Establishment of Model Home Garden for Home Consumption and Income Generation of Poor and HIV Victim Women at Bahir Dar, Ethiopia

Habtamu Tegen, Yazie Chanie and Minuyelet Jembere

Adet Agricultural Research Center, P.O. Box 08, Bahir Dar, Ethiopia

Abstract: For resource poor and HIV victim urban and pre-urban dwellers in developing countries, home garden is vital to enhance food and nutrient security. The availability of both ground and surface water in Bahir Dar city of Ethiopia propels many poor families to produce vegetable and fruit crop for home consumption and income generation. Productivity of fruits and vegetables has been seriously affected due to lack of high yield with good quality varieties, poor knowledge of agronomic practices, poor water and fertilizer managements to exploit the full potential benefits of home garden to the area. To minimize those gaps, resource poor and HIV victim women headed households were selected and model home garden were established to demonstrate improved production practices. Subsequent trainings and experience sharing focused on the different techniques of vegetable and fruit crops production and management, methods of compost preparation and how to generate income from home garden were provided. The seeds of lettuce, Swiss chard, head cabbage, kale, carrot and improved banana sucker and coffee seedlings were supplied for each model home garden. Based on the training and experiences gained, different vegetable growing structures, such as old plastic containers, wooden boxes, vegetable growing shelves made from locally available materials and old used car tier, and “food always in the house” (FAITH) gardening techniques were established to maximize the potential of home garden both vertically and horizontally. Within one growing season, participants produced plenty leafy vegetable for home consumption and they started to generate income by supplying fresh vegetable products to the local market. Nowadays, participants have been sharing their knowledge and experiences to new neighboring gardeners through their model home gardens. Therefore, the respective stakeholders should provide continuous technical and financial support to strengthen the established model home garden as a training center to disseminate improved production techniques for Bahir Dar city residents for the future.

Key words: Home garden, vegetables, fruits, women.

1. Introduction

Home gardening refers to the cultivation in small plot of land, which may be around the home or within walking distance from the home. It can be also described as a mixed cropping system of vegetables, fruits, crops, spices, herbs, ornamental and medicinal plants as well as livestock to serve as a supplementary source of food and income [1].

Throughout the tropics, people grow fruit and vegetables in their own home gardens. It assures them to consume good food at low cost. Fruit and vegetable are necessary for the good health of children and

adults. It makes diet more balanced and tastier. By keeping a garden, people are less dependent on shops and markets, where supplies are often irregular and prices are high.

It is also a source of income. The gardener can earn extra money by supplying produce not needed for home use. Generally home garden is a pleasant and instructive pastime for urban and pre urban residents [2].

Vegetables form an important part of the diet in just about every household in Africa. Various types of vegetables are cultivated, mostly in small back or front yard gardens, but also increasingly in medium to large scale commercial enterprises. The types of

Corresponding author: Habtamu Tegen, M.Sc., research field: horticultural crops. E-mail: habitt2006@yahoo.com.

vegetables grown vary with agro-ecology and consumption preferences [3].

Home gardens have been an integral part of local food systems in developing countries around the world. Many studies provide descriptive evidence and analysis of home gardens in developing countries of Asia, Africa and Latin America, and pinpoint their numerous benefits to communities and families [4]. In many cultures, women play an important role in food production, but at times their worth is somewhat undermined. They are also active in home gardening, though their involvement in the home garden tends to be determined by socio-cultural norms. In most scenarios, women's contribution to household food production is immense, but this does not imply that home gardening is predominantly a female activity. Women's participation and responsibilities in home gardening varies across cultures, including land preparation, planting, weeding, harvesting and marketing [1].

The benefits of home gardens should go beyond food and nutritional security for resource poor families. Bibliographic evidence suggests that home gardens contribute to income, improving livelihoods and household economic welfare, as well as promoting entrepreneurship and rural development. While there are multiple benefits of home gardening for developing countries, the literature also reveals the key constraints to the productivity and sustainability of home gardens and makes recommendations for improving the home gardens to make them a viable and sustainable enterprise [5].

Due to availability of both ground and surface water in Bahir Dar city, many poor with food insufficient families have been producing vegetable and fruit crop produces for home consumption and to generate income. Due to lack of high yield with good quality varieties, appropriate agronomic practices, water and fertilizer managements, gardeners do not exploit the full potential benefits of home garden. To minimize those gaps, model home garden establishment targeting at poor women headed households was felt

vital to enhance their capacity of producing vegetable and fruit crops at home garden to enhance their economic status in Bahir Dar city of Ethiopia. Model home garden targeting at poor women household was established based on the availability of land more than 100 m² in their compounds, experience of producing vegetables, water access and their economic status. Therefore, the objective of this paper was to establish model home garden to enhance the livelihood of resource poor women headed households and HIV victim members by demonstrating improved production practices and techniques.

2. Methodology

2.1 Area Description

The intervention work was carried out within 5 km radius from the center of Bahir Dar city, the capital of Amhara national region state of Ethiopia, to enhance the efficiency and productivity of home garden owned by poor and HIV victim female headed families. Bahir Dar city is located at 11°38' N and 37°10' E on the Southern side of Lake Tana (the start of the Blue Nile River) with mean altitude of 1,801 m above sea level, and it covers an area of 16,000 ha [6]. According to the author, the city is divided into 17 kebeles, which represent the lowest administrative units of the urban structure. The high population growth rate and rapid migration from rural to urban contributed to the growth of the city in 2007. Bahir Dar city has 220,344 (107,578 men and 122,766 women) inhabitants [7].

2.2 Participants Selection

In the first week of January 2011, researchers from Adet Agricultural Research Center in collaboration with experts from Agriculture Office of Bahir Dar city conducted an observational survey to identify potential home garden sites for intervention. Model home garden targeting at poor women household was selected based on the criterions, such as availability of land more than 100 m² in their compounds, experience of producing vegetables, water access and their

economic status. Based on this, five poor women household headed families were selected for the activity at three kebeles (code 08, 09 and 17) administration of Bahir Dar city.

In the selected households, first round training which was focused on different fruit and vegetable crops production and managements, compost preparation method and how to generate income from home garden was given in February 2011 by the respective researchers of Adet Agricultural Research Center for those selected model home garden participants. In addition to the selected model home garden participants, the so called Hiwot HIV/ADIS victim association involved in urban agriculture which comprises a total of 53 members with 35 female members, Hullegeb horticulture crop producer association which comprises a total of 30 members with seven female members and five Bahir Dar city agriculture office expertises attended the training. A sensitization workshop was also held on February 20 to 23, 2011 with the participation of stockholders who came from Agriculture Office of Bahir Dar city, United States Agency for International Development (USAID) and Women Affairs Office. During the workshop, activities were planned; the responsibilities of stakeholders and monitoring and evaluation systems were discussed and organized.

Improved vegetable seeds of lettuce, Swiss chard, head cabbage and carrot were supplied for each model home garden participant. More than 30 improved banana suckers are distributed in two of the selected

home gardens. Second round training and experience sharing program were organized in April 19-23, 2011, to visit well known private home garden in Addis Ababa of Ethiopia. Model home garden participants were trained and have got experiences regarding to how to establish home garden, the importance of urban agriculture, the recommended types of agriculture for home garden, the methods of compost preparation, nursery management, seed bed preparation, vegetable and fruit crops harvesting and handling, the methods of increasing the efficiency of home garden by using vegetable growing structures and the identification of the suitable months for home garden vegetable production.

Based on the training and experiences gained, different vegetable growing structures, such as old plastic containers, wooden boxes, vegetable growing shelves made from locally available materials and old used car tier, and “food always in the house” (FAITH) gardening techniques were established to maximize the potential of home garden both vertically and horizontally (Figs. 1-5).

2.3 Data Collection and Analysis

Data was collected from home garden during planting, harvesting, marketing and consumption by model farmers, local extension agents and researchers. Model farmers were invited to recode the amount of productions harvested, consumed and supplied for the local market. The collected data was analyzed by simple descriptive statistics.

Fig. 1 Model home garden owned by Mrs. Woynitu Mekonnen at Kebele 09 in Bahir Dar city of Ethiopia.

Fig. 2 Model home garden owned by Mrs. Nibret Kebede at Kebele 08 in Bahir Dar city of Ethiopia.

3. Results

3.1 Different Intervention Activities

Training focused on how to establish home garden, the importance of urban agriculture, the recommended types of agriculture for home garden, the methods of compost preparation, nursery management, seed bed preparation, vegetable and fruit crops harvesting and handling, the methods of increasing the efficiency of home garden by using vegetable growing structures, and the identification of suitable months for home garden vegetable production, were given by the respective researchers of Adet Agricultural Research Center for those selected model home garden participants.

Field visit and experience sharing program was also organized for participants to visit different home gardens found at Bahir Dar and Addis Ababa cities to initiate them to establish model home garden. According to the plan, different improved vegetable and fruit crops seeds and planting materials were distributed in two rounds. Different vegetable growing structures, such as growing shelves, old used car tier supported by wooden pole, old cane and plastic containers, wooden boxes and simple compost pits were established to maximize the efficiency of model home gardens both vertically and horizontally.

3.2 Vegetable Growing Techniques

3.2.1 Gardening Shelves

Most vegetables can be easily grown in containers and shelves. It helps to grow numerous types of vegetables on shelves as high up as you can reach or

as space allows [8]. Shelves are made up of locally available materials from woods, ropes and old used car tier strings. The established shelves in the present study have three manageable size layers with 50-60 cm width. According to the material used, it may durable up to five years. Growers have been producing up to 180 Swiss chard leaves every 10 d interval (Fig. 3).

3.2.2 Old Used Car Tier as Vegetable Growing Structure

By making different layer of old used car tier, growers maximize their garden vertically. It may durable for three to five years according to the strength of the stand. From one old used car tier, they were able to produce 30-80 Swiss chard leaves within 10 d interval (Fig. 4).

Fig. 3 Three level gardening shelf to produce different vegetable crops.

Fig. 4 Three layered old used car tier stand within 1 m² area.

Fig. 5 Swiss chard grown around the compost pit at FAITH gardening technique.

Table 1 Annual earnings from vegetable from model home garden in 2012.

Name of the participant	Types of vegetable produced	Home consumption		Supplied for local market		Total gained (ETH Birr)
		Amount (kg)	Price (ETH Birr)	Amount (kg)	Price (ETH Birr)	
Mrs. Enat Muche	Swiss chard	35	525.00	200	3,000.00	3,525.00
	Lettuce	-	-	170	2,550.00	2,250.00
	Carrot	10	75.00	80	587.50	662.50
						6,437.50
Miss Essay Mengstu	Swiss chard	50	175.00	-	-	175.00
	Lettuce	75	1,125.00	-	-	1,125.00
	Head cabbage	35	175.00	-	-	175.00
						1,475.00
Mrs. Woynitu Mekonen	Swiss chard	25	375.00	150	2,250.00	2,625.00
	Lettuce	15	225.00	175	2,625.00	2,850.00
						5475.00
Mrs. Nibret Kebede	Swiss chard	30	450.00	250	3,750.00	4,200.00
	Lettuce	-	-	130	1,950.00	1,950.00
						6,150.00

Source: data collected from model home garden.

3.2.3 FAITH Gardening Structure

It is a technique to grow vegetables throughout the year. It has been reported to provide vegetables throughout the year. It does not build upon heavy inputs of costly fertilizers but emphasizes the use of locally available compost resources [9]. It has 12 pits with the depth of 30-40 cm. At the center of each pit, ready available compost as well as un-decomposed leftover of vegetable and fruits will be incorporated and let it to decompose and release its nutrient gradually. Growers planted Swiss chard in a monthly interval. When they were planting the 3rd pit, vegetables planted at the 1st pit were harvested. When they were planting the 4th pit, vegetables planted at the 2nd pit were harvested. Similar trend was followed up to 12th pit. By this technique, fresh leafy vegetables was produced all year round for home

consumption as well as to supply for local market to maximize their earning (Fig. 5). Although, the taste of locally produced vegetable food is subjective, most of model home garden participants react that they prefer the taste of their own fresh products produced by themselves.

3.3 Annual Earnings from Vegetable

The kind of vegetables sold by households in the study area is presented in Table 1. This table shows the major vegetable grown as well as the total amount earn by individual households during 2012. The results revealed that the vegetable income by household during 2012 season in model home garden belonged to four major vegetable groups, namely, cabbage, Swiss chard, carrot and lettuce. However, household earns more from Swiss chard than other

vegetable in the year. This was due to that the majority of model home gardens were planted Swiss chard which enabled household to harvest more yield throughout the year. It was also revealed that they earn reasonable income at the end of the year. Earlier study confirmed that by the involvement in the production process in home garden, producers are able to meet family needs more easily and economically [10].

3.4 Current Status of the Home Gardens

Currently, participants produce horticultural crop products especially leafy vegetables, carrot, banana, coffee and fruit trees more in a designed way by applying the recommended horticultural practices and improved production techniques. The established model home garden of 10 m × 10 m can provide most of the household's annual requirements of vegetable products. Research findings stated that home gardening can reduce a family's total daily food expenditures by about 20% [11]. To maximize the potential of the home garden, they established different vegetable growing structures.

3.5 Lesson Learnt

Participants learnt the possibility of earning money from home garden by efficient utilization of small plots of land and maximizing the garden both vertically and horizontally by using different vegetable growing structures, such as old plastic containers, wooden boxes, vegetable growing shelves made from locally available materials and old used car tier, and FAITH gardening techniques to maximize the potential of home garden both vertically and horizontally. Growers can save the highest cost of the dish by continuous production techniques of vegetables and fruits.

Participants learnt that organic production is recommended for home garden by using compost and farm yard manure. Participants learnt that compost is a major component for home garden. They learnt three principles to prepare compost:

- (1) Don't hate to collect compost materials!
- (2) Don't exhaust to collect compost materials!
- (3) Don't hesitant to collect compost materials!

Participants learnt that peak compost preparation method is suitable and recommended for home garden or urban agriculture than pit compost preparation method. Pit method of compost preparation has its own limitation. It needs wider space to transfer the compost from one pit to the other till it decomposes well. It also requires ample free time to dig and transfer compost from one pit to the other.

Participants learnt that 45 days are enough for most vegetable crops to transplant from nursery bed to main seedbed. Forty-five days are also enough for compost preparation. These two things should be synchronized each other to produce vegetable crops at home garden. Participants learnt that any gardener should have a harvesting format to record how much produce is harvested daily, monthly and annually, how much produce are consumed at home and how much are supplied for local market.

Participants learnt that months of the year are divided into three in home garden point of view based on the availability of water and level of management requirements of home garden crops in Ethiopia condition. These are:

(1) Light months:

June	}	No need of irrigation water
July		
August		
September		

(2) Intermediate months:

October	}	Need light irrigation water
November		
December		
January		

(3) Heavy months:

February	}	Need much and frequent irrigation water
March		
April		
May		

4. Conclusions and Recommendations

Model home garden producers were able to produce fresh vegetables and fruits year round for home consumption that could save the highest cost of daily dish. Moreover, participants generate reasonable income by supplying surplus vegetable product to the local market. Women were empowered in their productive roles. The composting of biodegradable household wastes to fertilize gardens plays an important role in the process of cleaning the city and it promotes organic vegetable production.

Therefore, best practices and techniques of producing fresh foods at home garden should be demonstrated and scaled up to other kebeles, towns and cities. Concerned bodies (cities office of agriculture) in particular and all stakeholders in general should provide technical and financial support to enhance the potential of home gardens to increase the livelihood of poor women and HIV victim parts of the community. Strong linkages should be established among stakeholders (researcher, office of agriculture non-governmental organizations (NGOs) and private input dealers) to make home garden more sustainable.

Acknowledgments

The authors acknowledge Amhara Regional Agricultural Research Institute (ARARI) and Rural Capacity Building Project for financial support to establish model home gardens.

References

- [1] Galhena, D. H., Russell, F., and Karim, M. M. 2013. "Home Gardens: A Promising Approach to Enhance Household Food Security and Wellbeing." *Agriculture and Food Security* 2: 8. Accessed February 8, 2013. <http://www.agricultureandfoodsecurity.com/content/2/1/8>.
- [2] Waaijenberg, H. 2003. *The Vegetable Garden in the Tropics*. Wageningen: Agromisa Foundation, 42.
- [3] Maina, S., and Mwangi, M. 2008. "Vegetables in East Africa." *Farming Resources Series* 102, Elewa Publications, Nairobi, Kenya. Accessed on May 10, 2013. www.elewa.org.
- [4] Adekunle, O. O. 2013. "The Role of Home Gardens in Household Food Security in Eastern Cape: A Case Study of Three Villages in Nkonkobe Municipality." *Journal of Agricultural Science* 5 (10): 67-76.
- [5] Olajide-Taiwo, F. B., Adeoye, I. B., Adebisi-Adelani, O., Odeleye, O. M. O., Fabiyi, A. O., and Olajide-Taiwo, L. O. 2010. "Assessment of the Benefits and Constraints of Home Gardening in the Neighborhood of the National Horticultural Research Institute, Ibadan, Oyo State." *American-Eurasian J. Agric. and Environ. Sci.* 7 (4): 478-83.
- [6] Bureau of Finance and Economic Development (BoFED). 2010. *A 2009/10 Budget Year Annual Statistical Bulletin*, Bahir Dar, Ethiopia.
- [7] Central Statistical Agency (CSA). 2007. *Population and Households Census of Ethiopia*. Annual Report of Central Statistical Agency of Ethiopia, Addis Ababa, Ethiopia.
- [8] Phipps, N. 2014. "Growing a Vertical Vegetable Garden." Accessed April 27, 2013. <http://www.mekonginfo.org/assets/midocs/0001332farming-the-sustainable-intensification-of-agriculture>.
- [9] Henry, D. 1992. "Food Always in the Home." ILEIA Newsletter 8 No. 4, University of Georgia, Department of Anthropology Baldwin Hall, Athens, Georgia, USA. Accessed September 14, 2011. <http://www.agriculturesnetwork.org/magazines/global/whose-energy/food-always-in-the-home>.
- [10] Galhena, D. H., Mikunthan, G., and Maredia, K. M. 2012. "Home Gardens for Enhancing Food Security in Sri Lanka." *Farming Matters* 28 (2): 12.
- [11] Ali, A. M. S. 2005. "Home Gardens in Smallholder Farming Systems: Examples from Bangladesh." *Hum. Ecol.* 33 (2): 245-70.