Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.6, No.23, 2015

Impact of Small Scale Irrigation Schemes on Socio-Economic Condition of Smallholder Farmers – Evidence from East Wollega Zone, Ethiopia

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Abstract
Expansion of irrigation agriculture has for long been seen as a means to break the cycle of poverty in the Ethiopian country. The present study is an attempt to investigates the socio-economic impact of small scale irrigation on small holder farmers and potential links between irrigation and food security in East Wollega zone. Purposive sampling method has been used to select five weak and five strong irrigation schemes while random sampling method was used to select 200 households comprising beneficiaries and non-beneficiaries of the scheme from the selected area. A pre-tested structured interview schedule was used to collect relevant primary data during 2013/14 production year and secondary data were sourced from the official reports. Apart from conventional analyses, logit model has been used to analyze the socio-economic impact of the beneficiaries and non-beneficiaries. The finding revealed that small scale irrigation scheme had positive impact on the Education level, use of improvised, per capital aggregate income, improved standards of living, marketing and distribution, access to credit, nonfarm income, membership in WUAS, extension contact and average livestock. However, shortage of seed supply, market problem, water management problem, financial and disease resulted in a negative impact.
Keywords: Irrigation scheme, smallholders, socio-economic, logit.

1.0 INTRODUCTION

Irrigation has helped to increase agricultural production in the past 30 to 40 years in developing countries and has been evoking greater expectations in the recent past for attaining food security. Irrigation development, particularly small scale, will be an important component of diversification and expansion strategy to strengthen food security in the future through additional production. Agriculture in Ethiopia is heavily dependent on rainfall, which is highly variable spatially and temporally. The farming system too is largely based on plough and draught power, which has crop and livestock production complementary to each other.

These are felt in ever decreasing household production, decreasing grazing land, forage scarcity and weakened draught animals. The consequences of the above problems resulted in food insecurity which often turns into famine with the slightest adverse climatic incident. The challenge therefore, is how to meet this increasing food demand with the existing but dwindling natural resources under worsening climatic conditions. As it was seen in many Researches work reported, among many mitigation system some are by using improved technologies of agricultural production, both modern and traditional irrigation etc and enhance the economic, social and institutional conditions necessary to increase agricultural production and productivity.

In response to these problems, as well as based on previous development objectives, Ethiopia has developed a rural development policy and a comprehensive food security strategy targeting the chronically food insecure segments of the population especially in highly vulnerable areas. Implementation of these objectives has been reflected in the unreserved support for water harvesting and diverting running rivers to be used for small-scale irrigation schemes in nationwide. This could be realized in capacity building through establishing a number of Technical, Vocational, Educational and Training (TVET) colleges and universities, and the establishment of Regional Agencies, such as Rural development, Agriculture, water resources development, irrigation authorities/bureaus, cooperative promotion bureaus, etc .(WSDP, 2002; Mc Cornick et al., 2003).

There is evidence that most modern irrigation development in Ethiopia, (including SSI, MI and RWH), has largely been a supply driven, technically focused approach, which has tended to ignore various factors that are relevant for making smallholder irrigation farming sufficiently rewarding to justify investment costs, and to achieve significant food security and poverty reduction impacts. (Teshale 2001; Behailu 2002).

The synthesis in this section focuses on specific Socio-economic impact, major constraints and limitations, knowledge gaps, future opportunities for investments and lessons learned with regard to SSI, MI and RWH, from the perspectives of East Wollega Zone of Oromiya regional state but extrapolates discussions of the findings to experiences in other regions of Ethiopia in a national development context. (World Food Program, 2009).

Expansion of irrigation agriculture has for long been seen as a means to break the cycle of poverty in the country. Traditional Irrigation 48,000 hectare while Modern Irrigation 1,620 hectare (Including irrigated 1,877) Local Irrigation 3,378 hectare and Motor pump Irrigation hectare 10,018. Total 63,016 ha including other method of irrigation and rain fed irrigation hectare 15,309 in general 78,325 ha can be used for irrigation potentials.

1.1 Conceptual frame work

The current government's policy of expanding water harvesting and micro-dam schemes is an attempt in that direction. The benefits of irrigation have long been realized in Asia and other parts of the world. In the face of this success the research is relevant to reveal whether the same can be achieved in Ethiopia and East Wollega zone in particular. This paper shows the potential impacts of small scale irrigation scheme on socioeconomic importance in East Wollega Zone. It also highlights the necessary conditions required to realize the benefits of irrigation. Tsegaye Yilma & LulsegedTamene, December,(2003).

In the milieu**,** the present study is an attempt to know the socio-economic difference between users and non-users of small scale irrigation like standard of living, income generation, employment creation and the potential to reduce rural to urban migration. Identify variables that enable to be weak and strong irrigation schemes and review the operation and management structure giving attention to the functional effectiveness of the irrigation management committees (IMCs) and water users associations (WUAs) and, identify the major challenges of small holder farmer on development of small scale irrigation schemes.

1.2 Methodology of the study

Description of the study area

East Wollega Zone of Oromiya Region is administratively divided in to 21 woredas hosting a total population of nearly 2 million. The area is agro-ecologically split into 11% highlands, 49% midland and 40% lowlands. The zone has one long rainy season extending from March to mid-October with annual rainfall ranging from 1000 – 2400mm.

Mixed agriculture (crop and livestock) is the main stay of the farming communities on which their livelihood is fully dependent. In fact, East Wollega zone is commonly known as one of the surplus producing areas. Small-scale farmers in the zone extensively use chemical fertilizers, improved seeds, herbicides and insecticides to maximize their crop production. Major crops grown in the zone include cereals (barley, wheat, teff, maize and oat), pulses (field bean and peas), oil crops (niger seed, rapeseed and sesame), root crops (Irish potato and Oromo Dinch (Coleus edulis)) and vegetables (cabbage, onion and garlic).

Secondary data: Secondary Data will be obtained from Ministry of Agriculture reports, East wollega zone administration office reports, documents, published articles and journals, World Bank reports on Irrigation in world and Africa.

Primary data: Primary data will be collected from the weak small scale scheme and strong small scale irrigation schemes, and also employees of east wollega administrative zone. Apart from field observations, Household interviews with Key informants will be executed.

SAMPLING METHODS AND SIZE

For this study purposive sampling technique has been used to select five strong and five week irrigation schemes based on their performance. The strong irrigation schemes selected for study areas are Indiris ,Jaalallee, Shonkorra, Gorr'aa, Horawaataa and weak performed irrigation schemes selected for the study purpose are Gambeelaatarree, Jaatoo, Basaqa, Jaree,Waajjaa, Accordingly, the study areas in East Wollega region has been selected purposively depending on personal familiarity of the investigator and their endowment with small holder irrigation schemes. At the second stage household survey has been made by selecting random sample so that for each household there was an equal chance to be selected.

Questionnaires are also distributed based on 5th household's level from registered member of irrigation among users and non users. In general, total of 200 sample size is taken from five strong and five weak irrigation scheme projects among beneficiaries and non beneficiaries.

THE STUDY MODEL SPECIFICATION AND ESTIMATION

The researcher has considered dependent variable as Beneficiaries of Small scale irrigation scheme or not.

The Logit Regression Model: HH Beneficiaries of irrigation schemes or not (Y)

$$= B0 + B1\,SEX + \beta 2\,EDUC + \beta 3\,FARMEXP + \beta 4\,NONFARM + \beta 5\,SOIAL + \beta 6\,TypeHse + \beta 7\,LIVINGST + \beta 8\,PROBLEM + \beta 9\,LANDSZ + \beta 10\,MEMBEROFWUA + \beta 11\,CREDIt + \beta 12\,EXTENSIONCONT + \beta 13\,MKT + \beta 14\,IMPROVED\,SEED + \beta 15\,AvRFO + \beta 16\,AVLVSTO + \beta 17(PAI) + \beta 18Cost + \beta 19Soiltype + e(random\ error)$$. (W. Michael Hanemann and Barbara Kanninen)

Y is the function of dependent variables, and it is the estimated value of user or non user of smallholder irrigation schemes.b0 –is the intercept, the value of Y when all the dependent variables takes value zero . Researcher can also use a t-test for each independent variable to test the following hypotheses (as one or two tailed tests): H_o: $\beta_1 = \beta_2 = \beta 3 = \beta 4 = \beta\ 5 = \ldots\ldots\ldots\ldots \beta 19 = 0$ H_A: not all β's equal to zero

1.4 Results and discussions

Variable Description	Min	Max	Mean	Std. D
user and non user	.00	1.00	.4700	.5
Sex	.00	1.00	.8800	.326
Educational level	.00	14.00	4.695	3.5
Farm experience	10	50.00	21.585	7.74
nonfarm income	.00	1.00	.2400	.428
social position	.00	1.00	.4650	.50
Type house	.00	3.00	2.1	.79
Living standard	.00	1.00	.770	.421
experience of irrigation in years	.00	30.00	5.9670	4.26
perception of cost	0	40000	2489.9	2785
Irrigation land	0	10	3.60	1.46
Member of water association	0	1	.80	.433
Credit Access	0	1	.18	.381
Extension contact	0	2	1.34	.760
Distance from nearest market	5	43	20.28	10.38
use improved input	0	1	.89	.3
average production of irrigation for four year	.00	56025	1647.8	4046
average production of rain fall of four year	300	46000	6572.6	6815
average product of livestock output four year	.00	49057	10737	8620

Table 4.1 Demographic characteristics of household heads respondents

This sub-section presents the demographic and socioeconomic features of the 200 sample respondents. These features are found to be of great help in terms of clearly depicting the diverse background of the respondents and the impact this diversity has had on the descriptive, statistical as well as econometric results.

Major product produced in area includes maize, sorghum, groundnut, sweet potato, and vegetables were the four top crops grown by the sampled households. This can be explained by the fact that maize, sorghum, ground and vegetables have been both staple and cash crops in the East Wollega zone. Even though the majority of the farmers in the study area are farmers, the yield per hectare is very low as compared to others crop grown in the area. the main type of vegetables produced in the area include cassava, jetrova,jekarada,NIM plant,Redus,kawustar,ispotadia,sweetpotato,onion,banana,elephant grass, avocado, marakofana, mango,lusinio and ananas are modern vegetables' seed adopted in the area through modern irrigation and they are more beneficial for society if expanded strategy is really applied in the area. The average yield of vegetables varieties seed was 1 Oromiya Irrigation Development Authority data on vegetables and fruits by rain fed East Wollega Zone 2001-2005.

vagetable/crop	Year 2001		year 2002		year 2003		year 2004		year 2005	
	land/h	Prodn	Land/h	Prodn	Land/h	Prodn	Land	prod	Land/h	prod(K)
vagetables	8098	670318	14256	145365	10596	924256	20921	1811606	41351	2744086
Root/veget	4356	436788	7761	743220	6205	520315	9482	1047386	16333	1412622
Fruit(kudura	3743	233530	6495	710431	4391	403940	11439	764219	25018	1331463
Mudura	135.3	16435	517.1	92685	80.27	5201.9	124.4	41935	530.6	20381
Midhaan ala	6110	121726	11513	135716	7543	320087	7831	315641	10122	353073
Total	14343	808480	26286	168205	18220	1249545	28876	2169183	52004	3117540

Table;**Oromiya Irrigation Development scheme Data on fruit and vegetables in East Wollega Zone 2001-2005**

1.4.1 Constraints to vegetables production and marketing

Main problems of respondents are disease 16.5 percent, like root rot disease ,insecticide like ,management problem 24.5 percent like follow up and shortage water 21.5 percent due to management problem. In some areas like Sasiga woreda the main livelihood of society depend solely on animal farming and chat due to acidity of soil and part of land is given for commercial large farm investors, small farmer cannot access land to produce crops and animal rearing.

This sub-section illustrates Estimation of Logit model, balancing test and sensitivity analysis. Prior to running the logit regression, the explanatory variables were checked for existence of Multi co linearity and the degree of association. Accordingly, a technique of Variance Inflation Factor (VIF) was employed to detect the problem of multi-co linearity among the continuous variables. Similarly, contingency coefficients were used to check the degree of association among the dummy variables. It was concluded that there were no multi-co linearity problems between a set of continuous and discrete variables, as the respective coefficients were very low (less than 10 for continuous variables and less than 0.75 for dummy variables)

For the study area, the selection of explanatory variables was done after CH2 test used to identify mean difference between variables which are significantly affecting the marketing of vegetables. Since we are using the method of maximum likelihood, which is generally a large - small method, we use the z-statistic instead of the t-statistic to evaluate the statistical significance of the coefficients. So inferences are based on the normal distribution.
The various goodness of fits measures were employed to check and validate that the model fits the data well. The chi-square goodness-of-fit test statistics of the model show that the model fits the data with significance at 5% level. This shows that the independent variables are relevant in explaining the socio economic impact of small scale Irrigation schemes on different vegetables varieties.

LOGISTIC REGRESSION ANALYSIS RESULT

Variables Name	B	S.E.	Wald	Df	Sig.(P.value)	Exp(B)
Sex	.479	.903	.282	1	.595	1.615
Educ*	.103	.084	1.513	1	.019	1.109
Farm*	.058	.033	3.017	1	.082	1.060
Nonfarm***	3.963	.784	25.550	1	.000	52.625
Social	.039	.548	.005	1	.944	1.039
Typehs	-.088	.305	.083	1	.773	.916
Livingst***	1.965	.630	9.736	1	.002	1.40
Problem*	.588	.343	2.936	1	.087	1.801
Land	-.253	.243	1.083	1	.298	.776
Member***	1.819	.652	7.783	1	.005	6.164
Credit***	2.172	.635	11.712	1	.001	8.778
Extensioncont**	.728	.343	4.512	1	.034	1.483
Market***	.212	.043	23.863	1	.000	1.236
Improvedsed*	-1.603	.932	2.955	1	.086	.201
AvRFO	.000	.000	.348	1	.555	1.000
avLVSTO***	.000	.000	7.606	1	.006	1.000
Constant***	-6.030	1.841	10.731	1	.001	.002

a**. Table Regression Anlysis**, Variable(s) entered on step 1: sex, Educ, farm, nonfarm, social, typehs, livingst, problem, land, member, credit, extensioncont, market, improvedsed, avRFO, avLVSTO.

All of the above tests suggest that the matching algorithm we have chosen is relatively best with the data we have at hand. Hence we can use logistic regression

Out of 19 explanatory variables included in the model,16 variables are matched by propensity score model and 10 variables were found to be significant and affected by small scale Irrigation in influencing Small holder Irrigation farmer Economy at 1 percent, 5 and 10 percent significant levels. The variables included in Socio Economy of small holder farmer includes sex, Education, Farm income, non farm income, social status of household head, type of house of house hold head, Living standard of house hold head, problem of using Irrigation, land ownership, member of water user association, credit, extension contact, proximity to market, use of modern or traditional seed, average level of income from rainfall output and average level of income in birr from Livestock output . The 10 explanatory variables which have been found to significantly determine the socio economic of small holder farmer by the sample farm households with regard to whether or not to experience vegetables marketing problems are interpreted and discussed below.

Irrigation schemes have insignificant impact on sex of household head, type of household head, land ownership of household head, average income from Rainfall level of output, and social status of household head .

Education level of household head(Educ); This is continuous variable measured by years of education. As hypothesized that Level of Irrigation is positively and significantly affects Education of household imply Household 's Beneficiaries of Small holder farmer are more Educated than non beneficiaries. This shows Education is significant at five percent level of significance. one unit increase in years of education increase probability of using irrigation by 0.103 times units.

Farm income household(Farm): It is continuous variable and significant at Five percent level of significance. Irrigation has positive impact on socio economy of small holder Farmers' income vice versa. one unit birr increase in income increases probability of using Irrigation by 0.058 times. Elasticity of farm income shows

that have expected signs and significant at 10 percent level. Non-farm income/off-farm income of household head(non- farm); It is dummy variable with one if household head has off- farm income source 0 if household head has no off-farm income source. Increase in household heads non farm income source indicates improvement of socio economy of household heads. It shows that household off-farm income is statistically significant at 1 percent level of significance which imply that irrigation positively affect non farm income activity.The statistical analysis shows that there was statistically significant difference in mean off/non farm income of beneficiary and non beneficiary households. user of irrigation are 3.9 times more probably to have non farm income than non users counterpart.

Living standard of house hold head(Livingstd);This is dummy variable with 1 shows improved living standard of household head and 0 not improved living standard of household head. It is statistically significant at 1 percent level of significance. Beneficiaries of Irrigation scheme are 1.965times more likely improved living standard than non beneficiaries.

Problem of household head (problem);This is categorical variable which implies that all household head problems for irrigation use compared with those whom has no problem for use of Irrigation. since 0 represent household head that has no any problem to be beneficiaries of irrigation, all other problems are compared with this variables. These problem have negative impact on household use of small scale irrigation at 10 percent level of significance.

The household head those encountered by different problems produce small scale irrigation vegetables 0.588 times less than their counter part(those has no problem in use of small scale irrigation scheme in East Wollega zone.

Households' membership status in local cooperatives (COOP): House hold memberships status in local cooperatives represented by dummy variables 0 for non member and 1 for member of local cooperatives. Households' membership status in local cooperatives has positive and significant relationship at 1 percent level with probability of experiencing use of irrigated vegetables. The odds-ratio of 1.819 for households' membership status in local cooperative implies that other things being kept constant, the odds-ratio in favor of small scale irrigation vegetables as a household's were being membership in local cooperative. Household head who are member of local cooperatives have 1.819 times more probably use small scale irrigation than nonmembers.

This result suggests that being farmers are a member of local cooperative they are better off from the market problem which indicate cooperatives are an important institutional innovation in encouraging smallholder farmers to produce cash crops, in which it provides better incentive for their participation and socio economy of societies. The finding of (Geremew, 2012) was supports the current study result.

Access to credit (CREDIT): This is dummy variable 1 for access to credit and 0 for not access to credit. The obtained result for this variable confirms that access to credit service significantly affected by Irrigation user. Elasticity of output for access to credit have expected signs and significant at 1 percent level.

The findings by Geremew, 2012 and Lerman, 2004; support the finding of the current study that Irrigation credit as it plays a vital role in the process of smallholder commercialization (Geremew, 2012, Lerman 2004). Consistent to these findings the estimate shows that, small holder farmers has statistically significant at 1percent level of significance and imply beneficiaries of Irrigation have more likely access to credit with probability of 2.72 percent times greater than their counterparts, ceteris paribus. The plausible explanation is that, access to credit enables smallholder farmers to finance purchase of inputs and other production equipments, hence encourage farmers to produce a given cash crop like vegetables and improves socioeconomic of peoples.

Extension contacts: This is dummy variable measured in different units 0 for contact 1 for contact in terms of daily, weekly, monthly or annual contact and no contact. The average contact with extension agents among the respondents was 2.5 times in a month. The mean extension contact for beneficiary households was 2.6 times in a month, while that of non-beneficiary was 2.4. The maximum extension contact observed was daily and the minimum was zero no contact. The elasticity of frontier production with respect DA contact under vegetables was estimated to be .728. This indicated that non beneficiaries of Irrigation have less frequent contact with DA by 0.728 percent less than their counterparts. This study is consistent with the study of Geremew, (2012) which indicates that, farmers require advisory and other services to actively participate in production of market oriented crops.

The statistical analysis shows that there was no statistically significant difference in mean extension contact of users and non users households.

Proximity to the nearest market(Market): This is continuous variable measured in distance between small scale irrigation scheme and nearest market area measured in kilometers.

As hypothesized that 1the more proximate to nearest market area is household head the more producer of small scale irrigation vegetable is the household head other things remain constant. In another wards, as distance from market increase from small scale irrigation scheme, the less will be farmers use irrigation scheme in East wollega zone. one kilo meter increase in distance between small scale irrigation scheme and market area, probability of farmers for use of small scale irrigation vegetables decrease by 0.212 times.

Use of Improved seed (IMPROVED SEED): This is dummy variable 1 with local variety of vegetable seed and 0 modern variety of vegetable seed. Seed is the most important Irrigation input to improve the production and productivity of farmers. In the study area respondents predominantly grow local variety of vegetables seed. 80 percent of sample households used local variety seed because of lack of improved vegetables seed. The estimated coefficient result for this variable was found to be negative, reflecting local variety of vegetable seed has negative effect on producing vegetables. Elasticity of output for seed have expected signs and highly significant at 1 percent level. The empirical result of the study indicated that seed had the major influence on vegetables output. The elasticity of frontier production with respect to seed was estimated to be 0.201. This indicated that local Irrigation beneficiaries' farmers can use improved seed by 1.6 percent less than non beneficiaries farmers. The finding of the study was agreed with the study of Bayisa, 2010 which indicated that improved vegetables varieties were more profitable than the use of traditional varieties (Bayissa, 2010).

The number of livestock owned in TLU (LIVESTO):This is a continuous variable measured in terms of Tropical livestock unit (250 kg live weight). The number of livestock owned by a household in TLU is calculated by conversion factor for Tropical Livestock Unit (TLU) (A household livestock size in TLU is calculated by multiplying the number of each type of animal by an appropriate conversion factor and then summing.

Households with higher livestock holding will lead to higher probability of getting excess livestock for selling and hence generating additional income, particularly the owner of more oxen lead to an ability of ploughing more land on time, thereby achieving crop yields and earning higher income that increase probability of using small scale irrigation scheme more.

Problems and Solutions

Lack of Fuel supply for farmers for those use Motor Pump for their irrigation
Worm which is calledTutaAbsoluta damage tomato eg in Gobusayo
No skilled Pump maintenance trained in woredas shortage of research and innovation on irrigation use in woredas and zone like drip

Irrigation and motor pump

In Some of woredas farmers privately contact experts of pump maintenanince and purchase motor pump themselves to solve the problems.

In other ward ATMJOn recruit experts from Finfine by paying perdem to help our Zonal woredas. To solve problems of logistics and experts Irrigation Authority should have to increase its budget and employee well trained experts .

Projects that are planned with full farmer participation perform better than those that are planned by experts on their own do. Projects planned by consultants have operational problems.Projects that are viewed by farmers as being their projects perform better than projects that are viewed by them as belonging to the government.

Government managed schemes have operation and maintenance problems because of budgetary constraints.Water management is good on farmer managed schemes, for fear of high electricity bills, and poor at government managed schemes, since they do not pay the costs. The finding of this study shows that traditional irrigation schemes in Sanka area have a better performance than government sponsored schemes at Alwoha and Gimbora. Factors, which determine the performance of irrigation schemes, are identified as farmers' group cohesion, strength of the water committee, location proximity of the schemes to people's home, past experience of farmers in irrigation agriculture and farmers commitment to undertake intensive agriculture. Social cohesion among irrigators and effectiveness of water committee to enforce group by-laws are found to be an essential element of good performed schemes. Irrigation households have been able to produce two times a year using the irrigation water. Source; secondary data collected from East Wollega Irrigation Authority office 2014.

1.5 Conclusion and Recommendation

The major cash crops for smallholder farmers in East Wollega Zone are coffee, sweet potato, maize, chat and different types of vegetable.

Study result shows that small scale irrigation schemes have no significant impact on Sex of household head, type of household head, land ownership of household head, average income level of Rain fed output, and social status of household head .

Education level of household head(Educ):Irrigation have positive impact on Educational level of small holder farmer thus improves socioeconomic of them.

Farm income household is significant at 1 percent level of significance which shows that Irrigation schemes have positive impact on farm income of small holder farmer.

Living standard of house hold head(Livingstd) is statistically significant at 1 percent level of significance. Beneficiaries of Irrigation are 1.965times more likely Improved living standard than their counterpart. This also implies Irrigation of small holder farmer have positive impact on their living standards.

Problem of household head (problem);The household head those encountered by different problems produce small scale irrigation vegetables 0.588 times less than their counter part(those has no problem in use of small scale irrigation scheme) in East Wollega zone which shows that small scale irrigation schemes decrease small holder farmers' Problems of using Irrigation.

Households' membership status in local cooperatives (COOP): The plausible explanation is that, access to credit enables smallholder farmers to finance purchase of inputs and other production equipments, hence encourage farmers to produce a given cash crop like vegetables and improves socioeconomic of peoples.

Extension contacts: The mean extension contact for beneficiaries of households were 2.6 times in a month, while that of non-beneficiaries were 2.4. The statistical analysis shows that there was no statistically significant difference in mean extension contact of users and non users households.

Proximity to the nearest market(Market): one kilo meter increase in distance between small scale irrigation scheme and market area, probability of farmers for use of small scale irrigation vegetables decrease by 0.212 times.

Use of Improved seed (IMPROVED SEED): This indicated that local vegetable seed producer farmers can produce by 1.6 percent less than producer farmers who use modern variety of vegetable seed implying small scale Irrigation schemes have positively affect farmers use of improved seeds.

The number of livestock owned in TLU (LIVESTO):. Households user of small scale irrigation have higher total livestock and selling for generating additional income, particularly the owner of more oxen lead to an ability of ploughing more land on time, thereby achieving crop yields and earning higher income implying small scale irrigation schemes have significant and positive impact on number of livestock owned by household.

Even though majority of small scale Irrigation face management, access to credit, extension contact and marketing problems, the overall performance of selective small scale irrigation schemes since they started operating shows increasing in terms of agricultural financing, total output, amount of irrigation land used, social , international and commercial aspects that improve socioeconomic of society.

Beneficiaries' of Irrigation were able to produce two times a year using the irrigation water.

Social cohesion among irrigators and effectiveness of water committee to enforce group by-laws, farmer managed schemes have better performance in terms of consultants, maintenance service, strength of the water committee and better water management than government managed scheme.

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Appendix 4.1 current irrigation projects

No	Scheme Name	District	Kebele	Hector	No.user	Year	Status	Cost
1	G/Taree(weak	Go/Sayoo	Angoboo	150	235	1987	irrigate	711300
2	Gibe Lammu	Go/Sayoo	Buleecaalaa	113	500	1989	‘	816300
3	Jaatoo(weak)	Wa/tuqaa	Bonayya mole	114	920	1990	;	1127800
4	Basaqa(weak)	Wa/tuqaa	Bonayabasaqa	60	281	1988	“	541000
5	Waaccuu	Gu/giddaa	Goraa	60	240	1995	“	945400
6	Indiris(st)	Si/siree	Carii	40	93	1994	“	797750
7	Jaalallee(st)	Si/siree	Caffejaalale	60	156	2000	“	2756772
8	Jaree	Gu/biilaa	Jaree	40	112	1991	“	404700
9	Abbonnoo	Le/dullach	Abbonno	80	248	1988	“	855550
10	Ciracha	Le/dullach	b/yekka	50	100	1994	“	596830
11	Nageessoo	JimaArjoo	Wayyuwarqe	30	128	1990	“	247200
12	Wajjaa	Gi/ayanna	Arbigabayya	25	200	1989	“	329440
13	Shonkora(st)	Saasigaa	Shonkorra	180	583	2000	“	2585361
14	Gorr’aa(st)	Saasigaa	Maddajalala	167	662	2000	“	1871402
15	HoraWata(st)	Saasigaa	Horawaataa	73	306	2000	“	2035233
16	Hayya	Saasigaa	Horawaataa	150	300	2004	constro	2359779
Tot		9		1392	5064			18981819

Appendix 4.2 water user Association

Type of work	Unit measurement	plan	Actual	%
Establishing of new water user associations	Number	574	223	38.85
To strength established water user association	“	685	94	13.72
over all water user associations	“	1,259	317	25.18