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RESEARCH PAPER

Assessment of the Challenges and Opportunities of Horticultural Crops Production in South-West Shewa Zone of Oromia, Ethiopia

Hailu Duguma Muleta[1*], Mosisa Chewaka Aga[1], Dabesa Wegari Obosha[2]

[1]*Department of Horticulture, Ambo University, Ambo, Ethiopia;*

[2]*Department of Agribusiness and Value Chain Management, Ambo University,*

***Corresponding Author:** Email: hailuduguma@ambou.edu.et*

Abstract

Assessment of the challenges and opportunities of horticultural crop production is essential to identify the constraints and opportunities at a preliminary step in the course of crop productivity improvement goals. In this regard, horticultural crops are highly productive relative to the field crops, and also these crops are better rich in nutrition which is vital in balancing diet for health. Based on the inquiry raised from the society as a core, this study was initiated to identify the challenges and opportunities, which helps to prioritize to locate a noticeable baseline for future intervention. Both primary, as well as secondary quantitative and qualitative data sources, were collected from potential horticulture crop-producing districts of the South-West Shewa zone. These data were analyzed by adopting SPSS software. Descriptive statistics viz., means, standard deviations, frequencies and SWOT analysis were conducted. According to this survey, if the constraining challenges (lack of money; diseases, drought, frost and insects, weather conditions; lack of market; transportation and storage house problems; and limited know-how and skill) were solved, these districts would be potential for producing horticultural crops. Besides the conducive agro-ecology and other endowments, the presence of ample labor, market options, the high interest of the farmers, etc. were great opportunities for the horticultural crop diversification and intensification in the study area. To exploit these potentials, there is a need for farmers and experts to build capacity via training, financial support, provision and adoption of recent technologies (for example improved seeds), credit facilities, and market options, crop management practices.

Keywords: Constraints, potentials, identification, crops

Introduction

Identification of constraints and opportunities is the initial and essential step in development processes aiming at the improvement of crop productivity (Kraaijvanger *et al*., 2016). These investigators elaborated that intervention work that intends to raise agricultural productivity in low-external input settings requires an understanding of farmers' preferences and motivations and the complex socio-cultural settings in which these farmers operate. Agriculture is the mainstay of the economy in Ethiopia, where about 84 percent of the country's population living in rural areas engaged in various agricultural activities and generate income for their household consumption to sustain their livelihood (CSA, 2015; MoANR and MoLF, 2017). It plays a prime role in a country's political, economic and social stability (CSA, 2018). As a consequence of the alarming population growth and the emerging various levels of industries in Ethiopia, there is a need to boost production and productivity in this sector. The study conducted by Diriba *et al*. (2020) indicated the importance of this kind of investigation.

Horticultural crops are highly productive per unit land and time compared to field crops. Also, these crops are regarded as food and

nutritional security crops which is essential in balancing diet for health; i.e., it could have direct or indirect relation toward physical, mental, social as well as political aspects of security. These crops are significantly contributing to food security to feed the increasing population through increasing production and productivity. These crops save foreign currency through reducing crop import from abroad. Besides, horticultural crops play the lion share in Ethiopian economy via their contribution to foreign currency which is about 42 percent to the country's GDP (CSA, 2015; CSA, 2022). The sector unquestionably contributes to the current agriculture-led policy of Ethiopia in realizing the need for agricultural products as raw input for the industries.

The study districts such as Elu, Waliso and Wanchi are largely found in suitable agro climates for the production of horticultural crops including enset which is one of the dominant crops; and it is the major enset growing districts in these zones (ERA, 2012; Ashenafi *et al*., 2016; Ashenafi *et al*., 2017). Assessment of the challenges and opportunities of horticultural crops production in south-west and west Shawa zones of Oromia, Ethiopia can ensure a high chance of success. This should be done from the grassroots most preferably through farmers' participatory method (e.g. survey) of problem identification. Hence, for its realization, it is fundamental to identify the potentials and constraints, and then prioritize them. In the study areas, there was no up-to-date documented information with reference to the potential and constraints related to horticultural crop production. This will certainly lay a baseline for intervention by all the concerned bodies such as governmental, non-governmental organizations (NGOs) and any individual stakeholders. Besides, the result will guide the researchers towards the inquiry of the society/farmers around the studied area to extend the investigation. Hence, based on the inquisition rose from the society as a core, this study was aimed at identifying and prioritizing the production constraints and opportunities of the study area to formulate further research questions for future intervention.

Materials and methods

Description of Study Areas

The study was conducted in the Southwest Shewa zone during 2021/2022. South-west Shewa zone is located at 8º16´-9o56´ N latitude and 37º05´-38º46´ E longitude and altitude ranging from 1600-3576 m.a.s.l. It receives annual rainfall ranging from 900 - 1900 mm. The mean minimum and maximum air temperature of the area is 10ºC and 35°C, respectively (Hailu et al., 2015; Alemayehu, 2016).

Types of data, source and collection methods

The focus of the study was on farm-level data collection and analysis including qualitative and quantitative data on the socioeconomic structure of households and farms, production practices (agronomic practices), and technical production problems. In consideration of the characteristics of the target areas, both quantitative and qualitative open-ended and close-ended questions were used to gather data from the farmers. Also, secondary data were collected from zonal and district agricultural offices.

For qualitative data generation, a Participatory Rural Appraisal (PRA) method was employed in order to utilize the knowledge and opinions of rural people as reference data for future planning. PRA, a qualitative survey methodology, is a process to generate genuine interdisciplinary in the formulation of problems for agricultural research and development (Ison and Ampt, 1992; Belay *et al*., 2013). Hence, focus group discussions (FGD) having 6-12 members were used to identify and clarify shared knowledge among groups of individuals in the communities, which would otherwise be difficult to obtain accurately with a series of individual interviews alone. Similarly, mini-focus groups composed of 4 or 5 members were also used instead in some areas.

Before conducting the survey a preliminary visit to the selected community was made to

obtain background information on the farming system which considered the components of the farm household for instance soil, water, crops, livestock, labor, capital, and other resources. Direct observation and transect walking with the community key informant farmers on crop farms and homesteads were made to have an overview of the topography, vegetation, soil type, crops grown, and water supplies. After transect walking, the collection of data was conducted through Focus Group Discussions (FGD) and with key informant interviews consisting of men and women to discuss extensively the problems and opportunities in their localities. Accordingly, the gathered information was used to rank the perceived constraints based on the severity and importance of constraints to horticultural crop production and postharvest management.

Sampling techniques and sample size determination

Relatively potential horticultural crop-producing districts from the southwest Shewa zone were selected in consultation with the zonal agriculture offices through the preliminary survey. Out of 11 districts found in the southwest Shewa zone, data were collected from purposively selected three districts such as Elu, Waliso and Wanchi. These districts consist of a total of 15, 35 and 23 rural kebeles, respectively. Similar to district choice from the zone, two kebeles were purposively selected from each district for collecting quantitative data surveying through simple random sampling. Accordingly, upon determining a sample size of 20 from each kebele and a total of 120 representative households from districts were used for data collection; it was determined according to Yamane (1967) formula to calculate the total sample size (n) for households; and it was proportionally calculated for each kebele. Further, for reliable qualitative data, in particular, key informants having better knowledge and experience were also included.

$$\mathbf{n} = \frac{\mathbf{N}}{\mathbf{1+N(e)^2}}$$

Where n = designates the sample size the research uses;
N = designates the total number of households;
e = designates maximum variability or margin of error 5%;
1 = designates the probability of the event occurring.

Data analysis

After summarizing data, SPSS software Version 20.0 (IBM Corp., 2011) was used for the analysis process. Descriptive statistics (means, standard deviations, and frequencies) were also applied to analyze. SWOT (strength, weakness, opportunity, threat) analysis was also used to analyze the challenges and opportunities intimately connected to the horticultural crop production aspects.

Results and discussions

The results of the study have been presented and discussed independently in the subsequent sections based on the aim of the study connected to horticultural crop production.

Demographic and socioeconomic characteristics of sample households

Different key variables were used to describe the demographic and socioeconomic characteristics of sample producers. These include family size, age, education level, marital status and gender of the household that can usually influence horticultural crop production. The result of the study demonstrates that the means of family size, age and educational level respectively were 4.392, 43.567 and 6.79. Similarly, minimum and maximum in that order were (2, 22 and 0) and (8, 69 and 13) as indicated below. Regarding marital status and gender of the families, 90.83% are married and 7.5% are not married, and only 1.67% divorced. From this, most of the respondents have gender diversity, 94.17% are male, so females make up only 5.83% of them (Table 1).

Owing to the family size and gender diversity, the need for agricultural activities is not a critical problem for the majority of the farmers.

Nevertheless, daily labor might be required during planting and pick time of harvesting. Moreover, most of them are of productive age and with good education levels.

Table 1. Demographic characteristics of respondents

Continuous variable					
	N	Minimum	Maximum	Mean	Std. Deviation
Family size	120	2.0	8.0	4.392	1.5301
Age	120	22.0	69.0	43.567	9.7634
Educational level	120	0	13	6.79	3.355
Valid N (listwise)	120				

Categorical variable									
Marital status and sex of respondent		District						Total	
		Elu		Waliso		Wanchi			
		No	%	No	%	No	%	No	%
Marital status	Married	34	85	38	95	37	92.5	109	90.83
	Unmarried	6	15	1	2.5	2	5	9	7.50
	Divorced	0	0	1	2.5	1	2.5	2	1.67
Sex of respondent	Male	37	92.5	38	95	38	95	113	94.17
	Female	3	7.5	2	5	2	5	7	5.83

Note: No=sample size; Source: survey result (2021/2022)

Horticulture crops production and supply to the market

In the study areas, the types of crops produced include vegetables, cereals, pulses, coffee, fruits, spices and medicinal/aromatic plants. From these crops, fruits such as avocado, banana, papaya, mango, apple and orange; and among vegetables including root and tuber crops like onion, cabbage, tomato, potato, beetroot, inset, carrot, hot pepper and garlic (Table 2) are produced in their ascending order in terms of volume of production. A similar result on the type of horticultural crops produced in the areas was obtained according to a study conducted by Ajabush *et al*. (2020).

There is an important point that has to be noted about the rank of enset production indicated as five (5) in the table, particularly under Wanchi district. Wanchi area is a potential area for enset crop production and consumption as well. But the kebeles selected for the sake of studying different horticultural crops including enset may or may not be producing enset. In addition to this, the selected households of those kebeles may not be producing it. Otherwise, the crop is widely available and very well cultivated in Wanchi district similar to Waliso district. In line with this study, according to Alemayehu (2016), the major horticultural crops produced in the area include enset, potato, tomato, cabbage, beet, root, onion, garlic, apple, mango, avocado and banana. Hence, similarly, there might be minor misleading general results happening on other crops too which could be true for any research topic. Most respondents (about 79 %) replied that they were selling most of their produce (50-75%); similarly, about 78 % of the respondents said, only a small sum (0-25%) for

home consumption (Table 3). Collectively, more than 50 % of their produce was usually provided for sale. This result is contrary to the national data of CSA (2021) stating that about 70-80 percent was utilized for home consumption. The survey result may indicate the tendency towards business-minded circumstances of the farmers in the study areas. Hence, the trend is encouraging due to the fact that farmers tend to produce more and diversify horticultural crops since they intend to produce for sale instead of home consumption only.

Table 2. Type of fruit, vegetable, root and tuber crops produce during 2020/2021

Fruit crops										
Type of crops		Districts						Total		Rank
		Elu		Waliso		Wanchi				
		No	%	No	%	No	%	No	%	
Avacado	No	40	100	24	60	7	17.5	71	59.17	
	Yes	0	0	16	40	33	82.5	49	40.83	1
Papaya	No	40	100	39	97.5	24	60	103	85.83	
	Yes	0	0	1	2.5	16	40	17	14.17	3
Banana	No	40	100	39	97.5	2	5	81	67.50	
	Yes	0	0	1	2.5	37	95	38	32.50	2
Mango	No	40	100	33	82.5	36	90	109	90.83	
	Yes	0	0	7	17.5	4	10	11	9.17	4
Apple	No	40	100	40	100	36	90	116	96.67	
	Yes	0	0	0	0	4	10	4	3.33	5
Orange	No	40	100	39	97.5	38	95	117	97.50	
	Yes	0	0	1	2.5	2	5	3	2.50	6
Vegetable, root and tuber crops										
Type of crops		Districts						Total		Rank
		Elu		Waliso		Wanchi				
		No	%	No	%	No	%	No	%	
Tomato	No	10	25	26	65	22	55	58	48.33	
	Yes	30	75	14	35	18	45	62	51.67	3
Hot pepper	No	29	72.5	39	97.5	26	65	94	78.33	
	Yes	11	27.5	1	2.5	14	35	26	21.67	7
Cabbage	No	15	37.5	12	30	21	52.5	48	40	
	Yes	25	62.5	28	70	19	47.5	72	60	2
Onion	No	6	15	13	32.5	8	20	27	22.50	
	Yes	34	85	27	67.5	32	80	93	77.50	1
Garlic	No	40	100	38	95	30	75	108	90	
	Yes	0	0	2	5	10	25	12	10	8
Carrot	No	40	100	21	52.5	31	77.5	92	76.67	
	Yes	0	0	19	47.5	9	22.5	28	23.33	6
Beetroot	No	40	100	19	47.5	22	55	81	67.50	
	Yes	0	0	21	52.5	18	45	39	32.50	5
Potato	No	40	100	4	10	20	50	64	53.33	
	Yes	0	0	36	90	20	50	56	46.67	4
Enset	No	40	100	1	2.5	40	100	81	67.50	
	Yes	0	0	39	97.5	0	0	39	32.50	5

Note: No=sample size; Source: survey result (2021/2022)

Table 3. Average yield (%) of horticultural crops production for consumption and sell

Amount (%) of produce for home consumption and sale		District						Total	
		Elu		Waliso		Wanchi			
		No	%	No	%	No	%	No	%
Amount (%) of produce for home consumption	0-25%	40	100	14	35	40	100	94	78.33
	25-50%	0	0	22	55	0	0	22	18.33
	50-75%	0	0	4	10	0	0	4	3.33
	100%	0	0	0	0	0	0	0	0
Amount (%) of produce for sell	0-25%	0	0	2	5	0	0	2	1.67
	25-50%	0	0	23	57.5	0	0	23	19.17
	50-75%	40	100	15	37.5	40	100	95	79.17
	100%	0	0	0	0	0	0	0	0

Note: No=sample size; Source: survey result (2021/2022)

Different inputs used for horticultural crop production

In this study, some of the inputs (Table 4) such as seed, fertilizer and insecticide which were used for horticultural crop production were also assessed. Accordingly, 48.33 of the respondents were using improved seed followed by 37.5% local seed and 14.17 % using both. The use of improved seed could have been increased if the farmers were able to get reliable quality seed. Because some traders were providing mixed and poor-quality seeds, farmers were forced to use their own seeds since there was no alternative quality seed supplier.

Most of the respondents (94.17%) were applying insecticides while only a few (5.83) of them were not. They were not applying which might be due to two reasons. The first one that needs attention is no awareness or knowledge of the farmers about the significant loss of crop yield by insect damage. On the other hand, there might be tangible but insignificant insect damage on their crops.

The types of fertilizers used in the area were both organic (compost, manure) and inorganic (urea, blended NPS) as stated in Table 4. From organic fertilizer, the majority (50.83%) of the respondents were applying cattle manure; whereas compost was 25.83% and those using both were 8.33%. Concerning inorganic fertilizer, most of the respondent farmers (96.67%) were applying both blended and urea; hence there were also farmers only using urea for their crop production by realizing that it increases vegetative growth but without considering the better yield advantage while using other fertilizers (e.g. NPS). On the other hand, there were a few farmers (0.83%) responding that were not applying inorganic fertilizers realizing that the organic fertilizers, particularly cattle manure which can easily be obtained from their own homes were sufficient. Farmers added also, they cannot afford inorganic fertilizer which is in line with the result revealed by Alemayehu (2016) stating that farmers prefer organic fertilizer due to its lower price as compared to inorganic fertilizer.

Table 4. Farmers adopting (%) inputs for horticultural crop production in 2020/2021

Inputs used		Districts						Total	
		Elu		Waliso		Wanchi			
		No	%	No	%	No	%	No	%
Type of seed used	Improved	15	37.5	9	22.5	34	85	58	48.33
	Local	24	60	15	37.5	6	15	45	37.5
	Both	1	2.5	16	40	0	0	17	14.17
Type of fertilizer used	Organic	0	0	0	0	0	0	0	0
	Inorganic	22	55	2	5	3	7.5	27	22.5
	Both	18	45	38	95	37	92.5	93	77.6
Using of insecticides	Not used	1	2.5	0	0	6	15	7	5.83
	Used	39	97.5	40	100	34	85	113	94.17
Type of organic and inorganic fertilizers utilized (%)									
Types of fertilizers		Districts						Total	
		Elu		Waliso		Wanchi			
		No	%	No	%	No	%	No	%
Organic fertilizer in %	Compost	12	30	0	0	19	47.5	31	25.83
	Manure	13	32.5	28	70	20	50	61	50.83
	Both	0	0	10	25	0	0	10	8.33
	None	15	37.5	2	5	1	2.5	18	15
Inorganic fertilizer in %	Blended	0	0	0	0	0	0	0	0
	Urea	1	2.5	0	0	2	5	3	2.50
	Both	39	97.5	40	100	37	92.5	116	96.67
	None	0	0	0	0	1	2.5	1	0.83

Note: No=sample size; Source: survey result (2021/202)

Types of services and their sources

Different services are required by the farmers for crop production and other related activities across the whole value chain including postharvest till the produce reaches the end users. Those services such as access to credit for financial security, extension activities, reliable and timely marketing information, and training on different aspects from production to the end are the main important points to be considered by all the concerned parties. As results shown in Table 5 below, credit access was the least (30%) while extension (96.67%) was the most of all the services obtained; followed by training (73.33%) and market information (90%) accesses relative to credit. The most important factor related to the problem of credit as replied by the farmers was the high interest rate above and beyond lack of access. However, farmers have an interest in borrowing to fulfill inputs required for production and other related farming activities. A similar problem regarding the high interest rate of credit was identified by different scholars in other areas within this region (Mosisa, 2018; Diriba *et al*., 2020; Tadesse *et al*., 2021).

Table 5. Access to different services by sample respondents within three districts

Services and access		Districts						Total	
		Elu		Waliso		Wanchi			
		No	%	No	%	No	%	No	%
Credit access during the last production seasons	No	20	50	24	60	40	100	84	70
	Yes	20	50	16	40	0	0	36	30
Extension services access to horticultural cultural practices	No	2	5	0	0	2	5	4	3.33
	Yes	38	95	40	100	38	95	116	96.67
Market information access	No	0	0	0	0	12	30	12	10
	Yes	40	100	40	100	28	70	108	90
Training access on agriculture/ horticulture production	No	17	42.5	0	0	15	37.5	32	26.67
	Yes	23	57.5	40	100	25	62.5	88	73.33

Note: No=sample size; Source: survey result (2021/2022)

Production constraints of horticultural crops

There are a lot of constraining factors hindering farmers from boosting their crop production and of course productivity. Among others in their order of importance, lack of money to invest which is the most limiting factor; diseases, drought, frost and insects, weather conditions; lack of market; transportation and storage house problems; and limited knowhow and skill are the important bottleneck for the farmers as the study result is indicating in Table 6. Accordingly, 97.5%, 75%, 54.2%, 53.3% and 62.5%, respectively are the result of the individual farmer face-to-face interviews during the survey. In all the three study districts, the disease problem is very serious, and there is a misuse of chemicals, i.e., using the same chemical (e.g. Malathion) for all crops like onion, tomato, potato and other related vegetables. This is due to the lack of chemicals at the farmers' level; either they cannot afford or different chemicals may not be available and/or accessible at the right time. Similarly, there is confusion about which chemical is used for diseases or insects hence some farmers are applying insecticides for diseases and vice versa.

Access to credit is one of the means to alleviate the shortage of money for any accomplishments related to crop production and other postharvest activities including marketing. But there are ranked problems such as limited supply of credit, huge bureaucracy, high cost of credit, and also limited access to transport to the area at which credit service is available. Hence, 63.3%, 55%, 50% and 30% of the respondents confirmed the problems in their order of magnitude (Table 6). So, farmers' welfare can be tackled if the above-mentioned production, marketing and any other related problems according to their priority can be properly solved. This needs the involvement of different concerned stakeholders besides government sectors.

Table 6. Constraints hindering farmers not to increase their horticultural crop production

No	Type of Constraints		Frequency	Percent	Valid Percent	Cumulative Percent	Rank
1	Lack of money to invest	No	3	2.5	2.5	2.5	1
		Yes	117	97.5	97.5	100	
2	Limited knowhow and skill	No	75	62.5	62.5	62.5	5
		Yes	45	37.5	37.5	100	
3	Lack of market	No	55	45.8	45.8	45.8	3
		Yes	65	54.2	54.2	100	
4	Transportation and storage house problems	No	56	46.7	46.7	46.7	4
		Yes	64	53.3	53.3	100	
5	Diseases, drought, frost and insects, weather condition	No	30	25	25	25	2
		Yes	90	75	75	100	
Constraints of accessing credit service in study areas							
No	Prioritized Constraints		Frequency	Percent	Valid Percent	Cumulative Percent	Rank
1	Huge bureaucracy	No	54	45	45	45	2
		Yes	66	55	55	100	
2	High cost of credit	No	60	50	50	50	3
		Yes	60	50	50	100	
3	Limited supply of credit	No	44	36.7	36.7	36.7	1
		Yes	76	63.3	63.3	100	
4	Limited access to transport	No	84	70	70	70	4
		Yes	36	30	30	100	

Source: survey result (2021/2022)

Production opportunities for horticultural crops

The area is potentially endowed with suitable agro-ecologies be it edaphic (soil factor), climatic, and water for the production of horticultural crops. However, these opportunities have not been utilized corresponding to their potential. For instance, water availability is very prospective but irrigation projects are scarce that hinder the farmers from even producing on their very suitable lands. Generally, the favorability of the area for all horticultural crops is one of the motivating factors in all the study areas. Another important aspect is the availability of abundant of labor for any occupational need. As compared to field crops horticultural crops production requires a high labor force (Dassa *et al*., 2019). Also, the politeness and acceptance of some farmers to exercise full package agricultural activities according to the instruction they were given by experts could be a considerable opportunity. Although on the other hand, most of them were reluctant to implement the packages. Moreover, some NGOs have been supporting agriculture sectors, particularly horticulture. Organizations namely SNV (*Stichting Nederlandse Vrijwilligers* = Foundation of Netherlands Volunteers), Save the Children and World Vision have currently been doing different farmer-supporting activities in the study areas. Probably the other most important note, though on commencement, is that the government's focus on the establishment of fruit crop production in clusters of farmers now is encouraging. Generally, the detail is briefly stated as a means of the SWOT analysis under the following headings such as input supply, production, postharvest handling, storage, transportation, marketing and consumption.

Input supply

Strength: The existence of fruit and coffee nurseries in some districts; initiation of some farmers to use improved varieties.

Weakness: Fertilizers are not always accessible to farmers, particularly for irrigation producers; generally, the supply of inputs is unsound; farmers prefer low-cost seed to quality.

Opportunity: Fertilizers are available at primary cooperatives, and farmers can buy in cash; Waliso-Liban union started supplying some vegetable seeds; high demand for the produces at area; some farmers are in the process of producing seeds of a few vegetables (potato and onion); the presence of some government projects, for instance, Agricultural Growth Program (AGP), and NGOs such as World Vision, Save the Children, and Sustainable Land Management (SLM).

Threat: Increasing input price; lack of quality seed; diseases and pests; expensiveness and lack of hybrid seeds; lack of credit; illegitimate traders; unavailability of pesticides at primary cooperatives; absence of loan intended for horticulture crops production.

Production

Strength: Using improved varieties and applying full package practices are increasing; three times (two by irrigation and one by rain-fed) vegetable production; fruit and coffee plantation area is increasing; increasing farmers' skill/knowledge.

Weakness: Most farmers are not using improved varieties and applying full package practice; not all farmers are using inputs and irrigation water properly; farmers do not follow the cropping calendar, crop staggering (resulting in improper simultaneous supply of all the produce to market); poor cost analysis on vegetables.

Opportunity: Favorable agro-ecology for all horticulture crops; some of the farmers are experiencing full package; fruit production cluster focus by the government; NGOs support farmers; plenty of labor.

Threat/constraint: Lack of irrigation water; lack of improved seed and cultivar; production decrease owing to poor quality seed; climate change; vegetable disease.

Consumption

Strength: Consumption (eating) experiences development by some producers; in general, high demand for consumption by society from time to time.

Weakness: Negligence of experiencing consumption by the majority of producers; lack of awareness creation on the importance of nutrition.

Opportunity: Training providing on consumption by home agents of agriculture offices as well as health extension agents; consumption increasing with urban expansion.

Threat/constraint: Unsustainable access and availability of produce.

Suggested key intervention points

Based on this study, the subsequent suggested areas of intervention have been identified for the improvement of horticulture in the study areas. We believe that the direct involvement of different concerned government sectors is very imperative. Besides, these sectors should also play their role in awareness creation, mobilization and participation of others such as private sectors, NGOs, etc in order to practically improve the horticulture sector. This becomes truly implemented if we are able to invest on farmers' capacity-building strategy as well. Accordingly, based on the farmers' realistic suggested points as well as the potentially available natural endowments, the below-mentioned ideas should be considered:

Higher institutions and other similar sectors should support farmers in different intervention areas. Primarily, inputs (e.g. improved seed, fertilizers, chemicals, etc) access and availability for the farmers should be secured at the right time. An additional important issue raised by the farmers is the availability of water such as ground water and river water. In the

same way, the potentiality of enset at Waliso and Wanch districts was attentively raised to get better emphasis.

Groundwater: the farmers at Dasse Jabo kebele in Waliso district had forwarded during the discussion that groundwater is available near the surface. So, the farmers said that they need access to this water and power pump so as to utilize and produce year-round without the risk of water shortage.

River water: similarly, farmers at Kata Asgori kebele in Elu district forwarded the construction of a small dam on the nearby river namely Teji River to alleviate the scarcity of water obtained from this river during the dry season for irrigation production of horticulture crops. They further explained, otherwise this area is not suitable for horticultural crops during the rainy season and hence they instead produce cereal crops in the rainy season. Therefore, if the water scarcity problem in the dry season is tackled, they can produce two or more times on the same land by breaking the usual trend of relying only on the rainy season. In the Elu district on the other hand there is a serious problem of flooding during the rainy season from rivers such as Taji, Awash and Jalliwan which are potentially destroying crops and threatening other properties including houses in some years.

Enset (kocho): it is obviously known that areas embraced under Waliso and Wanchi districts are potentially producing enset as a country. It is a highly potential crop not only as a food crop but also as a cash crop. Even people in the area particularly in Waliso, the capital city of south-west Shewa, are doing a kind of value addition by using plastics as packing material and exporting quality products in this manner. If they are supported in this area, there is a possibility of great improvement in production as well as in exporting through advanced value addition. Based on the data in the area, they said that the crop on average yields about 25 kg per individual plant indicating promising productivity of the crop. However there is a risk of disease collapsing the crop if affected, particularly it is severe on the highlands. Hence there is a strong request and expectation of the farmers as well as the experts of those areas that Ambo University (AU), as a nearby big institution in its thematic area as well, identify the problem through research to solve this devastating recurrent disease in this region. They said that the disease is killing matured or medium-sized plants, i.e., top-down wilting of the affected crops. The opportunity to look for knowledge farmers about disease-resistant, drought tolerant and early maturing landraces is very crucial for genetic improvement through breeding (Borrell *et al*., 2020). On top of this, the farmers added also, there is a supply chain problem regarding marketing from producers (farmers) to the end users or consumers. A similar study output at the areas was reported by Tadesse (2018) indicating that there should be due attention to help farmers benefit a reasonable proportion from the selling of their enset produce.

Research and/or training have been considered to be the essential areas of concern through the following ways of involvement. These are varieties of adaptation or performance assessment research; training on agronomy, protection, handling, and storage methods; development of pest and disease management strategies; detailed market value chain research; training on market and produce quality; and clear awareness towards making people business minded further for the market instead of only producing for home consumption. Soil-related research is another concern because the problem of soil acidity in the zone was also raised. The issue of soil is essential in managing crop nutrition.

The fruit crop propagation issue was also forwarded by the experts during our focus group discussion. As mentioned in Table 2, fruits such as Avocado, Banana, Papaya, Mango, Apple and Orange are produced in the study areas. This can be an indication of the suitability of the location for such major fruit crop production, which is promising for further investment in it. On the other hand, the experts explained that fruits, for instance, apple grafted at other locations even in our country may not be adapting to the study area. So, they suggested that it is better to do grafting in this environment if we are able to coordinate with

the concerned institutions such as Ambo University for professional advantage.

Conclusion and recommendation

In conclusion, the study areas are generally very suitable for different horticultural crop production provided that interventions against these problems are made and all the available resources and potentials (land, agro-ecology, labor, groundwater and river water, and the willingness of the farmer are optimally utilized. According to the survey study the following important recommendations could be forwarded:

Farmers should follow the right agronomic practices given by professional intervention. As explained by the development agents (DAs) in the respective districts, very few farmers are willing to follow the instructions given through extension services. Therefore, there must be training to shape the attitude of farmers towards accepting new technologies and interventions (e.g. continuous field demonstration).

Farmers should use improved seeds with full packages as much as possible. Farmers should also be aware of insecticides and must not use them for disease control and vice versa.

All stakeholders such as the government, NGOs, and any concerned individuals and/or professionals should seriously contact farmers to understand their needs and always support them. This might include financial, professional, material, and any other support required for the farm community.

There should be sufficient access to financial institutions giving credit relatively with the lowest interest rate. In the study areas, though accessibility is not a serious case, the problem of high interest rates has been prohibiting farmers from using the available credit advantage. A promising trend has currently been started to support horticultural crop producers for instance SNV, a not-for-profit international development organization, can be a good example.

There should be low-interest rate financial sources established solely intended for encouraging the horticulture sector across the whole value chain.

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Conflict of interest

The authors have no any conflict of interest..

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