Horti-LIFE

Horti-economics of Farmers Field Schools in the 2016/17 and 2017/18 seasons

Introduction

Over the last two seasons Horti-LIFE supported DA's in 65 villages in the four main regions to create Farmers Field Schools (FFSs) on vegetable production; more especially on head cabbage, onion, tomato and green pepper. The 30 members of a FFS observe and discuss a package of 20 innovations that are applied on a learning plot of 200 m^2 in the fields of four lead farmers. The innovation package consist of technologies that proved to work on commercial farms.

After the harvest the FFS members calculate the Cost of Production (CoP) for the learning plots and the traditional farmers' field. All costs are discussed in great detail; incl. opportunity costs of land and labour, irrigation costs, marketing costs etc. For the learning plot the costs are well known as the project pays all inputs. The costs of farmers' fields are based on the records of the farmer and the outcomes of the group discussion on general costs. This procedure has two risks. The first is that yields on small plots are (estimated to be) higher than yields of large plots. The second is that farmers might give socially desirable answers; they tend to over-estimate the positive impact of the innovations applied on the learning plot. To compensate for this it is assumed that yields on the learning plots are overestimated by 25%.

In the 2016-17 irrigation season Horti-LIFE supported 108 Farmers Fields Schools and 66 of them made a reliable CoP assessment. In the 2017-18 season 109 FFSs, out of the 134, did the same. These data on 175 plots over two seasons are presented in the Annex. They can be used to analyse the economics of small-holder horticulture. All data are in Ethiopian birr; the two seasons are made comparable by applying a 15% inflation rate for the costs in the 2016/17 season.

Findings

The first finding refers to the traditional practice: smallholder use more than double the amount of fertiliser then officially recommended. The main findings on the innovation package are:

- Investments increase by 50%; 40% for short terms crops and 70% for long terms crops.
- Most of the increase is due to seeds that are 2 to 4 times more expensive.
- Fertiliser use increases by 64% on short terms crop; and by 80% for long terms crops.
- Yields increase by 104%; for cabbage it is lower (74%) and for tomato higher (124%).

These data lead to a set of conclusions on the efficiency:

- The costs price per kg of produce is 27% lower.
- In some cases farmers more pesticides are needed (cabbage); in others less. Overall per kg of produce 49% less pesticides are needed.
- Per kg of produce 14% less fertiliser is needed. Or stated the other way around: per kg of fertiliser 17% more produce is generated.

In line with the yields, the Gross Income is 115% higher. The net income is even 241% higher; it is particularly high for onions, as onions are both widely grown and imported. This means that the market price is closer to the production cost. So a 35% decrease in production costs per kg leads to a very high

increase in net income.

Tomato gives the highest profit: 350,000 ETB (12,00USD) per ha. The very high pest/disease pressure makes its' production risky and many smallholders stop growing it. Now production is dominated by over 250 investors (horti-preneurs) who rent some 1,700 ha of land in CRV. They pay 12.000 ETB per ha to smallholders who then see them making a 30-fold profit from it.

The Returns on Investments show very positive results as well:

- for normal farmers plots is 0.8; every 100 birr invested generates a net income of 80 birr. Long term crops (tomato, pepper) have much better returns than short term crops (onion, cabbage) due to the higher capital requirements and more complicated plant protection.
- for the learning plot is nearly double: 1.5
- for the additional investments on the learning plot this is again doubled: 3.1
- for the additional forex used on the learning plot it is 9.7[1].

The last number means that from every birr spent on importing quality inputs, farmers can earn an additional ten birr.

As substantial amounts of onions are imported, it is possible to calculate the potential impact of imported inputs on import substation. The additional production on the learning plots of 5,848 kg of onion required 3,137 additional birrs, or 112 USD, for imports. When the same amount of onion has to be imported this will costs 1,462 USD[2]. This means that every USD spend on inputs saves thirteen USD on importing onions.

Lastly the economics of Farmers Field Schools can be assessed. One FFS costs 1.000 USD/year. The average additional net income of the innovation package is 1,290 USD/kert. So the public costs are recovered by private gains when one farmer adopts the innovation package on 0.25 ha.

Conclusion

The data provide a solid justification for a horticultural smallholders support program from the government; both to avail forex to import high quality horticultural inputs and to setup a strong, specialised horticultural extension system.

The combination will have huge benefits as it will lead to economic growth and job creation in rural areas and to more affordable vegetables on the market. The latter is a precondition for a further reduction of malnutrition in the country. Lastly it will enable smallholders to make their land more productive, so they no longer have to rent it out to (outside) investors.

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[1] The additional forex is calculated as half of costs for the seed and the *additional* costs for fertiliser and pesticides. The assumption is that the import price of these inputs is half the price that the farmers pay. This is based on an input supply survey that Horti-LIFE did with the Plant Health Regulatory Directorate of MoALR.

[2] Ethiopia imported 47,498 tons of onions in 2017 worth 11.8 Million USD; so the average costs is 0.25 USD/kg.

ANNEX: Basic economic data on the performance of 175 learning plots of Farmers Field Schools

Items	Cabbage (n=37)			Onion (n= 72)			Tomato (n= 45)			Pepper (n= 21)			Weigthed Average
	Regular	Learning	Change	Regular	Learning	Change	Regular	Learning	Change	Regular	Learning	Change	
COST OF PRODUCTION													
Seed or seedlings	721	3,392	370%	2,081	5,132	147%	2,248	7,609	238%	2,005	10,339	416%	230%
Fertiliser	1,512	2,165	43%	1,889	3,405	80%	2,699	4,885	81%	2,271	4,551	100%	77%
Chemicals	1,294	1,741	35%	3,055	2,681	-12%	4,694	4,539	-3%	2,670	2,585	-3%	-4%
Other costs	9,811	10,394	6%	13,935	14,448	4%	14,254	19,281	35%	12,214	14,754	21%	15%
Harvesting labour	1,601	2,268	42%	2,271	3,601	59%	1,989	3,496	76%	2,491	4,994	100%	66%
Transport to market	1,836	3,792	107%	1,585	4,329	173%	2,313	7,227	212%	1,120	1,898	69%	164%
Total expense	**16,776**	**23,752**	**42%**	**24,816**	**33,596**	**35%**	**28,197**	**47,036**	**67%**	**22,771**	**39,120**	**72%**	**50%**
YIELDS													
Yield (kg/kert)	**8,621**	**14,985**	**74%**	**5,422**	**11,270**	**108%**	**9,666**	**21,632**	**124%**	**4,237**	**8,579**	**102%**	**104%**
EFFICIENCY													
Cost price (Birr/kg)	2	2	-19%	5	3	-35%	3	2	-25%	5	5	-15%	**-27%**
Chemical (Birr/kg)	0	0	-23%	1	0	-58%	0	0	-57%	1	0	-52%	**-49%**
Fertiliser (Birr/kg)	0	0	-18%	0	0	-13%	0	0	-19%	1	1	-1%	**-14%**
Gross income (ETB/kert)	31,752	57,324	81%	33,193	73,858	123%	61,183	135,023	121%	55,170	112,558	104%	**111%**
Net income (ETB/kert)	14,976	33,572	124%	8,377	40,262	381%	32,986	87,987	167%	32,399	73,438	127%	**241%**
RETURNS ON INVESTMENTS													
RoI standard	0.9	1.4		0.3	1.2		1.2	1.9		1.4	1.9	**0.8**	**1.5**
RoI on extra investment		2.7			3.6			2.9			2.5		**3.1**
RoI on extra forex		8.3			10.2			11.4			6.5		**9.7**