the College of Agriculture and Natural Resources for funding through the Undergraduate Research Program. The editors would like to thank the Walton Sustainability Solutions Initiatives at Arizona State University for their support in designing the OTuRN logo.