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Improving Livelihood of Small-scale Farmers through Market Led Irrigated Crops Development: Case Study from Tigray, Northern Ethiopia

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Introduction

Climatically, the semi-arid environment of northern Ethiopia is characterized by extreme rainfall variability which usually results in crop failure. Besides, the farming system is characterized by continuous land cultivation, overgrazing, and unbalanced pressure on natural resources due to absolute increase in population. These characteristics are associated with excess nutrient loss and reduction in soil moisture holding capacity which aggregately leads to land degradation and low biomass or grain yield (Koohafkan and Stewar, 2008). Under these situations, the famers in Atsbi-Womberta district have been classified as food insecure (SERA, 2000). To improve the food security of smallholder farmers, a shift in thinking has been emerged which focuses on the management of natural resources as a key entry point for improving the income of farmers. The key entry points starts with managing the extreme rainfall variability through increasing water availability in the root zones and productive use of the conserved water. The productive use of water has been integrated with improved soil fertility and pest management, and choices of marketable high value irrigated crops. Subsequently, integrated interventions on productive use of water have been introduced and tested through shifting towards more market oriented high value irrigated crops to bring meaningful difference in the livelihood of smallholder farmers. The intervention has been strengthened with capacity building of farmers, private and public extension service providers and researchers in collaboratively with partners along the irrigated crops value chain framework. The purpose of this paper is to highlights the key results of the integrated interventions in the effectiveness of irrigated crops development to improve the livelihood of smallholder farmers in Atsbi-Womberta district of Tigray, northern Ethiopia.

Material and Methods

The integrated high value irrigated crops development has been tested in Atsbi-Womberta district, northern Ethiopia. The district consists of about 23,400 households with an average family size of six. The district is characterized by extreme rainfall variability mostly occurs between June-July, with an annual average of about 668 mm. Mixed crop-livestock systems are the dominant farming practice in Atsbi-Womberta (IPMS, 2005). Rural farmers manage crop and livestock in an integrated way to improve returns from the limited resources. Besides, farmers diversify sources of income to secure food for their family. Crop production traditionally focuses on highland cereals such as barley and wheat and highland pulses such as faba bean and field pea. More recently, marketable high value crops such as irrigated vegetables and spices have been introduced and cultivated mostly in the valley bottomlands or flood plains where source of water and soil fertility is relatively higher.

Using the participatory market oriented value chain planning approach, high value irrigated crops had been identified as one of the emerging market oriented commodities that could contribute to improve the livelihood of smallholder farmers. The potentials, limitations and gaps in knowledge that warrant interventions were synthesized along the value chain framework. The key knowledge gaps identified include lack of marketing skills, access to market linkage and information, and lack of skills on product processing and grading. Furthermore, poor seedling and on farm irrigated crops management of the newly introduced crops such as vegetables; and limited skills in maintenance and operation of the newly introduced water lifting devices such as motor and treadle pumps, and drip irrigation were identified as gaps in knowledge. Consequently, new interventions were proposed and implemented according to the indentified gaps in knowledge along value chain framework in collaboration with development and research partners (IPMS, 2005). Need based capacity development of actors on context specific irrigated crops developments were assessed and proposed and implemented. Changes after interventions has been monitored using regular follow up of activities and monitoring of outputs/outcome and project impacts. Besides, the IPMS project conducted systematically household surveys studies to assess the impact of the project interventions and capture the lessons learned.

Results and Discussion

Various shifts and changes were observed in response to market oriented irrigated crops development (Table 1). Some of the key changes include a shift towards diversified and

intensified high value crops; increased capacity of beneficiaries to respond to emerging opportunities and challenges. These include incorporation of new commodities and rotation systems associated with market oriented irrigated crops development. Change in attitude of farmers towards intensified natural resources conservation strengthened. Results show that farmers initially used the irrigation to grow cereals, achieving yield increase of about 81% relative to rainfed. Later on, farmers shifted to non-cereal more market oriented irrigated crops, in which case the share of market oriented irrigated crops increased from 27% of the total irrigated land in 2004 to 88% in 2008 (Table 1). Furthermore, average household income of beneficiaries increased by about nine fold compared to non-beneficiaries.

Table 1. Changes associated market oriented high value irrigated crops before and after interventions in Atsbi-Womberta district of Tigray, northern Ethiopia.

Variables assessed	Before interventions	After interventions
Irrigated area	Limited	Increased by eight fold
Intensification	Mono-cropping	Double cropping
Diversification	Cereals/pulses	Vegetables, spices, fruits, pulses and forage
Share of market oriented crops (%)	12	88
Beneficiaries	Limited	Increased by three fold
Introduction of new crops	Limited option	High value crops such as garlic introduced during the frost period, pulses cultivated in rotation with vegetables.
Income	Low	Increased by nine fold
Food security status	Low	Increased by 81%

The total irrigated area also increased by about eight fold and the number of beneficiaries by about three fold. The increase in irrigated area and beneficiaries may largely attributed to (1) undersupply of high value irrigated crops products in the nearby market, (2) access to irrigated input supplies such as water lifting devices and planting materials, (3) the increase in capacity and skill of growers and extension support providers on productive water use, and (4) intensified resources conservation interventions to increase in crop water availability around runoff generating sites. Moreover, crop diversification of households increased, including garlic cultivation during frost period, and pulses to break pest problems and improve soil fertility, and raise income from beans during the dry season market niche. Aggregately, the results indicated that about 81% of the beneficiary households were classified as food secure compared to 39% of the non-beneficiary households.

Conclusions and Outlook

Undoubtedly targeting marketable commodities and interventions designed on the basis of knowledge gap analysis along the commodity value chain framework significantly contributed to the income of rural farmers. The lessons from the spectrum of the interventions show that investment in natural resources conservation should link with the income generating activities to the community. This linkage in turn stimulates the community investment in resources conservation. These require shifting towards market oriented crop production with improved skills and knowledge, and capacity to innovate, share and use knowledge along the value chain of the commodities. A particular lesson from the district is the involvement the communities in decisions, organization and mobilization to conserve natural resources using local resources. These have been one of the best and farsighted initiatives as an entry point to improve the income of rural farmers. Besides, the introduction of market oriented irrigated crops improved the income of farmers significantly. However, only about 45% of the potential arable land has been put under irrigation showing that there is a need to put further efforts and investment to increase water availability through rainwater harvesting, retention and detention ponds to enrich surface and groundwater, and crop water uptake efficiency through diversified and intensified crop management. In this regard, the district has hug steep lands with a 9:1 runoff generating to run-on sites which is useful to expand crop production under supplemental and full irrigation and improve income of many smallholder farmers in the district.

References

Abegaz, A. 2005. Farm management in mixed crop-livestock systems in the northern highlands of Ethiopia. Tropical Resource Management Papers, No.70. Wageningen University and Research Center, The Netherlands.

IPMS (Improving Productivity and Market Success of Ethiopian Farmers). 2005. Atsbi Wemberta Pilot learning Woreda Diagnosis and Program Design. IPMS_ILRI, Addis Ababa, Ethiopia.

Koohafkan, P. and Stewar, B.A. 2008. Water and cereals in drylands. FAO and Earthscan.

SERA (Strengthening Emergence Response Abilities) Project. 2000. Vulnerability profile: Atsbi-Wemberta woreda (district), eastern zone of Tigray region. Disaster Prevention and Preparedness Commission (DPPC) and United States Agency for International Development (USAID), 168pp.