

Small Holder Farmers' Experience on Pressurized Irrigation Systems in Kobo Valley

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1. Introduction

The problem of food security had long been in a priori importance in Ethiopia. The problems of land degradation, population pressure, low productivity in agriculture, improper utilization of resources, poor infrastructure, absence or poor level of adoption of technological innovations, etc., contribute to food insecurity in the country. The situation in the Amhara National Regional State as well as in Kobo Girana Valley is not different from the national situation.

Kobo Girana Valley Development Program Office (KGVDP) is located in North Wollo Zone of the Amhara National Regional State and covers Kobo, Gubalafto & Habru woredas of the Zone. It was established in 1999 by the Amhara National Regional State with the goal of ensuring sustainable food security and improving the livelihood of the people in the area.

The program has been implementing integrated rural development projects, which include crop husbandry, livestock resources development, natural resources development and irrigation infrastructure development over a period of 25 years. The development of irrigation systems in the valley is increasingly coming to be the core activity of the program implementation. It started implementing pressurized irrigation systems from ground water source and two of the pilot systems are implemented to date.

In this paper, the experience of KGVDP in the implementation and management of irrigation

systems with specific reference to pilot pressurized systems is presented. The existing situation, the potentials, constraints and proposed solutions are presented.

2. Irrigation Infrastructure Development

Kobo Girana Valley Constitutes five distinct sub basins, viz., the kobo sub basin, Alewuha sub basin, Chereti sub basin, Gelana sub basin, and Hara sub basin. Despite the available potential of water resources, the valley generally is considered to be drought prone area.

Based on the study document for KGVDP, the area has a potential of producing 156.2 million cubic meter surface water yield and 113 million cubic meter underground water yield, which totals 269.12 million cubic meter water yield per annum.

On these basis, the study proposed irrigation developments to irrigate an area of 5665 ha by using the sub-surface water source and about 3600 ha by using the underground water source, which altogether goes to 9265 ha of land by the end of the project, which is subject to revisions and detailed studies during implementation.

With regards to the underground water resource use, the study on KGVDP proposed the development of 90-130 bore holes each producing an average of 30 liters per second. A review study in 2003, on the other hand, proposed the development of about 63 bore holes, which have an average discharge of 50 lit/sec. Based on the second proposal, an area of

Table 1. Profile of Implemented Pilot Projects in KGVDP.

<i>Item</i>	<i>Unit</i>	<i>Pilot Projects</i>			<i>Total</i>
		HG-1†	WG-1	HE-1§	
Area	ha	34	41	5.7	80.7
Drip	ha	24	25	---	49.0
Sprinkler	ha	10	16	5.7	31.7
Beneficiary HH	No	163	124	8	295
Female	No	16	19	1	36
Male	No	147	105	7	259

† HG-1, Hordat Golina no. 1; § HE-1, Hordat Ethio Israel

2520-3150 ha can be irrigated using these boreholes and 12,000-15,000 house holds can benefit from these sources.

3. Performance of Pilot Projects

Since the commencement of the program, KGVDP has drilled 27 boreholes of which 21 are productive wells and 6 are test wells. Among the 21 productive wells, 4 wells are pilot wells and the installation of infrastructure on the two of these pilot wells are completed and considered as pilot projects. Until the end of 2005 only these pilot projects started proper crop production. By the beginning of 2006, pressurized systems infrastructures on additional six wells were in place to irrigate about 330 ha.

3.1. Profile of Pilot Projects

Prior to the implementation of pilot pressurized irrigation systems by KGVDP, a similar 5.7 ha pressurized irrigation system was installed by Amhara Regional Bureau of Agriculture (ARBoA) in cooperation with the government of Israel, and successive extension support was given by KGVDP. The positive effect of this system for the subsequent extension work was enormous. Including this system, the profile of the three pilot projects is given above.

3.2. Production Patterns and Input Use

A crop plan document is prepared for each project and the crops cultivated by the systems are onion, tomato, pepper, maize, haricot bean, groundnut and cotton. Major Crops used to be produced in the area before project implementations were teff, maize, and sorghum. Although the yields were better than the conventional production levels, productivity of crops in the systems were not up to the standards of commercial productivity levels.

As regards to input use, farmers don't use the required amount of inputs, especially fertilizer and pesticide, as per the recommended rates. Major costs are seed, fuel and electricity charges.

3.3. Product Marketing and Income from the Systems

Products are normally handled in an ordinary manner and sold to private traders, military camps and to Ambasel Trading House (in case of cotton & Haricot Bean). Marketing constitutes the major aspect of problems in irrigated agricultural production.

From the potential point of view, the systems are not efficiently operating. As a result, income gained from the system by farmers is not to the expected level as compared to commercial farms. Even at the existing operational efficiency, however, the farmers

significantly benefited from the system. The harvests showed that a net income of Birr 7500-12000 per hectare per season was gained depending the strength of the farm operators.

3.4. Successful Achievements

The successful achievement in the area with respect to the promotion of pressurized irrigation system is the change in attitude of farmers on the effectiveness of the system. From the beginning, farmers were suspicious on the suitability of the system and its capacity to satisfy crop water requirements. But later, the farmers proved the potential and the capacity of the system. Moreover, it was found out that, it is possible for the farmers to manage the system technically.

The system is economically feasible even at current farmers' level of practice and farmers who exercised recommended practices gain good income. Eventhough the life of the introduced practices is not long enough to perceive a significant change in the life style of the beneficiaries, farmers from the Ethio-Israel project, which operated for about eight years have gained substantial benefits and their life style is changed positively.

Although it is early to talk about the sustainability of the system at farmers' level, today beneficiary farmers of Horat Golina No-1 infrastructure have started to maintain their system and replenish spare parts. The beneficiaries of the Ethio-Israel project, which was established before the commencement of KGVDP, proved proper sustainability of such a system at farmers' level. They replenish all their spare part demand as long as they are available in the market.

3.5. Adoption Challenges

The challenge in the promotion of irrigation development is not easy in the area as well as in other parts of the region. As the technology is new and sophisticated, the challenges with pressurized irrigation systems are worse than others. Some of the issues are raised below.

3.5.1. Land Tenure Related Issues

The nature of farmland distribution is uneven and fragmented. Whilst some farmers have about a hectare or more of land in the system, who might be unable to manage it properly, some other interested on the system have no access and they may get the access by renting (20-33% rented). Another problem related to land is the inconformity of the shape and size of the actual farm with the requirement of the system. While the system needs rectangular shape at a definite size, the farms of individual farmers are irregular and two to three farm plots fall in one system plot and one farm plot falls in two to four system plots.

These situations lead to great conflict of interest among farmers. When such interest conflict arose and individual farmers become stumbling block to the smooth implementation of the system, land administration policy is expected to react promptly and find solution. The reaction and solution the policy element, however, is slow and process oriented, even for solutions and measures within their by-laws.

3.5.2. Institutional Weakness of Farmers' Organizations

Although the weakness is not entirely attributed to the farmers, there exists a great lack of leadership commitment in the farmers' organizations. Influenced by socio-cultural situations, they used to loosen their own bylaws.

3.5.3. Dependency Attitude of Farmers

These infrastructures are installed by the government and sponsoring organizations. The dependency attitude of beneficiaries for support in operation and maintenance is enormous. Covering fuel, electric cost is a major operation cost where beneficiaries tend to receive especially at the beginning of the system. Shortage of capital, lack of confidence on outputs, experience different forms of subsidies and sometimes presence of different forms of subsidy in the neighboring woredas are some of the reasons for their dependency attitude.

3.5.4. Poor Integration among Stakeholders

The integration and commitment of concerned bureaucratic bodies towards the promotion of irrigation extension, cooperatives establishment and strengthening, and supports in their respective tasks is weak and not to expected level.

3.5.5. Limited coordination in backward and forward linkages

The importance of availability and timely delivery of inputs and market outlet for farm produce is not questionable. The availability of inputs is limited and sometimes completely not available for some types of seeds. The absence of strong institutionalized market integration on farm products contributes to the fall of productivity and a shift to conventional cropping pattern.

and electric charge is critically needed; preferential electric tariff treatment for small holder farmers' irrigation systems should also be sought;

4. Ensure the availability of spare parts or substitutes during installation
5. Whilst it needs a special attention for effectiveness, the concern on irrigation at all levels is not to the demand. It is therefore essential to strengthening extension and institutional coordination as well as the backward and forward linkages of the agricultural production system.

4. Concluding Remarks

The implementation of these pressurized irrigation systems showed that the system is applicable at smallholder farmers' level with a strengthened multidimensional effort. Despite the need to undertake enhanced institutionalized multidimensional effort for the effectiveness of the system, the concern on irrigation at all levels is not to the demand. In order to improve irrigation management in the respect, the following ideas are forwarded.

1. As the system needs homogeneity, social mobilization and organization works should be finalized first;
2. Disparity is created & widens in access to irrigable land and in the management capacity of land as new land is irrigated. Hence, as new irrigable land is addressed, land related problems/issues have to be considered critically and the policy has to incorporate absorbing mechanisms (Long term Planning)
3. Ensuring the availability of credit access for the first production season for fuel