Production Constraints of Sweet Potato (Ipomoea batatas L.): A Review

Muluneh Bekele Etana¹, Mekonnen Tolasa Gonfa² & Chala Obsa Duresa³

¹Muluneh Bekele Etana, ²Mekonnen Tolasa Gonfa & ³Chala Obsa Duresa
Department of Horticulture, College of Agriculture and Veterinary Science
Ambo University, Ambo, Ethiopia

Abstract: Sweet Potato (Ipomoea batatas L.) is an economically important food crop globally including Ethiopia that is mainly grown on smallholder farms. It is a herbaceous dicotyledonous plant with creeping, perennial vines and adventitious roots. It belongs to family Convolvulaceae (morning glory flowers) and is hexa-ploid, and usually considered the only Ipomoea species of economic importance. It has large, starchy, sweet-tasting and tuberous roots. It adapts tropical and warm temperate regions. It is a highly heterozygous cross pollinated crop in which many of the traits show continuous variation. Sweet Potato crop is known for its resistance to drought, vigorous early growth and low input requirements. It also does well in areas of high rainfall and it requires very little labor and care compared to other crops. Different research output indicated that, Sweet Potato root crop has a potential of 50 to 60t/ha in Ethiopia, however, farmers are obtaining 6 to 8tons/ha only which is ten times lower than the potential. This much yield gap would be attributed to a number of factors that influences yield and quality of produce such as absence of high yielding improved and virus free planting materials, appropriate insect pest management and use of improved crop management options, limited cultivated land, poor storage facilities, lack of credit facilities, lack of extension training, poor transportation and high cost of input. As a general, even if there is a great deal of concern on production, research and technology dissemination; however, there is also a need to create sustainable and site specific integrated nutrient management options, appropriate irrigation schedules, generation of ways of conserving planting materials in dry seasons and development of compatible multiple cropping options for Sweet Potato in Ethiopia. Thus generation and promotion of site specific recommendations are of paramount importance for root crops like Sweet Potato. So the main objective of this piece of paper is to review on the major production constraints of Sweet Potato (Ipomoea batatas L.) for better yield and quality produce

Keyword: Ipomoea batatas L., Production, Ethiopia, Sweet Potato.

1. Introduction
Sweet Potato is one of five most important crops, in terms of production, economic value, and contribution to calories and proteins. In Ethiopia, agriculture is the main source of livelihood for about 80% of the population which it contributes to 42% of Ethiopia’s gross domestic product (Shiferaw & Holden, 1998). The country’s unique location close to the equator provides bimodal rainy seasons
(Mengistu, 2006), known as Kiremt and Belg. Kiremt is the main rainy growing season from June to September, and Belg is the short rainy season from February to May. The duration of these rainy seasons varies throughout the country. Therefore, rain-fed agriculture dominates most of the farming land that produces a variety of crops during these seasons including Sweet Potato (Tilahun et al., 2011).

Sweet Potato (Ipomea batatus L.) is belongs to the member of the convolvulaceae family that is originated in the central or south America low land with subsequent dispersed to north America, Europe, Africa and pacific between 15th and 20th century (Rai, 2005). The exact time of introduction of Sweet Potato in to Ethiopian traditional farming system is not clearly known. It is believed that the first introduce of cultivars to Ethiopia were from USA and Nigeria (Tesfaye et al., 2006).

In Ethiopia, Sweet Potato is the second-most important root crop in the country after enset. It provides a healthy diet for millions of people across the country (Gurmu et al., 2015). Moreover, it is commonly cultivated as an integrated crop, along with livestock, in the crop-livestock farming systems (Belehu, 2003). However, Ethiopia’s average Sweet Potato storage yield is low with about 8 t/ha, although the potential yield is 30 - 73 t/ha, and the international average is 14.8 t/ha (Belehu, 2003; Kivuva et al, 2014).

The crop is a dicotyledonous, herbaceous, perennial vine, cultivated as an annual. Sweet Potato is a crop that is very well suited to local growing conditions, especially during our prolonged dry season. Growing of Sweet Potato with irrigation, high yield are obtainable and root quality is good. Poor yield and qualities are associated with low ambient and soil temperatures, which can provide a market opportunity for locally grown crops (Gululuoglu L. and H. Arloglu, 2009). Sweet Potato is an important food security crop grown in many of the poorest regions of the world mainly by women for food and as a source of food and family cash income (Woolfe, 1992).

Sweet Potato is tolerant to wide range of edaphic and climatic conditions (Solomon E, 1999); adapts well to areas that are marginally suitable for the production of other crops and are food-insecure providing that a continuous supply of food or fodder throughout the year (Bourke, 1982). The plant is traditionally cultivated for food as a root crop (Ruiz et al., 1981). However, the top is also used as valuable forage for ruminants and other livestock species (Giang, 2004). The tuberous roots and leaves of Sweet Potato are an excellent source of carbohydrate, protein, iron, vitamins A, C and fiber (Qadir et al., 1999). Sweet Potato vines have crude protein contents ranging from 16 to 29% on dry matter basis which is comparable to leguminous forages increased milk yield (Etela et al., 2008); whereas the fresh tuberous root contains 80 to 90% carbohydrate of dry matter (Dominguez, 1992).

Sweet Potato has widely grown in Ethiopia, currently covering about 75,000 ha of land with an average national yield of about 8kg/ha (Assefa et, al, 2007) which is low compared to the world’s average production of about 14.8kg/ha. The tuberous root is used as food by humans whereas the vines are used as supplementary feed for gouts (Tesfaye et al., 2008). Tillage methods significantly influenced the growth and yield of Sweet Potato. This is shown by trend in the values of vine length, number of leaves and leaf area per plant gave relatively low soil bulk density, and water content and relatively high soil temperature compare with mound clearing. The lower value of bulk density and higher total porosity produced by tilled plots compared with mound clearing was attributed to the loosening effects of tillage (Agbede and Adekiya, 2009). The higher water content in the untilled manually cleared soil could be related to its higher bulk density lower porosity and reduced evaporation rate (Rani, 2011).

As a general, the productivity of Sweet Potato is limited to both abiotic and biotic constraints, leading to poor yields and quality at farm levels. The crop has a potential of giving over and above 60 tons/ha in Ethiopian conditions; however, yield obtained from farmer’s field is by far lower than 6 to 8 tons/ha. Thus the yields are ten times lower than the potential sought. The main causes include low soil fertility and drought, shortage of improved varieties, shortage of planting materials, pests and diseases particularly viruses, post-harvest problems such as storage and market availability and demand as well as low socio-economic status in some communities. As a food security crop, it can be harvested piecemeal as needed, thus offering a flexible source of food and income to rural households that are mostly vulnerable to crop failure and consequently fluctuating cash income. In addition to being drought tolerant and having a wide ecological adaptation, it has a short maturity period of three to five months. Sweet Potato has several advantages within the context of African cropping systems including...
Ethiopia: it produces food in a relatively short time, it gives reliable yields in sub-optimal growth conditions, it requires lower labor inputs than other staples, it serves as an alternative food source for urban populations, facing increasing prices of cereals and it provides a potential option to reduce vitamin A deficiency (Andreas, et al., 2009; and Getahun and Tenaw, 1990). In view of the above points, this review paper is initiated to review on the major production constraints of Sweet Potato (Ipomoea batatas L.) for better yield and quality produce.

2. Sweet Potato (Ipomoea batatas L.) Production

2.1. Uses

Sweet Potato has various uses especially, in developing countries like Ethiopia. It is grown by many farmers as a subsistence food. It is also an important vegetable crop that their roots are often used in curries while the fresh tips are used as a green. In Ethiopia, however, the leaves are not consumed. Similarly, Sweet Potato has the potential for processing. However, there is limited commercial processing of Sweet Potato in Ethiopia. During dry season, Sweet Potato leaves are used as animal feed.

2.2. Environmental Requirements of the Crop

2.2.1. Temperature

For the cultivar of Sweet Potato a temperature range of 25°C to 30°C is required during the vegetative cycle with optimum temperature being between 20°C to 25°C. The highest yield are obtained when temperatures are high during the day temperature of 15°C to 20°C; low temperature during the night favor the formation of tubers and high temperatures by day favor vegetative development. The tuber development only occurs within a temperature range of 20°C to 30°C and optimum temperature of 25°C whereas, growth stops when below 10°C (Qadir and Ali, 1999).

2.2.2. Light

Sweet Potato is a short day plant, which needs light for maximum development. However, the growth of the tuber appears to not to be influenced by photoperiod alone. It is probable that temperature and fluctuation in temperature together with short day favor the growth of tubers and limit the growth of foliage (Gulluoglu and Arloglu, 2009).

2.2.3. Altitude

In tropical region including Ethiopia it is possible to cultivate Sweet Potato from sea level to 2500m. In the case of Bolivia, Peru and Colombia it is cultivated from sea level to 2300m a.s.l (Tesfaye G., 2012).

2.2.4. Moisture

Moisture has a significant influence on Sweet Potato growth and production. In this context it is relevant to note the water content of the leaf is (86%), stem (88.4%) and the tuber (70.6%). At planting it is important to have moist soils in order to achieve good leaf imitation. The soil must also be kept moist during the growth period (60-120 days) through at harvesting the humidity must be low in order to prevent the tuber rotting (Busha, 2006).

2.2.5. Soil

Sweet Potato can be cultivated in a wide range of soil, which the best result obtained in ferralitic brown humic and calciphloglic soil. Ideally the soil should be friable have a depth of more than 25cm and have good superficial and internal drainage. The chemical properties of the soil are less limiting than structural properties in obtaining good yields. Sweet Potato also prefers lightly acid or neutral soil, with the optimum PH beings 5.5 to 6.5. Soils which are excessively acid or alkaline of ten encourage deterioration of tuber and negatively influence yields (Hanley et al, 1965).
2.3. Nutrient requirement/ Fertilizer Applications

Fertilizer application is one of the most important inputs for increasing the productivity of crops (Adediran et al. 2004). It is common that nutrient deficiency has been shown to account for low yields in the production of Sweet Potato (Njoku et al., 2001 and Okpara et al., 2011). Despite common low-input cultivation practices, Sweet Potato shows a large yield response to nutrient input application via fertilizer and manure (Agbede and Adekiya, 2010). Fertilizer application could also increase yield of Sweet Potato by at least 32% under poor soil condition and nearly double (83.93%) under better condition (Statthers et al. 2005). Better Sweet Potato root quality was observed at optimum amount of nitrogen supply especially through organic sources (Nedunchezhiyan et al., 2003). Potato grown without application of fertilizer was reported to have less dry matter yield (Nedunchezhiyan et al. 2010) as compared with the report of Jarvan and Edesi (2009) that dry matter content increased with application of manure and mineral fertilizer. This can explain why significantly lower dry matter was obtained from potato treated with no fertilizer.

Carbohydrate content was least with the application of 400 kg/ha NPK 15:15:15 as against the report of Vosawai et al. (2015) that application of increased mineral fertilizer gave the highest carbohydrate content. Vosawai et al. (2015) also reported that application of inorganic fertilizer produced the highest carotenoids content in Sweet Potato. Similarly, Naikwade et al. (2011) reported as beta carotene content was significantly increased in response to the type and the level of nitrogen fertilizer applied. The highest carotenoids obtained from Sweet Potato treated with sole NPK 15:15:15 was in agreement with report of Albert (2015) that sole application of NPK gave the highest carotenoids content.

2.4. Planting Materials

Yields of Sweet Potato could be improved by the use of good planting materials in terms of nodes number in the vine cuttings. The number of nodes on cuttings used as planting material may be an important aspect of yield variability. Yield of Sweet Potato could be improved by the use of good planting materials which bring about a higher tuber yield. The increase in the length of the vine cutting used and a length of about 30cm is recommended (Essilfie et al. 2016). It is also reported by Anakweze (2011) that cuttings of greater length than 30cm tend to be wasteful of planting material, while shorter cuttings establish more slowly, and give poor yields. It was observed that vine cuttings of 30cm length with six nodes which were prepared from the healthy stem of each variety (Nwankwo et al. 2014) increase the production of healthy vines.

According to the reports of Matimati et al. (2003) and Essilfie et al. (2016) the survival of Sweet Potato is majorly attributed to the soil, weather conditions and that Sweet Potato sprout well under a rain-fed condition. In 2004, Ebregt et al. reported that the survival of Sweet Potato is more related to the agro-ecological condition which may cause planting materials failure to take off and also that Sweet Potato does not have the ability to resist dryness. This report is in line with the findings of Yeng et al. (2012) that fresh planting materials from dividing portions of the vine, with good land preparation ensures good sprouting of vines. None significant growth parameters response of Sweet Potato was in agreement with the findings of Janssens (2001) and Mukhtar et al. (2010) which was attributed to innate quality of the crop itself. In the report of Puran and Ronell (2014), vine cuttings with 3 to 5 nodes was reported to survive with higher opportunity to sprout and develop due to presence of more nodes and higher carbohydrate reserve. Even, higher number of nodes of seven was reported by Anakweze (2011) as against 2-3 nodes observed in this trial to have sprouted better than other higher number of nodes. Comparisons were made on depth of planting the vine cuttings and confirmed that burying two-third of the vine would suffice for better establishment and subsequent yield compared to other levels of burying the Sweet Potato cuttings.

Much variation was observed in the system of planting. In most places, cuttings were not planted in rows and spacing varied from 15 to 30cm. Where row planting was practiced, the spacing between rows ranged from 45 to 75cm and 15 to 45cm between plants. Stem cutting was invariably used as planting material. In most places, cuttings were planted on flat soil but in a few areas planting was dope on ridges. According to findings, ridge width and height happened to be researchable and the recommendations showed that medium to high ridges (25 to 36cm) are advantageous on poorly drained
soils when there are heavy rains, and flat or low ridges are practiced where drainage is good and rainfall is not very high (Endale, et al., 1999). Tractor plowed farms, furrows are spaced 75cm apart and plants are placed 30cm away from one another.

2.5. Irrigation requirements of the crop

Even though Sweet Potato crop is said to be drought tolerant, different research results showed that it needs sufficient moisture at early stage especially during the first six weeks to secure healthy stands establishment. This was mainly because Sweet Potato vines are succulent and fragile, and if no sufficient moisture is supplied it dries up soon. If there is no rain in early parts of planting, supplementary irrigation of 2mm of water per day is required even in the main rainy season. To meet this requirement, irrigating in alternative days is vital. Moisture stress during growth significantly reduces storage root yield. As a crop grows on, irrigating with 4-5mm water would suffice for a given week. Because Sweet Potato crop needs sandy and well-drained soil; and if the soil has high moisture content, planting in raised bed is preferable (MOARD, 2000). With growing interest of Sweet Potato as emergency food security crop in the country, there were increased pressure from concerned bodies to supply Sweet Potato cuttings in off seasons. Obviously the production of vines under such situations required application of irrigation water pumped from springs, rivers or lakes. There was a practice of applying water to field capacity once in a week in such cases in majority of Sweet Potato fields. Yield and quality of Sweet Potato in non-irrigated experiments were extremely low compared with that of irrigated experiments.

2.6. Weeding

Hand weeding with the use of bolo was dope by farmers. Rare farmers are utilized herbicides to control weeds in Sweet Potato productions. As in planting, this activity used family labor, the husbands, sons and wives, helped in weeding.

2.7. Harvesting

All Sweet Potato roots, regardless of size, are harvested at one time. Sweet Potato vines are cut first and rolled to one side of the field. The roots are then dug using either a blunt bolo, spading fork, harvesting hoe, or any implement (Bartolini, 1981). In large farms, the crop is harvested by passing a moldboard plow along the rows. Sometimes, a tractor-drawn harvester adjusted to the width of the rows is used. The advantage of this system is that the field can immediately be planted to another crop soon after harvest. Moreover, weevil infestation can be avoided; hence roots are usually of good quality.

2.8. Sorting and Grading

After harvesting, Sweet Potato roots are sorted to facilitate the removal of diseased and damaged ones as well as to separate them into different sizes using a grade standard for Sweet Potatoes. Grading is important since it makes marketing of the different grades to different types of buyers possible. Ungraded products usually require detailed examination by the buyers and this practice is not only time consuming but also damages the produce. In addition, ungraded roots, when stored, deteriorate faster than the graded ones.

2.9. Postharvest Handling of Sweet Potato

2.9.1. Curing

Curing is a process of wound healing that helps reduce storage tosses of slightly damaged roots. It involves tuberization and thickening of the root skin, followed by the development of a wound periderm, which consequently retards moisture loss. The primary purpose of curing is to allow rapid healing of cuts, bruises, and skinned areas on Sweet Potato roots, thereby reducing secondary deterioration losses by preventing invasion by pathogens. Buescher (1980), reported on the beneficial effects of curing, stated that cured Sweet Potato roots exhibited lower weight loss and higher percentage salability after 6 months of storage than uncured Sweet Potato roots. For years, the general recommendation for curing Sweet Potato has been to store the roots at 30°C and a relative humidity of 90-95 percent for 10-15 days. However, attempts were made to shorten the period because curing
longer than necessary does not only waste heat but may also result in excessive sprouting owing to the high relative humidity.

Boswell (1950), as cited by Mc Combs and Pope (1958) recommended that the shortening of the curing period from 10 to 6-8 days. Lutz et al. (1951) suggested that curing of roots for 4 days at a temperature of 29°C. Under this condition, minimum loss owing to decay during subsequent storage was observed. Mc Combs and Pope (1958) also reported that a 4-day curing period at 30°C and 90-92 percent RH is appropriate for Porto Rico variety. They stated further that the length of curing, whether 4 or 10 days had only a minor effect on weight loss of the stored roots.

2.9.2. Packaging

Packaging refers to the containment of a product in packages that are used not only to contain but also to protect, identify, and sell it. For Sweet Potato roots, packaging starts from the farm or from storage to the market then to the final consumers. Suitable packages or containers lessen scratches, bruises, and injuries during transport from one point to another. Thus, different types of containers are needed. If packaging is for storage, a good packaging material will give longer storage life to the product.

The most common packaging materials for Sweet Potato are wooden crates/boxes, kaings (baskets made of rattan or bamboo), and jute or burlap sacks. Most farmers, however, prefer to use a sack as container because it has greater capacity (50-70kg of roots) and occupies relatively less space during storage and transport than the other containers (Data et al., 1982). A preliminary study comparing the performance of roots transported in three types of containers (wooden crates, kaings, and sacks) showed that Sweet Potato roots transported in sacks had the least damage during transport. Further holding of the roots in the laboratory, however, resulted in higher temperature and percentage weight loss of the stored roots. Crates were found to be much better transport containers than sacks and kaings based on the damage observed after transport (Data et al., 1981). Lutz et al. (1951) reported that packing Sweet Potato roots in sacks resulted in very high losses. He further stated that roots did not decay, were badly skinned, and of poor appearance, hence they could no longer be stored for any length of time before using.

In packaging Sweet Potato roots by any means, enough ventilation must be provided to prevent air condensation and excess dampness which are likely to cause rotting and sprouting. However, care must be taken to avoid over-ventilation as it can result in excessive weight loss. In marketing, some of the benefits of packaging are reduction of shrinkage from drying out and of damage from customer handling. Data and Quevedo (1987) reported that Sweet Potato roots packed in plastic bags with or without perforations and in jute sacks had significantly lesser weight loss than roots packed in paper bags and open trays. Plastic bags and jute sacks minimized air movement and provided high humidity within the container.

2.9.3. Storage

In temperate countries, Sweet Potatoes are usually stored in cold storage rooms where temperature and relative humidity are controlled. Kushman and Deonier (1975) reported that the optimum storage conditions are 15°C and 85-90 percent RH. Below this, decay, interna) breakdown, and impaired edibility may occur because lower temperatures favor the growth of fungi that cause decay in Sweet Potatoes. On the other hand, temperatures above 15.5°C reportedly shorten the storage life of Sweet Potato because it causes considerable weight loss. Mc Combs and Pope (1958) also observed that the dry matter content of Sweet Potato generally decreases during storage. The decrease in dry matter is usually higher at 18.5°C than at lower temperatures. This is attributed to the increase in respiration rate as manifested by increased moisture loss of Sweet Potato stored at higher temperature. Kushman and Deonier (1975), in a study of the effects of storage temperature on Porto Rico, Allgold, and Goldrush Sweet Potato, revealed that roots of all three varieties kept very well at 15.5°C and nearly as well at 21 °C but not at 10°C.

In some cases, Sweet Potato is stored at the prevailing low temperature instead of using cold storage rooms. Sealed pit or clamp storage was done by small holders of the crop. Sweet Potato roots, especially those applied with maleic hydrazide as foliar spray before harvest and with methylester of a-
naphthalene acetic acid after harvest had low percentage weight loss and degree of sprouting when stored for 8 weeks using this method (Gooding and Campbell, 1964).

2.9.4. Processing and utilization

There are several ways of processing Sweet Potato. However, all respondents in the study area boiled the roots for their regular meals or snacks. Boiled roots were usually used as substitute for cereals. Other processed products were baduya, maruya, bitsu-bitso, candy, chips, camote cue, sinaging, and ira-id. The products were processed by the household members. The wives were mostly the processors, assisted by the children. Husbands seldom helped in processing. If they did, they helped in grating and in providing fuel for cooking. The wife and the children did the cooking and molding. If the processed products required wrapping, then this was done by the wife and the children. Sweet Potato was also processed for feeds. The roots were boiled and then fed to animals, mostly swine. The wives, assisted by their children or husbands, cooked the roots for feeds. Decisions related to processing were generally made by the housewives.

2.9.5. Marketing

In the marketing of sweet potato very few of the producers marketed their produce except for some processed products. For fresh Sweet Potato roots, a few reportedly delivered their products to the town proper. Processed products, except boiled ones, were sold at school canteens during schooldays, town markets, local stores, and even in the processor's own place. Housewives/women, being in charge of money matters, were also in charge of marketing; they are assisted by the children.

2.10. Disease and Insect Pest Problems

2.10.1. Stem and foliage scab disease

The stem and foliage scab disease is one of the most prevalent and destructive diseases of Sweet Potato. It mainly affects the above-ground parts, particularly the vine tips, making them not acceptable for human consumption. The disease is recognized through scabby lesions on the lower surface of the leaf laminae, as well as on the petioles and stems. The affected parts are usually stunted and deformed. In rare instances, the stems grow upright instead of lying flat, as with healthy plants. As a result of scab infection, plants may die or tuber production may be greatly reduced (Nayga and Gapasin, 1986; Pongcol, 1982). Under field conditions, the pathogen may survive on the diseased leaves and stems on the ground so that the absence of alternate hosts will not result in the reduction of inoculums for the next cropping season.

The scab pathogen was effectively disseminated by water using a rubber hose and a sprinkler (Regis, 1982). Shorter incubation period, greater number and bigger size of lesions, and higher percentage infection were observed in the test plants where a rubber hose was used. Natural air movement in which diseased Sweet Potato plants were placed very near the test plants failed to disseminate the scab pathogen. It is apparent that faster spread of the disease in the field can be expected during the rainy season.

2.10.2. Sweet Potato Weevil

One of the limiting factors in the successful production of Sweet Potato is the weevil, which attacks the tubers and stems of the plant. Females lay eggs on tissues at the base of the stems where initial infestation occurs and later spreads in the developing tubers. Upon hatching, the larva bores deeper into the stem or tuber. The infested tuber gives off a characteristic disagreeable odor and tastes bitter even after cooking, thus becomes unfit for human consumption. Heavy infestation by the insect, if left uncontrolled, can cause tremendous yield loss.

This is the most serious pest of Sweet Potato which adults are ant-like which lay eggs on stems and roots. They can pupate in the stems and be transferred in planting material. Once established in a crop this pest is difficult to control and pre-plant treatment of cutting with chlorpyrifos combined with foliar applications of chlorpyrifos at 5 to 10 weeks from planting provides significant control. Material connected from an infected crop would require insecticide dipping before planting. Destroying all crop residues after harvest and crop rotations are the best ways to keep weevil numbers down (Busa, 2006).
2.10.3. Giant Termite
Termites can be a major problem especially on newly cleared where the activity of established colonies has not been identified. Avoiding known termite infested areas may be successful in the short term. Aggregation techniques to locate and concentrate termite activity followed by a baiting program is the best way to clear future planting areas of this pest (Tesfaye et al., 2008).

2.10.4. Leaf Feeding Caterpillars
Leaf feeding caterpillars may cause problems if infestations are severe enough to cause significant leaf reduction. At the start of the wet season, hungry magpie geese can cause serious damage by trampling crops and eating the roots.

2.10.5. Myco-plasma
Infected plants have small pale yellow stunted leaves and stems. The infection is spread by leaf hoppers and if plants are infected while young, yields are greatly reduced. Control is by regular monitoring for symptoms and the removal and destruction of infected plants (Zaag et al., 1989).

2.10.6. Viruses
Different research had shown that the infection of feathery mottle virus had no significant effect on yield of Sweet Potato. On the other hand, severe virus infection has caused yield reduction and distorted roots. Symptoms are often not visible on infected plants and laboratory testing is required to confirm any infection. The virus is spread by insect vectors and by infected planting material. If Sweet Potato is to be grown over an extended period then new virus free material should be planted (Busha, 2006).

2.10.7. Fungal Disease
Soil borne fungal diseases can infect the roots but are not a large problem on well drained sandy soils. Any organic matter added to the soil should be well decomposed before planting.

3. Summary and Conclusion
Sweet Potato is known as poor man’s crop that has become a food security crop all over the world with numerous potentials for income generation and export. The crop required low inputs, matured in short period of time and provided reliable yield in Ethiopian conditions. Consequently it obtained national focus and Sweet Potato crop has a potential of 50 to 60t/ha in Ethiopia; however, farmers are obtaining 6 to 8tons/ha only which is ten times lower than the potential. This much yield gap would be attributed to a number of factors which attributed to yield and quality of produce like as absence of high yielding improved and virus free planting materials, appropriate insect pest management and use of improved crop management options. As a general, even if there is a great deal of concern on production, research and technology dissemination; however, there is also a need to create sustainable and site specific integrated nutrient management options, appropriate irrigation schedules, generation of ways of conserving planting materials in dry seasons and development of compatible multiple cropping options for Sweet Potato in Ethiopia.

As a general, the output of many researchers are constrained by numerous factors such as inadequate government aid, labour cost, poor access to credit, poor storage facilities, lack of new technologies, poor market outlets and high incidence of pests and disease. There is a need to improve Sweet Potato production and its products. Efforts to improve current production and allied activities must seek to reverse the weak presence/non-existence of institutional support, breed for high yield and control of pests and diseases. Others are development of suitable cultural and management practices, popularizing existing technologies; identify negative impact of socio-cultural and economic factors. Indeed, there is a need to strengthen extension delivery system and the economic base of farmers through soft loans by lending institutions.
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5. Conflict of Interest
Regarding the publication of this manuscript, there is no any conflict of interest.

6. References


