



Photo credit : Philip Atiim, CRS

# Labor-Saving Technologies

## REDUCING WOMEN'S WORKLOAD AND SHIFTING GENDER NORMS

### Background

In Northern Ghana, women are responsible for nearly 70% of farming activities, playing major roles in land preparation, sowing, harvesting, processing, and marketing. They are responsible for 90% of household chores,<sup>1</sup> including collecting water and fuelwood, cooking, and caring for children, the aged, and sick household members — thus they spend triple the time on unpaid work as men.<sup>2</sup> Women's heavy labor burdens reduce opportunities to engage in livelihoods and food security activities, which negatively affects their children and their own health and nutrition.<sup>3</sup> Three tasks carried the brunt of time and energy usage of women in the project area.

**Water collection:** Women typically trek to the water source 7 times, which takes 3-4 hours each day. She carries 25 kg of water on her head while often maneuvering steep banks and mud to fetch water from dams, streams, and rivers.

**Wood fuels:** About 90% is obtained from natural forest and savannah woodlands,<sup>4</sup> contributing to desertification. Gathering wood in remote areas puts women at risk of assault. Its use contributes to respiratory infections and other health concerns. It takes 15 – 20 hours of women's time weekly.

**Seed sowing:** Women do the physical labor of sowing maize, millet, groundnuts, and rice seeds. One acre takes one hour for three women to sow using traditional methods.

CRS-Ghana funded "Empowerment through Innovation Project", piloted labor-saving technologies with members of established Savings and Internal Lending Communities (SILC) groups from January-September 2021<sup>5</sup> in 10 communities. It was layered onto WASH programming supported by Helmsley Charitable Trust in Talensi and West Mamprusi Municipal as well as the European Union-funded Regreening Africa project in Mion District.

<sup>1</sup> Ghana population and housing census, 2010.

<sup>2</sup> World Economic Forum. The Global Gender Gap Report 2020, 2019.

<sup>3</sup> World Bank. Ghana: Economic Diversification through Productivity Enhancement, June 2019; International Fund for Agricultural Development (IFAD), 2016. *Reducing rural women's domestic workload through labor-saving technologies and practices.*

<sup>4</sup> Strategic natural energy plan, wood fuel and renewables, energy commission, Ghana, 2006.

<sup>5</sup> Existing SILC Groups were used that were at least 4 years old.

## The Approach

1. Identified technologies based on most time-consuming tasks, experience, and stakeholder consultations: water cart, treadle pump, dibbler, and fuel-efficient cookstove.
2. Worked with in-country fabricators to construct technologies.
3. Held community-sensitization meetings to introduce technologies, which garnered leaders' support and increased community members' enthusiasm.
4. Tested the technologies with women for 3-weeks with post-test focus group discussions to gather feedback.
5. Modified technologies based on feedback. For example, added brakes to the water cart to improve maneuverability on steep terrain and increased cooking stove size to accommodate larger cooking pots.
6. Strengthened local capacity on use of the technology.
7. Conducted a rapid assessment with 77 women to explore how they used the technologies, the ability to use the technologies, their effectiveness, and willingness to pay.

## Strengthening Local Capacity

Several activities were deployed to strengthen local capacity. For the water carts and dibblers, two district-level training of trainers with 20 community animators on assembly, use and maintenance were held and then cascaded to SILC members in 10 communities. The training reached 1,300 women and men.

To facilitate access to local and affordable maintenance and repair or even replacement, five local welders were trained on maintenance and construction of the water carts and seed dibblers. The fabricators were trained at the Tamale Implement Factory (TIF)<sup>6</sup> when the modified water carts and dibblers were being constructed that allowed for hands-on training. TIF encouraged the welders to make a business out of repairs and replacements.

For the fuel-efficient cookstoves, sixty women were trained in 6 communities and each woman organized at least 3 stepdown trainings. The training included sessions on protecting the environment, the benefits of the cook stove and instruction on how to build, use and maintain it. Trainees built three cook stoves per training as samples for the community. They reached more than 1,800 women by September 2021.

<sup>6</sup> Tamale Implement Factory (TIF) is a government-owned entity that designs and fabricates low cost, simple agricultural equipment for farmers. They also worked with CRS on their Soybean Innovation Laboratory project to fabricate multi-crop threshers for soybean farmers in Northern Ghana

## Managing Group-Owned Technologies

Given the price point of the dibbler and water cart, individual ownership would be difficult, so a group management system was set-up. The SILC groups that became the conduit for distribution and management of the technologies determined the management terms.

- Each group selected a caretaker, who was often the president. The caretaker stored the technology, ensured its accessibility to all members, kept daily use records, and was responsible for maintenance.
- To illustrate commitment and demonstrate co-funding, each member purchased their own water containers that were inspected by CRS staff or SILC agents.
- Group members decided on a usage fee for the technologies by SILC and non-SILC members. The SILC Groups agreed to pay GHS 1 per use and held the money in the SILC group's social fund for maintenance and/or eventual replacement of the technologies.
- Groups agree to contribute money to maintain or replace the technologies if the social fund is not sufficient to cover the cost.

## Results

The results are based on a rapid assessment conducted during the 4<sup>th</sup> quarter of fiscal year 2021, less than 4 months after introducing the technologies. CRS observed high rates of adoption of most of the technologies piloted. Women were more emphatic about the water carts and fuel-efficient cookstoves, which they typically use throughout the day. The pilot showed slower adoption of the dibbler, a technology that is used during a specific season each year.

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*“External knowledge is very important; I never thought our work could be made easier in this manner with such simple tools.”*

*Female respondent, Gaare,  
Ghana*

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## Water Carts

Building on CRS-Burkina Faso experience, CRS-Ghana developed a contextually appropriate water cart. The cart was designed to limit trips to the water point and the need to carry water on the head to minimize injury and fatigue. TIF initially fabricated 15 hand-drawn water carts. CRS initially procured several 200-liter plastic containers and 60-liter pig feet water containers as well as asked community members to use their 25-liter containers. The project expanded and made changes to the cart design based on feedback and then expanded to 50 carts after the test. The project transitions from providing water containers to a cost-share with community members supplying their own water containers. The cost of the water cart was USD \$190.

Women reported the water cart reduced the time spent on collecting water. They go to the water source once per day now. CRS observed carts enabled some boys and men to take on water fetching duties. While it remains culturally unacceptable for males to carry water on their heads, it is acceptable for them to transport water containers in a cart. Water carts are being used for carting produce and shea nuts from the farm, taking inputs to the farm and transporting bricks to build houses. Men use the cart, paying the usage fee. Some SILC groups plan to use the social fund, make additional contributions, and together purchase additional water carts and pumps. From SILC Groups record, the use payments have led up to a 15% increase in social funds. With assistance from CRS in brokering relationships, other SILC groups were mobilizing to purchase water carts from the local fabricator.

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*“The way I have enjoyed the use of the water cart, my husband and I are planning to buy one for our personal use.”*  
*Female respondent, Kukpalgu, Ghana*

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## Treadle Water Pump

Mechanical, easy-to-operate paddle pumps draw water from open sources through inlet pipes, reducing water contamination and injuries from reptiles and falls on steep slopes. CRS purchased 10 from the local market for US \$76 as they were available but promoted for irrigation purposes. Women and girls reported the pumps brought great relief, as they used to fall on the steep slopes while carrying the water on their heads.

## Hand-Drawn Mechanical Dibbler

This simple, low-cost, locally made, efficient dibbler reduced the time, labor and stress for women to sow farmland and ensure use of good agronomic practices (e.g. seed spacing and density) that increase yields, eases weeding and fertilizer application. TIF fabricated 10 dibblers that can plant various crops (i.e. millet, maize, groundnuts, cowpea, and soybeans) as the wheels and spokes are adjustable to align with spacing protocols for different crops. The dibbler cost US \$86.

Although there was slow adoption, the assessment found it saved time. One female farmer can now sow an acre of land in one hour. The limited adoption may be a result of it arriving late into the planting season and its limited use to planting.



Photo credit: Philip Atiim, CRS

## Fuel-Efficient Cookstoves

The cookstove reduces cooking time, energy inefficiency, sight and lung health problems, and treks to collect wood fuel, thus lowering women’s energy usage and risks. The Centre for Rural Improvement Services piloted a stove made with local materials – brick, sand, clay, cow dung, rice straw, gravel, and water — as the community members can source themselves.



Photo credit: Caroline Dery, CRS

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*“The amount of money I spend on fuel wood for my catering services has reduced drastically because of the use of the energy saving cook stove.” Female participant-commercial cooked food vendor, Duusi, Ghana*

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By September 2021, community members had constructed approximately 350 cookstoves in 10 communities and have continued to build new ones and repair existing stoves. Women who were trained in cookstove fabrication, with support from their community animator, have sensitized and facilitated the construction of the stoves in 4 neighboring communities. CRS has learned from members of non-study SILC Groups that they are building the improved cookstoves themselves. The stoves are being used for household cooking and women-owned food businesses.

Women reported several benefits of the improved stove: less smoke produced which reduced eye irritations, better heat retention, less time to prepare food, less firewood used, and reduced need to restart fires that the wind blew out.

## Use of Time Saved

Women reported using the technologies save them time. Most reported using this time to engage in more productive work, at the market or helping on the farm. Men interviewed expressed that spouses now have more time to sit together, discuss family issues, and engage in couple activities.

## Lessons Learned and Recommendations

- **Appropriate technology can shift roles and responsibilities:** Although the technologies tested and promoted were aimed to ease women’s time and energy burden, we found that men started taking up water fetching, as the water carts circumvented cultural norms that limited them in fetching water. When considering technologies to reduce labor burden or activities to shift roles and responsibilities from women to men, it’s important to understand why men may not do certain roles and take this into consideration when designing.
- **Labor-saving technologies contribute to secondary-level improvements:** The use of the treadle pump prevented women from entering the local water sources, reducing contamination. Furthermore, requiring each person to have their own sealed water containers mitigated contamination in transferring water to personal containers and reduced waiting time for the cart.

- **Sustainability:** A crucial step for ensuring sustainability is working with local fabricators that community members can reach. Local fabricators offer the technology at a lower price and community members have reduced transport costs. This may entail providing technical and business support and training to local fabricators.
- **Conduct a life-cycle cost analysis:** It was important to discuss the technology cost with SILC group members to put an appropriate maintenance and replacement plan in place. Projects can conduct a life-cycle cost analysis to have a more accurate determination of the fees.
- **Hands-on training and sourcing local materials:** The uptake of the fuel-efficient cookstove was accelerated given the practical training in which the women built the stoves themselves. Furthermore, the ability to source local materials freely and being able to construct the cookstoves themselves eliminated the income barrier many women face given cultural norms.

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