Irish Aid Learning Platform on Climate Change and Development

Ethiopia Case Study Annual Report

Lake Hawassa Longitudinal Study Methodology
Irish Aid

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Introduction

'Improving Smallholder Livelihoods and Resilience in the SNNPR (Southern Nations Nationalities and Peoples' Region) and Oromia Regions through climate smart agricultural economic development' is a consortium project funded by Irish Aid and managed by SOS Sahel, Vita, Self-Help Africa and Farm Africa. The project aims to alleviate poverty and foster resilient/sustainable livelihoods for vulnerable Smallholder Farmers (SHF) through climate-smart agricultural and economic development. The International Institute for Environment and Development (IIED) and Echnoserve Consulting are conducting a longitudinal study (2015-2017) in the project area of Lake Hawassa watersheds. The study is in the process of understanding the effectiveness of project components – such as building climate resilience in the livelihoods of SHF around watersheds – for the purposes of institutional learning and the efficacy of future programming. As such, it broadly follows the twin track (Track 1 & 2) methodology of the 'Tracking Adaptation and Measuring Development' (TAMD) framework by assessing institutional climate risk management and contributions to resilient development at the community/household-level (Brooks et al. 2011).

This annual report outlines the findings from the first year of data collection on the relative effectiveness of activities integrating considerations of weather/climate into development planning/decision-making. The analysis of Track 1 provides the baseline for institutional climate risk management and coordination of consortium members and government institutions. The analysis of Track 2 reports on the effectiveness of technology improvements in developing the climate resilience of SHF and gender sub-groups via production, income and nutrition. Intervention types include: a) soil/water conservation; b) start-up poultry farming for women; c) improved maize varieties and other crops; d) support for agro-ecological crop production; and e) irrigated vegetables.

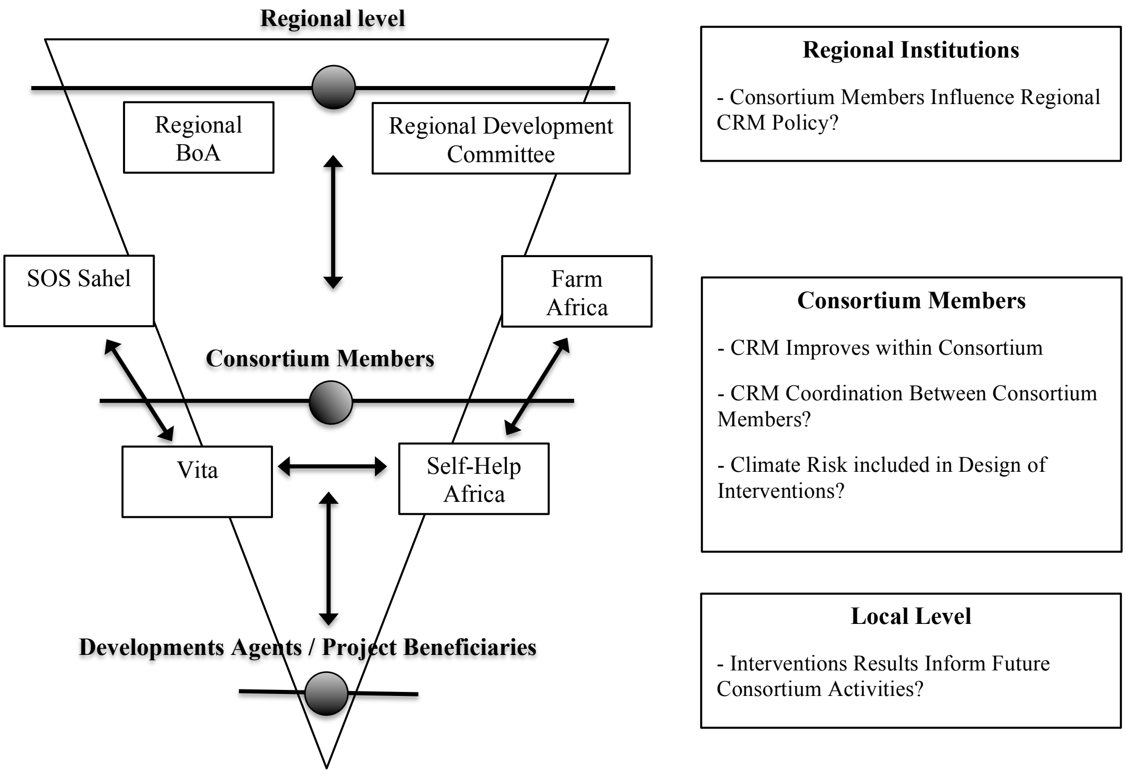
The main research questions are:

1. What are the causal mechanisms behind improving climate resilience?
2. What impact are project activities having on climate resilience?
3. How do different groups – including women and girls – benefit from project activities?

INSTITUTIONAL CLIMATE RISK MANAGEMENT (TRACK 1)

Using the TAMD Track 1 framing, the study assesses the climate risk management and coordination capacity of the Consortium partners (see Figure 1). The objective is to first gauge how Consortium institutions manage climate risks from policy development to implementation – e.g combing Climate Information Services (CIS) with participatory community-level vulnerability assessments into institutional decisions; the second is to establish the degree of inter-institutional linkages inside and outside the Consortium – e.g. between consortium partners, local government, technical experts and Kebele committee systems. Current capacity to coordinate and manage risks will be established and documented, while monitoring improvement over time.

Figure 1: Institutional Coordination and Climate Risk Management



Metrics are designed using institutional scorecards (see Karani et al., 2015) adapted to the specific requirements and characteristics of the consortium partners operating around Hawassa, and assess the coordination and risk management capacity at different timescales (see Table 1). The first assessment records current practices as a baseline, which indicates areas for institutional learning and improvement. The second assessment shows the level of progress institutions make – engagement between partners may increase through structured information sharing; conversely, climate data and community vulnerability assessments may be given an better institutionalised role in project design.

Table 1: Scorecards Adjusted for Consortium Climate Risk Management

CRM Indicators	**Poor**	**Fair**	**Good**	**Excellent**	Comments
Consortium Engagement with Local Government		X			Collaboration with local Development Agents
Inclusion of CIS in Project Design			X		Consortium members are using climate data available
Participatory Community Vulnerability Assessments				X	Beforehand, assessments were done with the communities
Climate Risk Knowledge and best practices shared			X		The consortium organizes periodic workshops to share results
Policy synergy existing with government institu			X		Outcomes of the workshop used as a basis to orientate climate policies
CRM Institutional collaboration			X		Regional level advisers from BoA working with the consortium NGOs

Track 1 Baseline Scorecard Results

The findings from Track 1 represent how climate risks are managed in different institutions. Regional and Woreda Bureau of Agriculture, consortium members and SOS Sahel are the focus institutions in the assessment. The results of different institution climate risk management capacity are summarised as follows:

Region Agriculture Bureau: results show that the bureaus do not have in place climate change strategies or mainstreaming climate change on their principal planning documents. However, initiatives have been enacted in the past years to reduce climate risks especially on watershed management work, which was mobilized by the government. Despite the continuation of initiatives, the extent to which institutions coordinate on climate risk management is very minimal. For instance, only a small budget is available for piloting interventions to address climate change; and no specific funds are available to enable mainstreaming of climate change issues into the annual planning document of the region.

Woredas: (Wondogenet and Hawassa zuria) in general, the Woredas are not accessible to information. The result shows that in all selected scorecard indicators of Track1, woredas were do not meet at least minimal even in one of the indicators.

Consortium Members: The need to assess all the consortium members is due to the implementation of the project that capitalizes on the extensive experiences of the consortium members (SOS Sahel, Farm Africa, Self Help Africa, and Vita) to achieve the goal of contributing to poverty alleviation and resilient, sustainable livelihoods in the SNNP and Oromia Regions through climate smart agricultural. The assessment examines consortium members using various types of indicators such as community vulnerability assessment, use of climate data, engagement with local government and others. The result shows that – except for Farm Africa – none or minimal use of climate information in the conduct of general operations. However, consortium members' engage with local government, creating policy synergy, institutional collaboration, and such interactions is resulting in moderate levels of awareness of climate change among stakeholders.

SOS Sahel: The leading consortium member SOS Sahel was assessed separately because the institution is directly involved, and responsible for the implementation of the project. The assessment focused on the area of participation, process of implementation, awareness of stakeholders, learning and expectation from the project. Accordingly, results show they are managing to implement the project according to schedule. The scorecard results also indicate that access and use of climate information is very minimal. Due to this low usage of information, the integration of information into future climate planning is slow but evidence exists of incremental change.

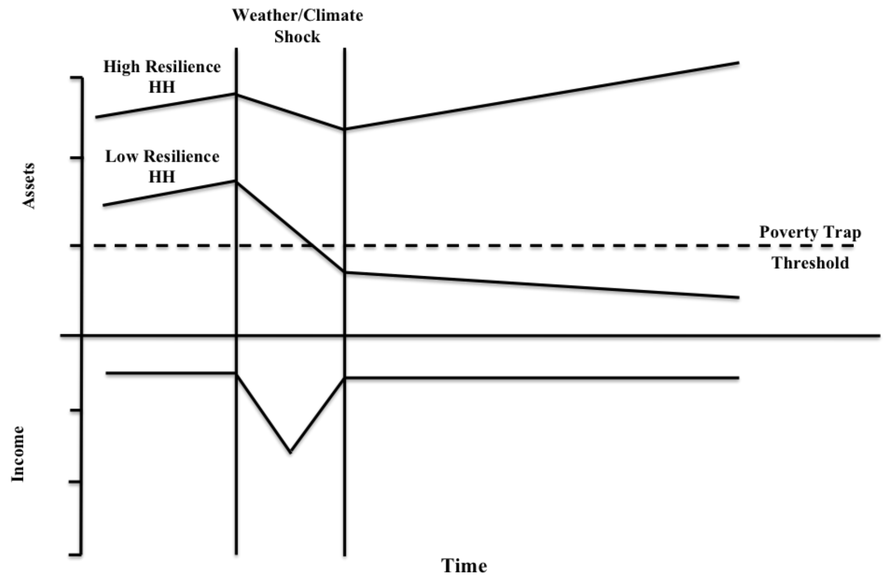
HOUSEHOLD LEVEL CONTRIBUTIONS (TRACK 2)

The first part of Track 2 assesses improvements in climate resilience post-implementation of climate-smart technologies for SHF, focusing on changes in nutrition, production and income, and with special emphasis is given to the gender dynamics of initiatives for livestock management. Program activities include: 1) sustainable crop intensification; 2) Savings, Loans, Pullets and Cockney (SLPC) for women; 3) conservation agriculture; and 4) irrigated vegetables.

Conceptual framework

Resilience is a function of the ability of a socio-ecological system to learn, self-organise and adapt (Folke et al, 2002). In practical terms of climate variability and change, resilience is the buffering capacity to shocks and stresses derived from the intrinsic characteristics of the system, or as with more fragile settings, the ability to establish and iteratively learn from preemptive/reactive adaptive measures (Brooks et al, 2011) that simultaneously facilitate progress and development (Anderson, 2011; Solórzano, 2016). Central to climate resilient systems are productive and convertible assets that facilitate the agency necessary for adaptive learning and self-organisation, and which enables resistance/recovery from hazards, and ultimately, transformation out of pre-existing conditions (see Figure 2); whilst at the same time, assets are often weakened and eroded when vulnerable groups experience climate shocks and stresses, particularly when planning and organisation give way to prolonged periods of coping.

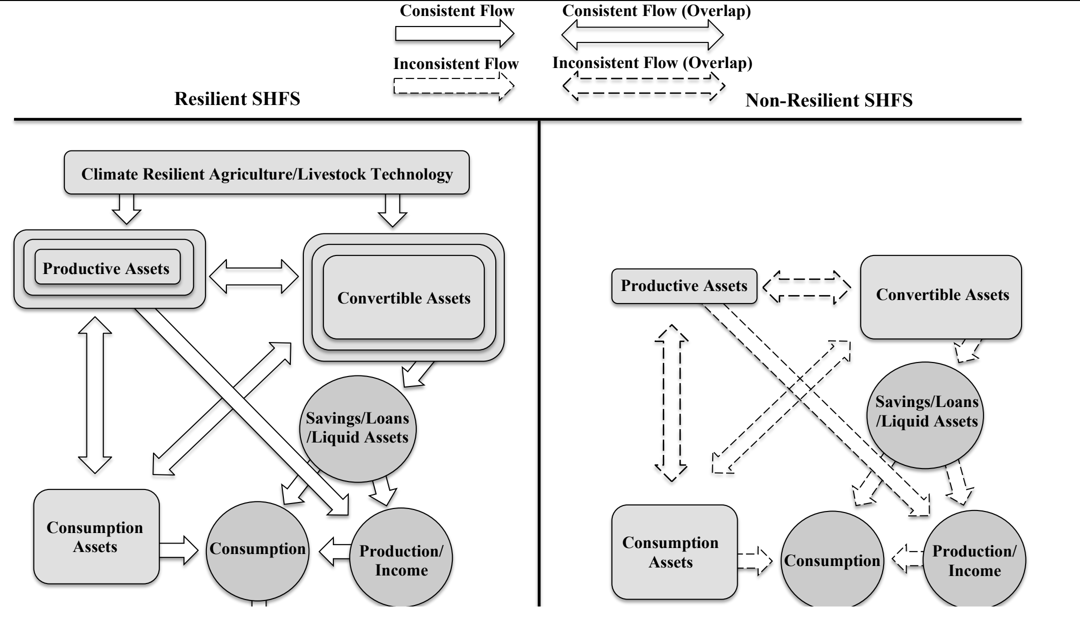
Figure 2: Assets, Climate Resilience and Development Progress



Adapted from Carter et al., 2004

Figure 3 shows the interaction between climate-smart technologies, climate resilience, and asset functions (Dorward et al., 2009). The labour time of climate resilient smallholders (productive assets) with increased technology improves productive capacity, productive income, and consumable assets while simultaneously increasing the convertible asset base [see 'Stepping Up' in Dorward et al (2009)]. In times of low climate stress, convertible assets accumulate; when climate stress/shocks begin, the asset base is larger and more durable. Without technologies, the productive assets of SHF remain with climate sensitive, and subject to intermittent discontinuity and ultimately the erosion of convertible assets ('Hanging In').

Figure 3: Climate Resilient Technologies, and Asset Functions



Matching Approach

Efforts were made to ensure results are not biased by alternative explanations. This required 'matching' households receiving CSA interventions (treatment households) with households who did not get the intervention (control households), but nonetheless have very similar farm and household capacity characteristics. Table 6 shows how matching is done based on farm capacity to produce, generate income and supply nutrition to the members of the homestead; preference was given to households that matched on the primary drivers of capacity in this group – in particular, livestock value, farm asset value and irrigation practices. In addition, the two groups were also matched based on kebele and woreda, thus reducing biases associated with bureaucratic administration, altitude, rainfall and spatially-defined political factors. The result is a sample that facilitates robust comparisons across the two groups.

Table 6: Variable Matches Across Treatment and Control Households

		Treatment Group	Livestock	Farm Assets	Irrigation	Farm Size	Adu/Ch Ratio	Fertilizer	Market distance	**Control Group**
Wondo Genet	Wotera Kchema	**T1**	VL	M	Y				L	**C1**
		T2	L	M	N				L	**C2**
		T3	H	VH		VH	VL			**C3**
		T4	M	M	Y				L	**C4**
		T9	VH	M		L	L			**C9**
		T10	VH	L	Y	H				**C10**
		T11	L	VL	Y		VH			**C11**
		T12	VH	M	Y			VH		**C12**
	Yowo	**T5**	L	L	Y	L				**C5**
		T6	L	M	Y					**C6**
		T7	M	L	Y	VH				**C7**
		T8	H	M	Y				M	**C8**
		T13	M	L	Y	L		L	M	**C13**
		T14	VH	VH	Y	M				**C14**
		T15	VH	VH	Y			VL		**C15**
		T16	L	L	Y					**C16**
Hwassa Zuria	Kajema Emblo	**T17**	L	VL	N		H			**C17**
		T18	L	L	N		M			**C18**
		T19	H	VL	N	L	M			**C19**
		T22	L	VH	N	L		M	H	**C22**
		T26	M	H	N		H	L	H	**C26**
		T28	H	VL	N	L	M		H	**C28**
		T29	M	VH	N	L		H		**C29**
		T30	VH	VH	N	VH		VH		**C30**
	Lebu Keromo	**T20**	H	L	N				M	**C20**
		T21	VL	VL	N		M	L		**C21**
		T23	VL		N		H	L		**C23**
		T24			N		M		VL	**C24**
		T25	VL	VL	N	VL			VL	**C25**
		T27	L	H	N		VL	L		**C27**
		T31	H	H	N	VL				**C31**
		T32		H	N	L		VH		**C32**

T= Treatment C = Control VH = Very High H = High M = Medium L = Low VL = Very Low

Climate Resilience Indicators

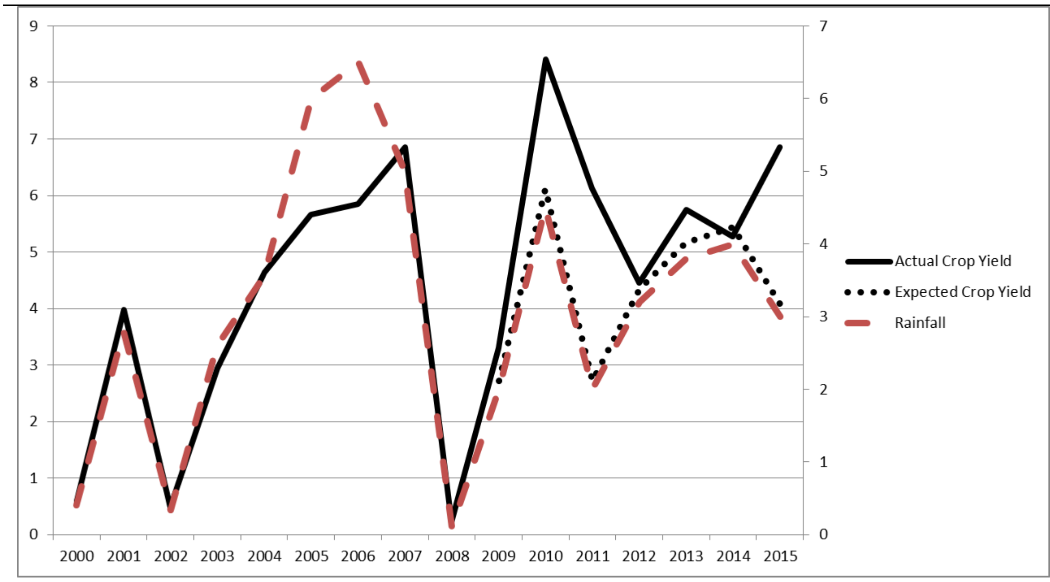
Table 1 explains the livelihood improvement and gender dynamics of the Lake Hawassa initiative, the domains of change, and the ways indicators are being developed to assess climate resilience. As shown in the previous section, each component contributes to the ability to recover from shocks/stresses and improve existing livelihoods, or increases the likelihood of changing to a more preferable state. Measuring the occurrence and magnitude of climate hazards is central to the assessment SHF performance during times of climate challenges (see Brooks et al., 2013).

Table 2: Project Activities, Domains of Change and Indicators

Project Activities	Domain of change	Adapted KPI Indicator
Improvements/Diversification of Livelihoods	**Climate Resilient Food Production/Nutrition**	**Resilience Indicators**
1. Soil/water conservation **2**. Start-up poultry for women; **3.** Improved maize varieties and other crops; **4.** Support for agro-ecological crop production.	**1.** Soil/water retention for crops; **2.** Eggs and meat for consumption, sale and use assets; **3.** Climate resilient crops; **4.** Climate resilient crop production.	**+** Calorie intake adjusted for climate shocks; **+** Yields adjusted for climate shocks; **+** Income adjusted for climate shocks.
Gender Dynamics	**Gender Sensitive Climate Resilient Food Production/Asset Holding**	**Resilience Indicators**
1. Start-up poultry farming for women; **2.** Savings and loans scheme for women; **3.** Improved maize varieties and other crops for men.	**1.** Gender equitable livestock holdings **2.** Gender equitable investment capacity **3.** Improved capacity of male agricultural production.	**1.** Livestock of female headed HH adjusted for climate shocks; **2.** Income female headed HH adjusted for climate shocks; **3.** Yields male headed HH adjusted for climate shocks

Outcome variables – nutrition, yields, income – can be converted into resilience measures by using weather and climate information to establish expected values depending on the severity of shocks and stresses. The margin between expected and actual production related values – with expected values based on past observations of, for example, rainfall and yield – indicates the sensitivity of farming systems to weather and climate (see Figure 4). The larger the positive margin between expected and actual values, the greater the resilience relative to the historical record. Such measures can be used to assess the effectiveness of different technology-improving initiatives in terms of resilience, whilst develop more nuanced understandings of climate resilience and gender, age, livelihood, and geographical locations around watershed.

Figure 4: Measuring Resilience with Crop Yield and Rainfall Data



NATURAL RESOURCE MANAGEMENT (TRACK 2)

The second part of Track 2 assesses the natural resource contributions of collective landscape planning, soil restoration/conservation, and initiatives to reduce contamination of Lake Hawassa. The study documents the physical changes brought about by conservation and land management measures, along with community perceptions of the quality and accessibility of natural resources, and its effects on community climate resilience. In accordance with study objectives, spatial statistics and community focus groups provide the means to measure land, soil and lake regeneration, whilst establishing what such measures mean for communities residing around Lake Hawassa.

Natural Resource Management Indicators

Table 3 outlines the natural resource management components, domains of change, and ways to develop indicators to assess climate resilience. Improving natural resources restores soil nutrients that enable SHF to achieve greater returns from investments in agriculture; and watershed management retains land quality for collective community usage. The objective is to descriptively show progress on natural resource management, and then make connections between such improvements and livelihood outcomes.

Quantitative measurement of natural resource variables – e.g. soil run-off/fertility, watershed regeneration and vegetation cover – require remote sensing data of the land area around the Lake. Metrics are available and have been studied previously by researchers interested in, for instance, the sustainability of water recharge around the lake (e.g. Roe et al., 2012). The study will use and update available data to spatially inform of recent progress made by the watershed component of Irish Aid's work.

Table 5: Collective Action on Natural Resource Management > Domain of Change > Indicators > Methodology

Natural Resources	Restoration of Natural Resources	Indicators	Indicator Access
1. Collective land/soil conservation and management;	1. Regeneration of watershed, soil fertility	+ Vegetation cover; + Soil fertility; + Soil run-off/erosion; + National resource accessibility.	+ Geographic Information Systems + Focus group discussion about national resource assets and access. + Participatory mapping of natural resource-livelihoods interactions up- and down-stream.

Additionally, community perceptions of natural resource improvements and access will establish ground-level findings and supplement the quantitative research. More specifically, documentation community perceptions offer insight into linkages between improvements in the natural resource base, and SHF livelihood practices. A further component is the accessibility of natural resources to different sub-groups, such as men and boys, women and girls. This can be conducted through natural resource mapping and focus group discussions.

WORKPLAN (2015-2018)

The methodology was designed and finalised by Echnoserve and IIED in the final quarter of 2015. In terms of Track 1, baseline data was collected on institutional climate risk management and coordination in the second quarter of 2016. The findings will be circulated in the annual assessment report and another round of data collection will be conducted to assess progress in 2017. In the last quarter of 2015, baseline data was collected in Hawassa for the household contributions of the CSA initiatives (Track 2), and preliminary results were circulated in January 2016. The same data will be collected on five more occasions in both May and December for the remaining 2-3 years. The mapping of natural resources component will begin in the third quarter of 2016, as will focus group discussions for linkages between natural resource regeneration and livelihood outcomes (Track 2); a second round of data collection will be completed in late 2017 to establish progress. Finally, an annual assessment report will be available at the end of the second quarter of each year, with a final report in June 2018.