Project Update: February 2020

The encroachment of undesirable shrubs into grasslands is of global concern among ecologists, rangeland managers, and pastoralists. In the Ethiopian highlands, the invasion of *Helichrysum* species threatens ecosystem services in and around a community-based conservation area, particularly the provisioning of the *Festuca* grasses highly prized by both humans and endemic wildlife. Local communities and researcher have identified *Helichrysum* encroachment as the most critical sustainability concern in this area. Therefore, I have conducted three round field work to accomplish the following activities:

Activities:

Workshops

We have conducted the first workshop to introduce the overall objectives of the project and to co-design field experiments with community members. After we briefed the activities, we have organised a schedule of vegetation monitoring with the local management team, and local communities chosen nine people from nine districts who join the project as community monitors.

Figure .1 Discussions with the local community representatives on the objective of the project

Training for the Community Monitors

The nine community monitors selected from the local communities were trained. Those selected participants in the monitoring programme have learned how to conduct and manage ecological field data collection, analyse the data collected, install field experiment, remove shrubs from the plot, biodiversity inventory, soil sample collection and interpreting the results.

Members of the community also engaged with scientific research, so that we can continue to understand how community-based management impacts sustainable decision-making. This long-term engagement with a scientific process will promote learning, which will improve the resilience and adaptive capacity of the conservation area.

Figure .2 Training the local community monitors selected during the workshop

Install Field Experiments

Based on the training given to the nine community members, we have installed the co-designed field experiments for 40 plots. For vegetation data collection plots were systematically laid using block design along the altitudinal gradients and aspects. We have established eight blocks each of them having five plots. Four blocks are established along altitudinal gradients and the other four blocks are placed on the north-west and north-east aspects. The highest elevation from which the transect line (the first plot) starts to stretch is 3550 m asl and the lowest elevation (last plot) is 3200 m asl. Permanent marked plots of 5 x 5 m (25 m^2) were laid at every block. Each block has

two fenced and three unfenced plots. Thus, we have installed a total of 16 fenced/experimental and 24 unfenced/control plots.

Figure .3 Installing field experiment plots using meshed wire

Field Experiment: Shrub removal.

This field experiment is intended to inform our understanding of the competition between *Festuca* and *Helichrysum*, and to explore management options for the removal of the invasive *Helichrysum splendidum*. We used block design that allow us to explore removal and regrowth of shrubs across a range of environmental variability. We organized our removal according to aspect and altitudinal gradients.

From each block design one fenced plot was randomly selected and all the *Helichrysum splendidum* found in these plots were removed. Thus, we have removed the shrub from eight fenced plots.

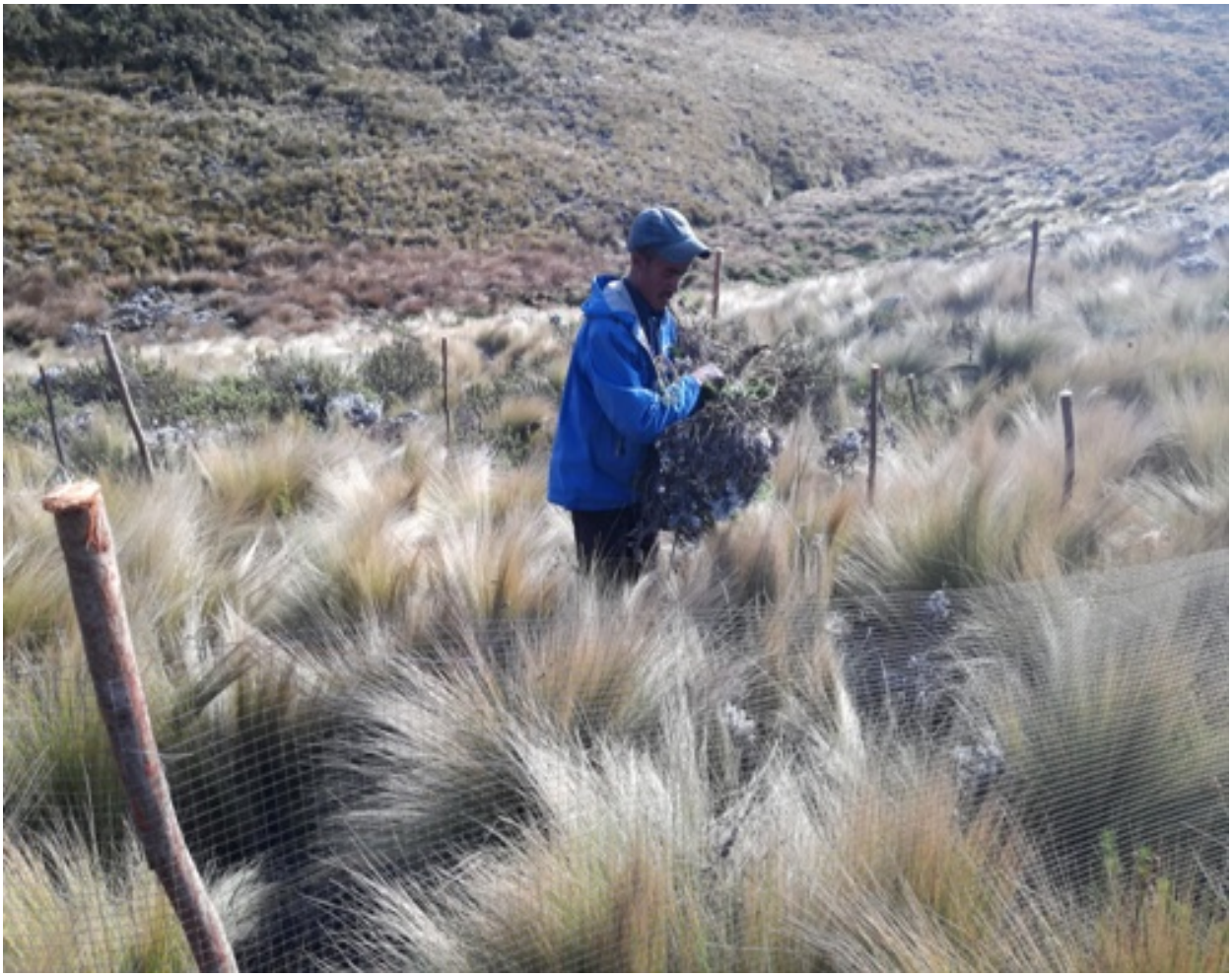

Figure .4 shrub removals from the fenced plots

Biodiversity Inventory

Baseline survey or the cover abundance of all plant species found in the plots was assessed and recorded from the established block plots.

Moreover, altitude, longitude, latitude and aspect were measured for each plot using GPS and compass.

Table .1 Biodiversity Inventory collection data sheet

Biodiversity Inventory Data Sheet		
Block Number:		
Plot ID:		
GPS Coordinated:	**Lat:**	**Long:**
Altitude:		
Collector Name:		
Date of Collection:		
No.		

Local Name		
Amharic name		
Species Name		
Presence/Absence	**(1/0)**	
Cover Abundance estimate (CA)		

Ongoing activities

1. Collect soil samples: a soil sample from each field experiment plot to be grown in a comparative greenhouse experiment is being collected.
2. Set up greenhouse experiment: the glass house is under construction to conduct a series of greenhouse experiments to compare with the field data.
3. Conduct monitoring: monitoring will be done monthly to record growth parameters from the field experiment.
4. Identification of the collected plant specimens.
5. Data entry for the biodiversity inventory.

Coming activities

Field data collection for the fourth round from the experimental plots on the following variables:

a. Number of new seedlings for grass and shrub.
b. Germination dates (approximate).
c. Growth parameters such as height, number of branches, etc.
d. Dates of flowering and seed setting.

Soil seed bank germination in the glass house: variables to measure are:

a. Number of new seedlings for grass and shrub.
b. Germination dates (approximate).
c. Seed bank density (from soil samples).
d. Growth parameters such as height, number of branches, etc.
e. Soil content in the lab (every year).
f. Dates of flowering and seed setting.

3. Writing of the reports and publications for scientific papers.

Opportunities

- Financial support from Rufford Small Grant.
- Good commitment from Department of Plant Biology and Biodiversity Management in providing field materials and logistics.
- Commitment of the district administrates, experts and local community during my field work.

Challenges

As yet I have faced no difficulties.