

# Expanding and Sustaining Exclosure Land Management

## SUMMARY

Exclosure land management has several positive impacts. Expansion and sustainability of exclosures needs support from the Ministry of Agriculture, Regional Agriculture Bureau and policy makers to address community concerns through a joint effort of government, research institutions, local and international NGOs and people in the communities.

## RECOMMENDATIONS

- The Ministry of Agriculture (MoA) could help prepare and provide training manuals on improved agricultural and grazing land management practices such as fattening and dairy production, bee keeping, controlled or rotational grazing, and help provide training for trainers on improved land management practices.
- Develop a long-term management plan for existing and future exclosures through ARARI in collaboration with the Regional Agricultural Bureau, District Agricultural Offices, district administrative bodies, and local communities. International research institutes such as International Water Management Institute (IWMI) could provide financial and technical support for developing the management plan. This was a recommendation from a workshop held at Amhara Regional Agriculture Research Institute (ARARI) in Bahir-Dar, Ethiopia (20 June, 2014).
- Regional Agricultural Bureau and District Agriculture and Rural Development Offices raise seedlings of economically important species for enrichment plantations and fodder species to increase livestock feed.
- The Agricultural Bureau and NGOs collaborate and coordinate efforts to build the capacities of farmers and extension workers on modern agricultural practices including fattening and dairy production.
- Coordinate the support of local and international NGOs to offset some of the negative impacts of exclosures on livelihoods through activities such as bee keeping, fattening programs and enrichment planting. NGOs involved in sustainable land management, such as GIZ, USAID, World Bank, AfDB and WFP could provide financial support in the form of long-term credit to purchase modern bee hives and improved livestock breeds.

## BENEFITS OF EXCLOSURE LAND MANAGEMENT

Research in Gomit watershed demonstrated that existing exclosures have improved:

- The incomes and livelihoods of smallholder farmers,
- Native vegetation composition and diversity, above ground biomass, land cover, and soil quality,
- Degraded land, and
- Regulating and provisioning ecosystem services.

## Further research that could be coordinated and undertaken by MoA and ARARI

- Carry out a comprehensive socio-economic analysis that incorporates all services provided by exclosures. Define community concerns and test ways and means of addressing those concerns through participatory agricultural research.
- Conduct an agro-economic study on the possibilities for earning income from carbon sequestration.
- Investigate the competitiveness of exclosure land management compared to other land management practices such as crop production.
- Explore ways to increase women's participation.

## RESEARCH SUMMARY

Communities in Gomit watershed first established exclosures on communal grazing lands in 2006. There are currently just fewer than 80 ha of exclosure, or 5% of the total watershed. The three-year plan of the Community Watershed Team is recommending exclosure areas be expanded to just over 110 hectares, or 7.5%.

## APPROACH

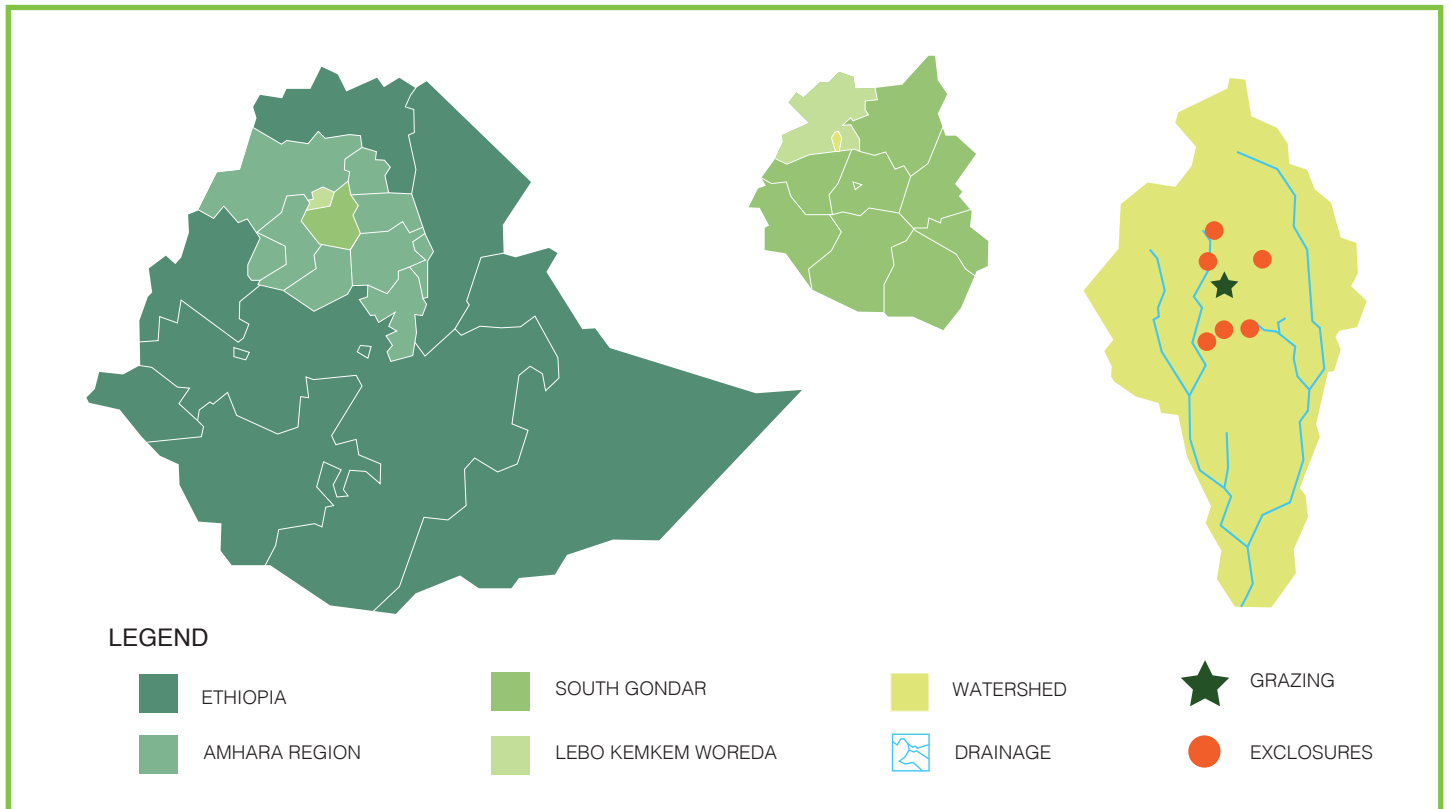
The first exclosure in Gomit watershed was established in 2006. Subsequent exclosures were established in 2008, 2009, 2010, 2011 and 2012. These exclosures were established by communities in the Gomit watershed (a total of 360 households). Priority areas for establishing exclosures were identified as a joint initiative by communities, a Community Watershed Team (CWT),

governmental (e.g., district agricultural and rural development office) and NGOs (e.g., German Development Cooperation or GIZ). The management and use of the exclosures in the Gomit watershed is managed by a CWT and governmental organization. The CWT would like to expand the practice of exclosure land management and establish up to five exclosures in Gomit watershed in the coming three years.

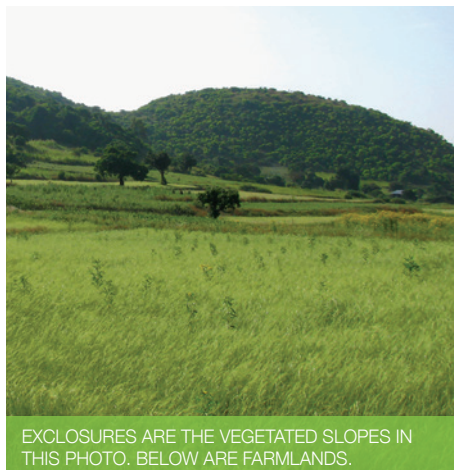


DEGRADED COMMUNAL GRAZING LAND IN GOMIT WATERSHED, SOUTH GONDAR ADMINISTRATIVE ZONE, NORTHERN ETHIOPIA.

Source: Wolde Mekuria.

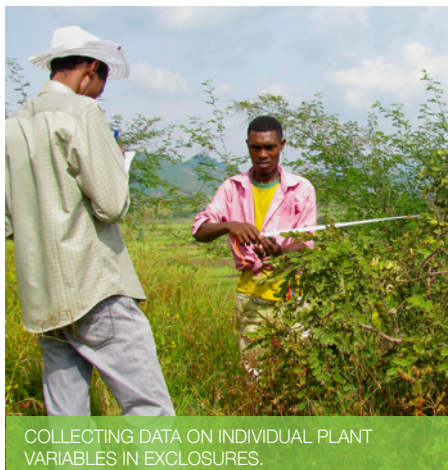


STUDY AREA WITH THE LOCATION OF EXCLOSURES AND GRAZING LAND INDICATED IN RIGHT.



EXCLOSURES ARE THE VEGETATED SLOPES IN THIS PHOTO. BELOW ARE FARMLANDS.

Source: Wolde Mekuria.



COLLECTING DATA ON INDIVIDUAL PLANT VARIABLES IN EXCLOSURES.

Source: Wolde Mekuria.



SOIL SAMPLING IN EXCLOSURES.

Source: Wolde Mekuria.

Researchers from the International Water Management Institute (IWMI) and Amhara Region Agriculture Research Institute (ARARI) participated in data collection that took place from September to December 2013.

## RESULTS

### Vegetation composition and diversity improved

All exclosures displayed higher plant species richness and diversity when compared to communal grazing land.

### Regulating and provisioning ecosystem services

Aboveground standing biomass and carbon increased, which could lead to revenue from carbon credit trading.

The Net Present Value (NPV or net current value of an amount of money in the future), of the aboveground carbon sequestered in exclosures ranged from USD 6.6 to 37.0 per ha<sup>-1</sup> and increased with exclosure duration. At a watershed level, a temporary certified emission reduction (tCER) unit of 139.4 Mg CO<sub>2</sub> ha<sup>-1</sup> can be obtained, resulting in NPV of USD 478.30 per ha<sup>-1</sup> after 3.5 years on average.

### Soil improvement

Significant differences were observed between exclosures and communal grazing land as well as among exclosures in soil pH, soil moisture, bulk density, and cation exchange capacity (CEC). The results demonstrated that communal

grazing lands contain higher total nitrogen and phosphorus when compared to the total nitrogen and phosphorous contents in exclosures. Only the differences between exclosures and communal grazing land in soil organic matter content were not significant.

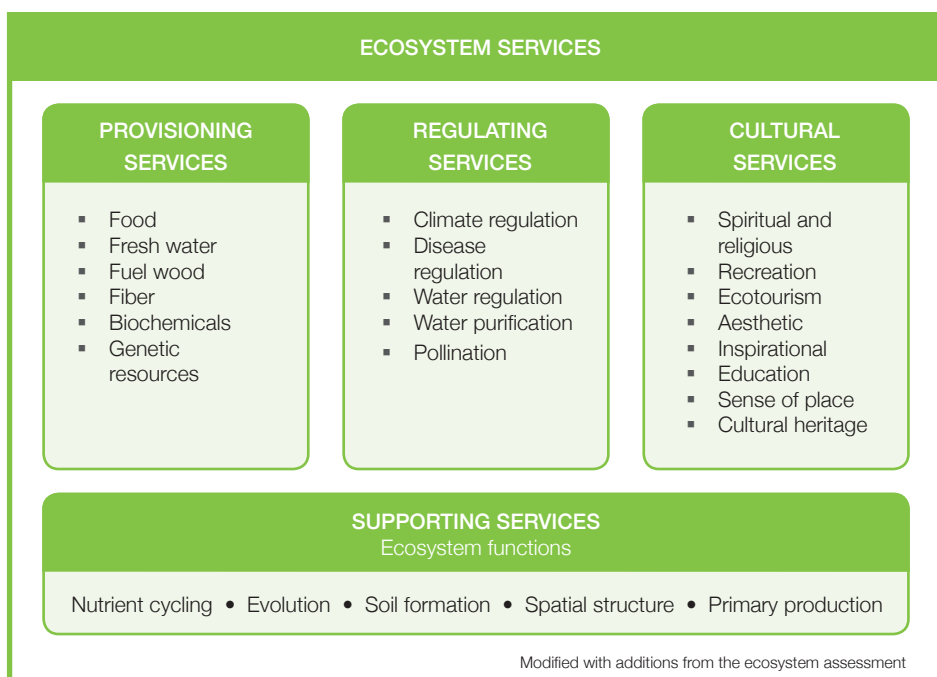
### Community perceptions are mainly positive

Exclosures are jointly managed by the Community Watershed Team (CWT) and governmental organizations. The CWT consists of nine members (seven men and two women). Governmental organization included the Regional Bureau of Agriculture, District Agricultural and Rural Development Offices and district administrative bodies. Exclosures are managed through bylaws, which are an initiative of government and

the Sustainable Utilization of Natural Resources for Food Security (SUN) program and approved by the community following consultations. Community residents were involved at the planning stage in monitoring and evaluation of exclosure land management. However, women's participation in decision making has been limited.

Survey respondents said that exclosures are effective in restoring degraded ecosystems. They reported that:

1. Indigenous tree species are regenerated,
2. Vegetation cover is increased,
3. Soil erosion and sedimentation is reduced, and
4. Gullies are rehabilitated following the establishment of exclosures.



Also fodder production increased following the establishment of enclosures, mainly from grasses and fodder trees such as Sesbania. According to the respondents, expanding enclosures in the watershed benefits the neighboring areas through reducing soil erosion, gully formation, flooding, and sedimentation in the downstream areas.

### Community concerns that need to be addressed

- Enclosures have reduced the availability of fuel wood and reduced the number of useful tree and shrub species in the remaining communal grazing lands. This is a critical concern, as more than 90% of people in these communities depend on bio-energy sources such as wood and dung for household energy demands.

- Enclosure land management has reduced the number of livestock at household level.
- Households that do not have adequate labour feel they benefit less compared to households who have more labour.
- Women's participation in decision making has been limited.

## AUTHORS

### IWMI

Wolde Mekuria, w.bori@cgiar.org  
Simon Langan, s.langan@cgiar.org  
Andrew Noble, a.noble@cgiar.org  
Robyn Johnston, r.jonston@cgiar.org

### Amhara Regional Agricultural Research Institute (ARARI)

Beyene Belay, Beyene.belay@yahoo.com  
Tadesse Gashaw, tadmeth@gmail.com  
Dagninet Amare, dagnnet@gmail.com

## THIS BRIEF

This brief is based on a study carried out in Gomit watershed, Libo-kemkem District, South Gondar Administrative Zone, Amhara Regional State, Ethiopia. The work was undertaken as part of the CGIAR program on Water, Land and Ecosystems.

Enclosure Land Management Status and Trends: Effects on Ecosystems Services and Livelihoods in Gomit Watershed, Ethiopia in 2012 by Wolde Mekuria, Simon Langan, Andrew Noble, Robyn Johnston, Beyene Belay, Tadesse Gashaw, Dagninet Amare.

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The CGIAR Research Program on Water, Land and Ecosystems (WLE) combines the resources of 11 CGIAR centers, the Food and Agriculture Organization of the United Nations (FAO) and numerous national, regional and international partners to provide an integrated approach to natural resource management research. WLE promotes a new approach to sustainable intensification in which a healthy functioning ecosystem is seen as a prerequisite to agricultural development, resilience of food systems and human well-being. This program is led by the International Water Management Institute (IWMI), a member of the CGIAR Consortium and is supported by CGIAR, a global research partnership for a food secure future

CGIAR Research Program on Water, Land and Ecosystems  
International Water Management Institute (IWMI)  
127 Sunil Mawatha, Pelawatta  
Battaramulla, Sri Lanka  
Email: wle@cgiar.org  
Website: wle.cgiar.org  
Agriculture and Ecosystems Blog: wle.cgiar.org/blogs

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