

## Research Article

# Cluster-based pre-scaling up of tomato technologies in harari region rural areas: Small holder farmers livelihood improvement

Ibsa Aliyi Usmane\*, Abdulaziz Teha, Badaso Urgesa, Oromiya Magarsa and Robe Elema

Fadis Agricultural Research Center, Oromia Agricultural Research Institute, Addis Ababa, P.O. Box, 904, Ethiopia

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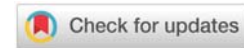
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\*Corresponding author: Ibsa Aliyi Usmane, Fadis Agricultural Research Center, Oromia Agricultural Research Institute, Addis Ababa, P.O. Box, 904, Ethiopia, E-mail: [ibsaaly2012@gmail.com](mailto:ibsaaly2012@gmail.com)

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## Abstract

Small-holder farmers' livelihoods basically depend on agricultural products and other related activities. Based on this impression, Agricultural Extension Research team conducted cluster-based pre-scaling up of improved tomato variety (Malka shola) at Harari region in two kebeles (Aradas) Kile and Dodota with objectives of scale up the improved Tomato technologies for increasing the production and productivity for the improvement of small-scale farmers livelihood and strengthen the linkages among stakeholders on the promotion of tomato technologies for one year (2019/2020). For this research activity, 100 farmers with 40% (pre-harvest to post harvest) women composition were participated by grouping them in three clusters, from land preparation to marketing of their products. As a result, 21.88ton/ha at cluster1 12.37ton/ha at cluster 2 and 14.59ton/ha at cluster 3 were produced from the total 75 hectares of land by irrigation system at off season in which Agricultural Extension Research team provided all necessary inputs to targeted farmers according to the land size they own and know how. Throughout this research activity implementation the disease occurrence, ups and down of market price, shortage of seed supply and non-frequent advices from immediate local development agents were raised by farmers as challenges. Therefore, research institutes, government's development organizations, NGOs, and other stakeholders should jointly focus on plant protection, market linkage strengthening, facilitation, capacitating, monitoring and evaluate on ground situation at field and farmers level.

## Introduction

Tomato (*Lycopersicon esculentum* Mill.) is one of the most widely grown vegetable crops in the world [1,2]. It is widely cultivated in all parts of the world and it is the largest in volume of production after potato and sweet potato. Currently, tomato mainly recognized as quality product for both local and export markets and providing a route out of poverty for small scale producers who live in developing countries in general and in Ethiopia in particular [3]. Tomato is a high value commodity which has the potential for improving the incomes and livelihoods of thousands of smallholder farmers in Ethiopia and diversifying and increasing Ethiopia's agricultural export exchange earnings [2].

Tomato is the most frequently consumed vegetable in

many countries, becoming the main supplier of several plant nutrients and providing an important nutritional value to the human diet. It is also important source of vitamin A and C as well as minerals. It is widely consumed in every house hold in different modes including raw, as an ingredient in many dishes, sauce, salads and drinks [4]. Tomatoes can make people healthier and decrease the risk of conditions such as cancer, osteoporosis and cardiovascular disease.

People who ate tomatoes regularly have a reduced risk of contracting cancer diseases such as lung, prostate, stomach, cervical, breast, oral, colorectal, esophageal, pancreatic, and many other types of cancer. The studies show that tomatoes and garlic should be taken together at the same time to have its cancer preventive effects [5].

Despite the importance of this crop, the production and



productivity is constrained by different biophysical and socio-economic reasons, such as lack of adapted and improved tomato technologies, land shortage, inadequate knowledge on production and management (processing) systems, poor extension services, poor marketing system and proper utilization of the crop are a few to mention [1]. To address those problems, technology introduction, development, promotion and evaluation with farmers as participatory approach could have a marvelous impact sustainable production and improved the livelihoods of rural households.

## Objective

To scale up the improved Tomato technologies for increasing the production and productivity for the improvement of small-scale farmers livelihood of AGP districts

To strengthen the linkages among stakeholders on the promotion of Tomato Technologies in AGP selected districts

## Materials and methods

This cluster-based pre-scaling improved onion technology research activity was conducted in Harari Region at Kile and Dodota kebeles. This site was selected based on the potential onion production and accessibility of the market nearby the community residence and the site classified into different clusters. After site selection 100 (60 men) farmers in which 40% (40) women composition were selected by considering the experience they have the know-how of the technologies, land availability and other cost-sharing issues. Then, the important training concern to the onion technology production was given for the targeted farmers and classified them into cluster according to the following Table 1.

## The research activity implementation

The site was prepared and all the recommended packages were applied that were: row stretching between plants and rows, fertilizer application, and other agronomic practices were undertaken at each stage of onion production to harvesting and marketing.

## Result and discussion

The total product obtained per cluster shows that as depicted on Table 2 the technology has got more attention by farmers in which individually farmers got 42651.42 birr up to 124,608 birr in average with 16 birr/kg in local price at that production time. This indicates that if farmers access with good price time and storage they can more benefit. Farmers used the obtained birr for different purpose in their livelihood strategies like food secures throughout the year, additional milk cow, fattening bull and small ruminants purchasing, schooling their children by covering all costs, and able to cultivate additional land for further production.

## Training

Field day was organized at research site at time of the maturity stage; farmers, and other stakeholders suggested a couple of ideas and shared experience they have to one another

concerned to the tomato varieties with its technology on the farmers land. The technologies exposed to different peoples by television, Radio FM, and written form of extension materials.

## Constraints farmers faced during production season

Farmers suggested a couple of issues concerned to the technology as depicted on Table 3 that they have been facing challenges through the production of tomato start from planting to marketing, accordingly delay of inputs, market price fluctuation, diseases at germination and vegetative stages, lack of support from nearby Development Agents, lack of infrastructure, and storage harvest to long shelf life span of the product. And they suggested that if these problems solved early, they would be more benefit from the technology and improve their livelihood in strategic ways Table 4.

## Exit strategy

The technology pre-scaling up process is a continuous process where the 'end' of pre-scaling up activity is the

**Table 1:** Participants' composition in Harari Region cluster.

Cluster 1		Cluster 2		Cluster 3		Total
Female	Male	Female	Male	Female	Male	
10	15	12	23	13	37	100
Land coverage in hectare						75
24		19		32		

**Table 2:** Overall yield, benefit in birr (Ethiopian currency) and Expenditures.

Variables	Cluster 1	Cluster 2	Cluster 3
Land coverage-ha	24	19	32
Production-ton/ha	21.88	12.37	14.59
Marketed-ton/ha	19.47	9.33	13.61
Benefit in birr by time market price individually	124,608	42651.42	43552
Expenditures they spent on	House construction at village level and Harar city, food secures throughout the year, additional milk cow, fattening bull and small ruminants purchasing, schooling their children by covering all costs, able to cultivate additional land for further production.		

**Table 3:** Participants of the field day.

No	Participants	Gender	
		Male	Female
1	Farmers	92	21
2	DAs	12	-
3	Experts and others	5	-
	Total	109	21

**Table 4:** Constraints of the Tomato production at research site.

No	Constraints
1	Delay of providing inputs
2	Market price fluctuation
3	Diseases
4	Lack of frequent support from Development Agent and other bodies
5	Lack of centered station sell for vegetable production(infrastructures)
6	Lack of Storage technology



'beginning' of the wider scaling up intervention by the public extension system. Hence, there was properly hand over for wider scaling up responsibility to the concerned bodies formally. As a result, emphasis was given to capacity building activities, value addition, community seed system and creation of market linkages to create fertile ground for smooth exit and sustainability of the work.

## Discussion

The activity was conducted in Harari region where tomato variety which called "Malka shola" is very adaptable and gave high yield throughout the cluster in the study area. The yields obtained were different because the populations in the cluster were different in number and the variety was very disease and pest resistance as depicted in Table 2. The training was for given 110 farmers, 11 Development Agents and 6 experts on couple of training title such as agronomic practices of Tomato, soil type and fertilizer application for Tomato, postharvest utilization of Tomato production, home utilization and seed systems as depicted on the Table 5. And the field day was prepared when Tomato production was on farmers' field in which 104 farmers, 12 Development Agents and 5 experts in addition gave couple of ideas and suggestions on the Tomato production. Throughout the Cluster-based pre-scaling up the farmers raised the constraints as a whole that are in order delay of providing inputs, market price fluctuation diseases, lack of frequent support from Development Agent and other bodies, lack of centered station sell for vegetable production (infrastructures), lack of Storage technology.

## Conclusion and recommendation

This research cluster-based pre-scaling up of tomato technologies was conducted in Harari Region by three clusters

with seventy five hectare of land resulted with total productivity in average 12.37 ton/ha 21.88 ton/ha and average benefit farmers individually earned 42651.42 birr 124,608 birr by local price at production time sixteen birr/kg. for this technology pre-scaling the field day prepared as good event for more promotion, as a result, farmers and other participants raised couple of issues as challenges –delay of input like pesticide, diseases appeared, market price and other; as experiences cluster form technology promotion is very appreciable and reach large farmers. Therefore, based on these all issues the following recommendation was derived: the inputs from concerned should be delivered in hand early to farmers, market opportunity should be access at this production and storages, and strengthening the cluster form technology promotion is very important and promoted to other areas.

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## References

1. Mersha A (2008) Effects of stage and intensity of truss pruning on fruit yield and quality of tomato (*Lycopersicon esculentum* mill). M.Sc. Thesis presented to the school of graduate studies of Alemaya University 10-16.
2. Mulualem T, Tekeste N (2014) Evaluation of improved tomato (*Lycopersicon esculentum* Mill.) varieties through participatory approach in South Ethiopia. Herald Journal of Agriculture and Food Science Research 3: 055-060. [Link: https://bit.ly/38GL2IC](https://bit.ly/38GL2IC)
3. Tewodros M, Belachew K, Tekeste N (2013) Promotion and evaluation of improved technologies through participatory approach in South Ethiopia: Experience from hot pepper. Unique Res J Agric Sci 1: 57-62. [Link: https://bit.ly/3n3bMrU](https://bit.ly/3n3bMrU)
4. Tesfaye T, Tesfaye K, Woldetsadik K (2011) Clay plot irrigation for tomato production in the north east semi-arid region of Ethiopia. Journal of Agriculture and Rural Development in the Tropics and Sub Tropics 112: 11 -18. [Link: https://bit.ly/3nYuSRq](https://bit.ly/3nYuSRq)
5. Tola M (2014) Tomato Value Chain Analysis in The Central Rift Valley: The Case of Dugda Woreda, East Shoa Zone, Oromia National Regional State, Ethiopia. [Link: https://bit.ly/3hAqply](https://bit.ly/3hAqply)

**Table 5:** Field day Organized and publicity.

No.	Title of training	Experts		Development Agents		Farmers	
		Male	Female	Male	Female	Male	Female
1	Agronomic practices of Tomato	4	2	9	2	75	35
2	Soil type and fertilizer application for Tomato	4	2	9	2	75	35
3	Postharvest Utilization of Tomato production	4	2	9	2	75	35
4	Home utilization and seed systems	4	2	9	2	75	35