

Short Research Article

Pre extension demonstration and evaluation of hip pump in western Oromia, Ethiopia

Water lifting devices enable the lifting of water from a lower level to a higher one. Water lifting technologies free the farmers from the limitations of inadequate rain during dry seasons, thus raising their capacity to grow crops up to two or three planting annually. The method lifting water to the field for irrigation in the country and in oromia too are mostly traditional. The water is transported to the field with the help of bucket; water points and area to be irrigated are far apart; the ground and/or river water is at deeper position to convey to area to be irrigated. Therefore, this activity was aimed at scaling up of over flow pump and Rope & washer pumps for micro irrigation. The demonstration was conducted in west wollega (Gimbi woreda) and Qellem Wollega (Sayyo woreda). Two FREG were established in each woreda consisting of 15 farmers in each group. Totally four FREG were established consisting of 60 farmers. Theoretical and practical training was given for all FREG member farmers, SMS and DAs. Totally eight hip pump were distributed for all FREG. Data was collected by; focus group discussions and semi-structured interview. The collected data was analyzed from feedback/field report and Focus group discussion. The study recommends that Training should be given for extension staffs who work directly with irrigation farmers on hip pump. Woreda Irrigation Development Authority should facilitate field demonstrations with farmers for further scale up Sources of technology should be as close as possible to the farmers. So the respective Woreda Irrigation Development Authority should facilitate for farmers who need these technologies by providing these pumps from the sources.

Key words: pre-extension, demonstration, hip pump, water lifting

Background and Justification

Water is essential for the growth of agricultural crops. In many regions, however, there is insufficient rainfall available to produce a crop with decent yields, and irrigation systems are needed to provide the crop's need for water. Also, provision of drinking water is fundamental for both human beings and livestock, but its transport from the water source to final destination is often required. Water sources can either be under ground water reservoirs, open natural water bodies (rivers and lakes), or artificial water bodies (canals). The use of water lifting devices is crucial to transport water from water source to the field or to the consumer.

Water lifting devices can be divided into two groups: (i) devices that are run by muscle power of humans or domestic animals and (ii) devices mechanized by lift irrigation techniques. Devices which are run by muscle power are often very time-consuming in real terms, due to their low productivity. Mechanized lift irrigation techniques, while more efficient, need to be adapted to the local conditions and to the different demand needs. To establish and implement

water lifting devikces, local people need to be trained on how to use these technologies in water efficient way, as well as how to maintain these technologies in the long run.

Local hydro geological, economic and social conditions, as well as national strategies, e.g. the strategy to standardize the equipment, must be considered in selecting the technology which best fits local conditions. In the end, it is the individual farmer or the benefitting association who should make the final choice.

Water lifting technologies free the farmers from the limitations of inadequate rain during dry seasons, thus raising their capacity to grow crops up to two or three planting annually. Thus additional income possibilities for the subsistence economy of the households are provided.

In addition, Water efficient technologies such as pumps can bring an improvement to the situation of women by increasing household food security and nutritional variety, as well as decreasing the amount of labor required to obtain water. Most pumps can easily be operated by women.

It is estimated that more than 90% of the food supply in Ethiopia comes from low productivity rain-fed small-holder agriculture. Hence, rainfall or access to irrigation water is the most determinant factor affecting the food self sufficiency at household level and national food supply. Not only limited access to water has impeded the productivity of farming system but also lack of appropriate means of utilizing the available water more productively.

The development of irrigation and agricultural water management holds significant potential to improve productivity and reduce vulnerability to climactic volatility in any country. Although Ethiopia has abundant rainfall and water resources, its agricultural system does not yet fully benefit from the technologies of water management and irrigation. The majority of rural dwellers in Ethiopia are among the poorest in the country, with limited access to agricultural technology, limited possibilities to diversify agricultural production given underdeveloped rural infrastructure, and little to no access to agricultural markets and to technological innovations. These issues, combined with increasing degradation of the natural resource base, especially in the highlands, aggravate the incidence of poverty and food insecurity in rural areas. Improved water management for agriculture has many potential benefits in efforts to reduce vulnerability and improve productivity.

“Water is the key entry point for boosting agricultural productivity and incomes,” says Alfred Wise, director of Kick Start International Tanzania, the non-profit organization behind the popularization of manually operated water pumps used on smallholder irrigation projects.

Hip pump enables farmers to access water in order to diversify and grow higher-value crops such as fruits and vegetables. “Unlike farmers who wait for the rains, who all come to market at the same time with the same crops, farmers using irrigation also have crops to sell in dry seasons when prices are high,” Wise said.

Hip pump can utilize a rowing motion in combination with the rocking of the hip. As the user rock their hip back and forth their arms are also moving in a circular motion (rowing motion) to operate the piston. Another instance which can be adopted involves pushing the pump handle with the rear of the body. This pump can also be used with a hip belt to assist the user with the pulling motion. It is flexible enough to accommodate many different usage style, the benefit is that it can be used for long period without tiring and in a manner that is comfortable for different users. In general, this pump is highly energy efficient because a user or community can incorporate the muscle of person’s whole body to use the pump. Compared to pumps which use a person’s arm to operate this pump enable the community /society to pump for longer duration since human’s arm have poor endurance as compared to their leg. In particular, the level effort to use this pump is substantially less than effort required to use as similar cylinder and piston pump that does not have a pivoted base-such as a standard floor mounted bicycle pump.

This pump is design for the user to perform basic maintenance with no special skill or tool is required or furthermore no special trainer skill is needed to install or to replace or to operate, so any person can operate easily.

Generally, there are many manually operated pumps in the country but many of them cannot resolve the solution of water lift for the farmer, because they have some problems encountered in the society the energy request to operate and body /physiological fatigue problems. So to solve this problem the Hip pump is appropriate as it need low energy and reduce fatigue problem.

The Hip Pump is a light and easy-to-use pressure pump that can irrigate water from a depth of **four** meters and lifting it to a height of **five** meters above the water source.

People are catching on to the ways that this technology not only helps them with the problem of a lack of water, but also helps them earn a living and improve their happiness in all aspects of their life. Not only was this equipment supposed to be directly useful in improving irrigation in drought-ridden areas, it was going to be very useful in creating a business,

employment, and income. This was essential in improving the lives of these rural workers. Since this tool does rely on human power, it is ergonomic and safe.

Many farmers had problems with the inconsistent weather; they were often battling with lack of rainfall and droughts in unproductive lands. The irrigation pump allows them to have consistent water throughout the year, helping the crops and providing income that is more consistent for the families.

Specific objectives

- ✓ To create awareness among farmers on hip pump technologies
- ✓ To get farmers feedback for further improvement of the technology

Materials and methods

Material resources that were supplied hip pump at the due time of working season. The zones were randomly among the mandate area of BAMRC. From each zone one district and among each district two PAs or FTCs picked out purposively based on irrigable land and ground/river water facilities possessed. From identified frame of sample, a mixture of 10-15 farmers (by gender & social status) per kebele were selected on the random sampling basis and be organized in an four groups. Selection of PAs and farmers were done joint venture team composed of researcher, WOARD and locally decentralized institution (PAs' chairperson).

Training (capacity building) session was the integral part of the project and will be organized for farmers, DAs, SMS and other identified stakeholders of the extension area so as to upgrade their skills on principle, installation(assembling & disassembling), operation(usage),management, handling and repair of delivered implements

Moreover, for efficient demonstration of technologies, short field day, workshop and group visit was conducted throughout the group for sharing experience involving neighbor farmers, in addition to frequent follow up of the project at various stages.

Data collection method

- ◆ Group and individual discussion
- ◆ Joint field and home visit
- ◆ Semi-structured interview
- ◆ Continuous interaction (monitoring and evaluation)

Data analysis

Data were analyzed qualitatively from field notes and semi-structured interview guide organized and summarized after feed in to computer

Results and discussion

Total number of farmers participated in training

60 farmers were participated on technical training of operation of hip pump

It is estimated that over 200 farmers have now had exposure to over flow treadle pump technology and rope and washer pump through field visit scale up



Source: own field work

Benefits of Farming practices

The benefits of using the treadle pump and rope and washer pump in farming practices

- Increased land area under irrigation;
- Reduced work time compared with bucket irrigation; full irrigation of fields, resulting in improved crop quality;
- reduced labor demand
- reduced workload
- Work time has been reduced compared to bucket irrigation;
- Irrigation used for seed multiplication; examples include coffee and tomatoes

Social and Cultural changes

Women operate hip pumps without any traditional or religious constraints and see this as an opportunity for empowerment.

Conclusion

The demonstration was conducted in west wollega (Gimbi woreda) and Qellem Wollega (Sayyo woreda). Two FREG were established in each woreda consisting of 15 farmers in each group. Totally four FREG were established consisting of 60 farmers. Theoretical and practical training was given for all FREG member farmers, SMS and DAs. Totally eight hip pump were distributed for all FREG.

168 The FREG using this technology and the demand is created on hip pump. Due to demand
169 created on this technology from neighboring of the hosting farmers; Sayyo Irrigation
170 Development Authority has been started to provide this hip pump.

171 Its advantages are saves water; it doesn't require large water sources, reduce drudgery, saves
172 their time as compared to bucket Irrigation and no need of fuel as it is operated manually by
173 using our hip; It is also helps for rearing seedlings at nursery site for those who irrigate large
174 area of land. It is very useful for those farmers who can't afford motor pump and its cost of
175 fuel because hip pump is affordable for small holder farmers.

176 Although, it has the aforementioned advantage the problem with hip pump are It can't irrigate
177 large area of land and the other problem is its spare parts because It is imported from abroad.
178 Therefore, hip pump is recommended for further pre scaling up Sources of technology should
179 be as close as possible to the farmers. So the respective Woreda Irrigation Development
180 Authority should facilitate for farmers who need these technologies by providing these pumps
181 from the sources. Irrigation Development Authority at Zonal and woreda level should give
182 training for farmers and Das and facilitate supply. NGOs who are working on irrigation
183 development should consider this hip pump and facilitate for farmers on credit basis as other
184 pumps like motor pump in order to reach smallholder farmers

185

186 **Reference**

187 Arora K, L., 2002. Water power and Water Resource Engineering.

188 Michael, A.M, 1978. Irrigation Theory and Practice Pp 290-300

189 Sileshi B., 2010

190 Web site <http://www.Manual operated water lifting pumps .com.UK>. History

191 Web site <http://www.Kick start.org/product/moneymaker hip pump .com>

192 Web site <http://www.iwmi.egiar.org/publications/working papers>

193

194

195

196

197

198

199