

Stove-For-Work: An Approach to Reduce Vulnerability to CC and Improve Livelihoods

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The Growing Problem of Degradation of Natural Resources

The adverse effects of environmental degradation are without a doubt predominantly faced by those whose livelihoods primarily depend on natural resources. Such is the case for over 85% of the Ethiopian people, who live in rural areas and rely on rainfed agriculture for their daily sustenance. With population growth increasing at an alarming rate, exploitation of natural resources is also rising rapidly (Bielli, et al. 2001). Reversal and containment of further degradation of natural resources are thus given high priority at the national level. For instance natural resource conservation and management through integrated development and utilization of land, soil, water and forest are the corner stones of the country's National Conservation Strategies (1994), Rural Development policies (2003), and its 2011 Climate Resilient Green Economy Strategy (CRGE).

While the causes of land degradation in the country can be attributed to multiple interacting factors, deforestation is certainly one of the main contributors to soil erosion and depletion of biodiversity. Following land and water, forests provide the greatest benefits to rural communities in Ethiopia by providing fuel for cooking and heating, raw material for construction, charcoal for income generation, land for settlement and agricultural expansion, and overall watershed protection. At an estimated level of 40,000 ha/annum, deforestation in the country is very high (Tesema 2006). The Gumera Maksegnit watershed where the ICARDA project is located is no exception. Most recent estimates show that there has been approximately 19% decline in forest cover between the periods of 1986 to 2007 which is mainly attributed to expansion of agricultural land and increasing demand for firewood (Ejigu, 2011).



Fuel efficient Stoves, the way to go?

In Ethiopia, Research and Development work on fuel efficient stoves began in the 1980s with the World Bank Energy Sector Assessment (World Bank, 1984). Since then multiple governmental and non-governmental organizations have invested in this sector and have introduced several fuel efficient stoves as an alternative to the traditional open fire stoves with very poor efficiencies. The *Mirt* stove is one of the results of such researches. It is proven to have an energy efficiency gain of about 23-24% relative to the traditional stove, reduces household's demand for firewood by up to 45%, and offers a reduction in carbon monoxide (CO) concentration by 89% and particulate matter (PM) by 17% over a mean 8-hour time frame (Feleke, 2007). However, adoption of the technology by rural households is quite limited primarily due to accessibility and affordability of the

technology (Fikadu, 2011 and Eshetu, 2014). Households thus continue to use the inefficient open fire cooking system with women spending hours in collecting firewood, crop residues, and animal dung to meet their household fuel demand; and exposing themselves and their family to health risks associated with extended exposure to smoke and open flames. In the Gumera-Maksegnit watershed women on average walk about 5 hours to collect firewood twice a week or more, depending on the family size. Cow dung is also collected, dried, and used as fuel to make up for shortfalls in demand for firewood, thereby depriving the soil of highly needed natural fertilizer.

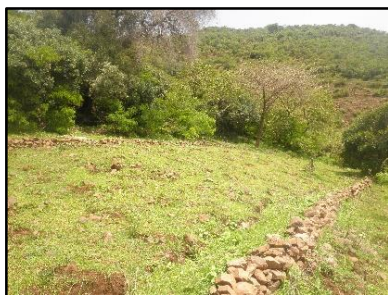


The WLE supported project in the watershed identified the *Mirt* stove as an ideal solution to decrease deforestation in the watershed, reduce women's drudgery, and improve soil fertility by reducing the demand for manure as fuel. However, the project was faced with the challenge of encouraging adoption of the technology.

Devising Appropriate Dissemination Strategy

Building on previous research findings the project resolved that the best dissemination strategy has to focus on making the stove readily available and most importantly affordable for the local community. The stove generally costs around 150 Birr which is equivalent to 8 USD, an amount that is still beyond the reach of the average farmer considering their limited income, and their family priorities.

The project thus took it upon itself to work with District level offices to identify and train young landless women to produce the stove locally, and make it available for the full price for those who can afford it, or through a stove-for-work program whereby those who choose this option will repay the cost of the stove by contributing family labor for NRM related activities within the watershed. The project thus managed to create income generating opportunities for the women producers who sold their stoves to the project and whoever else was interested to buy it from them. Ensuring the availability and accessibility of the stoves resulted in the adoption of the technology by over 800 households in the watershed.



The stove-for-work program also proved successful in mobilizing the community to maintain soil conservation structures, and partake in afforestation activities resulting in the planting of over 40,000 trees within the watershed. Preliminary analysis of data collected from adopters to assess the multi-dimensional benefits of using the stove also indicate, *ceteris paribus*, reduced demand for firewood, increased income for the producers,

improved health for women, and increased application of manure on their farms thereby contributing to improved soil fertility.

Women's opportunities to access technologies that promote efficient use of ecosystem services can be influenced by several socio-economic factors. In this case, the main bottleneck of availability and affordability of the technology. Making the stove readily available and accessible through stove-for-work programs proved to be the most important factor to improve women's health, reduce their drudgery, and an opportunity to generate income.

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