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Trends of Avocado (*Persea americana* M) Production and its Constraints in Mana Woreda, Jimma Zone: A Potential Crop for Coffee Diversification

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ABSTRACT

An assessment was conducted to study the trends of avocado production and its constraints in Mana Woreda, Ethiopia, between October 2007 and January 2008. Informal survey was undertaken before the actual assessment was made to have a better insight about production areas in the Woreda in order to identify the peasant association that are known in avocado production. Accordingly, six peasant association; (Doyo Bikila, Doyo Toli, Gudeta Bula, Buture, Somodo and Bilida) were selected based on their relatively long experience in avocado production. From each peasant association the numbers of respondent were determined using proportional sampling methods and data were collected using structured questionnaire. The survey result indicated that the trends of avocado production have been increasing since its introduction to the study area. The average number of avocado tree grown by an individual farmer in the past 10 years, five years and present time was 5.2, 15.3 and 35.8, respectively. However, the production of this crop in the study area has many production constraints among which avocado root-rot disease, long time to bear fruits and failure to bear fruit at all are the major ones. Therefore, further investigation should be made to find solution to these major problems so that the potential of the crop could be exploited in a sustainable manner in the future.

Key words: Avocado, trends, constraints, yield, marketing, diversification

INTRODUCTION

Avocado (*Persea americana* M) which is native to the high lands of Mexico and Central America is cultivated in tropical and sub-tropical regions from 40°N and 40°S (Samson, 1986). It is one of the most nutritive fruits known. It contains eleven vitamins, fourteen minerals and high percentage of oil (up to 30%) with no cholesterol (Currier, 1991). Avocado is by itself a complete food containing nine essential amino acids even though not in balanced proportion (Bergh, 1991). Avocado is also processed into oil for human consumption and used as ingredient in various cosmetics and health products (Gaillard and Godefory, 1995).

Early European travelers in the sixteen century found avocado in cultivation and distributed throughout Central America and Northern South America. Distribution to the Africa and Asian tropics occurred during the 1700's and 1800's (Nakasone and Paull, 1998). Private orchard owners in Hirna and Wendo Genet areas first introduced avocado to Ethiopia in 1938. Gradually, its

cultivation spread nation wide with satisfactory adaptation to different agro ecologies (IAR, 1993). According to Seifu (2003) avocado is one of recently introduced fruit crops to the Ethiopian state farms.

Avocado was introduced to Jimma by Jimma Agricultural Research Center (JARC) in 1969 from Wendo Genet and DebreZeit areas (personal communication). On the other hand, Edossa (1997) reported that avocado fruit was unknown to consumer in southwestern part of Ethiopia in general about fifteen years back. He further indicated that in 1979 a collection orchard was established at JARC by planting few locally available collections.

Although, avocado is relatively new fruit crop to the agriculture research system of Ethiopia, it is now being widely distributed in the country from lowland to highland areas (1000-2300 masl) where there is no frost hazards (personal communication). Presently, there is a great demand for avocado in southwestern part of the country (Edossa, 1997). This demand is very high particularly at Mana Woreda, which is located in the vicinity of Jimma town. Its present market value is continuously increasing much better than other available fruits. This indicates that avocado is a potential fruit crop not only for solving the problem of balanced diet but also for fetching sizable income for producers. It thus has become the potential fruit crops for diversification where farmers' income has been highly limited to coffee as the Woreda is well known as major coffee producing area in Jimma Zone. However, there is no information about the trends of avocado production and its constraints at the Woreda level though many farmers have been engaged in the production of the crop. Hence, collecting baseline information about the trends of avocado production and its production constraints are very important for further improvement and promotion of the crop. The primary objective of the study was to assess the trend of avocado production and its constraints in Mana Woreda in order to provide baseline information for researchers and producers.

MATERIALS AND METHODS

Study site: The study was conducted at Mana Woreda, Jimma Zone, which is located between 7°54'N and 36°53'E in Southwestern part of Ethiopia with a total area of 47,898 ha. The altitudinal range of the Woreda is between 1410 and 2610 m above sea level. The area has an average annual rainfall of 1467 mm and the mean annual minimum and maximum temperature of 13 and 24.8°C, respectively. The Woreda comprises 24 rural kebeles and one town which is 368 km far from metropolis and 22 km from Jimma town, respectively. Mana Woreda is one of the densely populated Woreda of Jimma Zone with the total population of 151, 958 of which 76,367 are male and 75,598 are female. The Woreda comprises 21,687 households of which 20,003 (92.23%) are headed by male and the rest 1683 (7.77%) are headed by female house holds. Six sampling kebeles namely: Doyo Bikila, Doyo Toli, Gudeta Bula, Buture, Somodo and Bilida were used as study sites.

Study methodology

Method of data collection: Informal survey was conducted first, to have a better insight and identify the major avocado producing kebeles of the Woreda. Based on a survey results six peasant associations (kebeles) were selected on the basis of long period production and marketing experience of avocado at the study area.

A total of 67 households were randomly selected from the sampling sites by employing proportional sampling methods (15% from each kebele or peasant association). Data on avocado

production trends and its constraints were collected from October 2007 to January 2008 by using questionnaire. The data were collected from farmers who were engaged on the production and marketing activities of avocado.

Method of data analysis: The collected data were summarized and analyzed as descriptive analysis (minimum, maximum, mean and frequencies of percentage values) using SPSS (version 13) computer software program. Furthermore, the collected data were checked for errors and irregularities to ascertain reliability for further processes. The checked and analyzed data were presented through tabulation and graphical presentation to illustrate numerical data.

RESULTS AND DISCUSSION

Production experience and source of planting materials: The survey result indicated that the farmers in the study sites have an average of 12.39 years of avocado production experiences with a minimum and maximum of 9 and 19 years, respectively. This finding was in line with the report of Edossa (1997) who explained that the production of avocado was not known before 15 years. Moreover, the result agrees with the findings of Wondyifraw *et al.* (2008). Furthermore, the report indicated that there were farmers who planted avocado at the beginning of 1980s. However, most of them reported that they started to plant avocado in the late 1980s. The research result also indicated that the farmers obtained planting material from different sources. These different sources includes Jimma Agricultural Research center (JARC), Mana Woreda Agriculture and rural development office (ARDO), farmers own production (FOP), others (markets and cafeteria) (Fig. 1). The maximum contributions were made from farmers their own production (FOP) (53.7%) followed by Jimma Agriculture Research Center (JARC) which accounts for 25.4% of the total sources of planting material. Although, the contribution was less cafeterias plays their own contribution for avocado production in the study site. However, care should be given when planting material are collected from unknown source. Because avocado needs planting of A and B type avocado to produce any fruits otherwise the plant may fell to produce any fruit after investing a lot of resource for 8 to 10 years. Therefore, provision of technical support together with improved seed and agronomic practices is an issue that should be focused for finding solutions. However, currently the Woreda ARDO prepares avocado seedlings to distribute for innovative farmers by collecting seeds from different sources. The avocado seedlings planted at the study area in the past five years by the involvement of JARC, Woreda ARDO and farmers own production were 24.2, 34.9 and 40.9%, respectively. This figure also indicated that farmers own production plays great role for the promotion of avocado production in the study area although the original source were from Jimma Agricultural Research center.

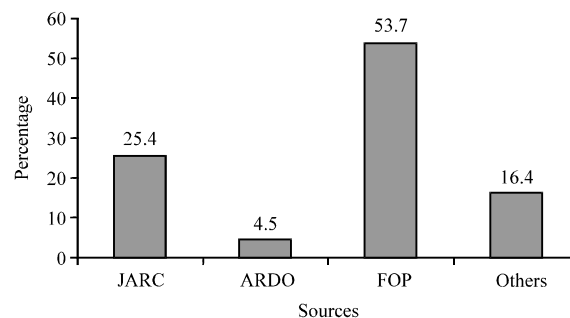


Fig. 1: Sources of avocado planting materials

Trends and social values of avocado production: Assessment of avocado production in the survey area showed that there has been an increasing trend of avocado production in the last several years (Fig. 2). The study indicated that the average amount of avocado trees grown by an individual farmer before 10 years and 5 years were 5.19 and 15.28, respectively. Currently on average an individual farmer owned 35.83 avocado trees around his garden or field with a minimum and maximum of 8 and 400 avocado plants, respectively. However, all avocado plants the farmers owned do not start to bear fruits. This indicates that on average there were 85% increase of avocado plants over the avocado owned by individual farmer before 10 years. However, according to World Bank (2004) production and exports of fresh fruits have shown modest growth of which avocado accounts 11%. Furthermore, the report indicated that the overall, production growth has experienced only 1% growth per annum over the last decade, with a decline in per capita terms.

The survey result also indicated that the variation in the amount of avocado plantation was not only restricted among farmers but also among sampling sites or peasant associations. The study point out that in all sampling sites there was an increasing trend of avocado production and relatively more avocado plantation were planted in Bilida as compared to the other peasant association (Fig. 3a, b).

The major reason for the increasing of avocado production area in the study area is because the fruit has better market value. The result from overall data analysis proved that the main objective

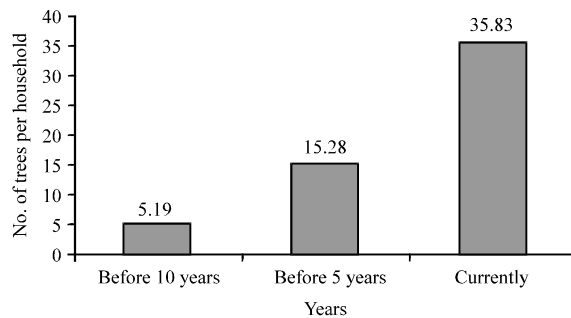


Fig. 2: Trends of avocado production at mana wereda

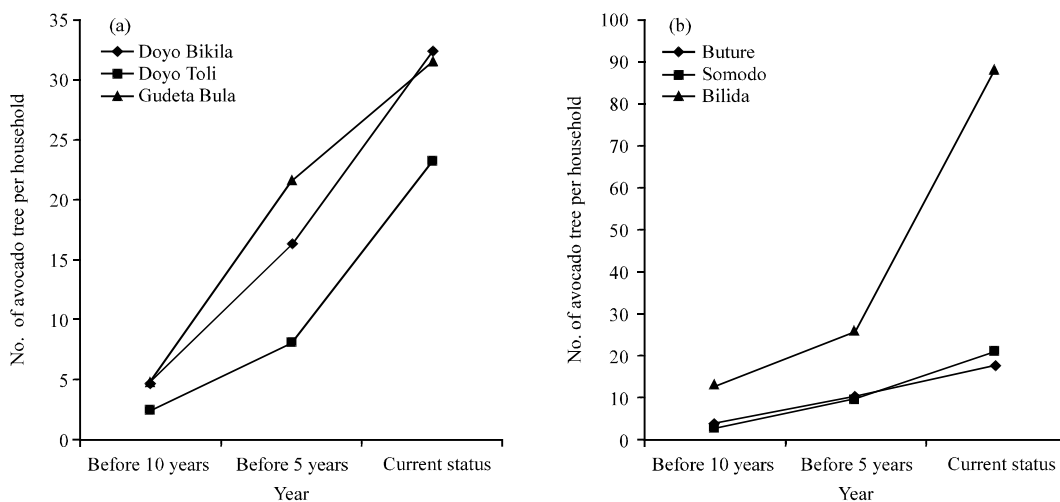


Fig. 3: Trends of avocado plant exist among the six kebeles in the study area October 13, 2010

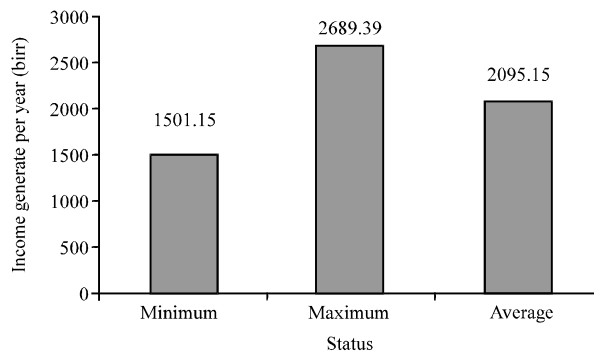


Fig. 4: Income earned in one production season/household

of avocado production is for sale. The data showed that the average amount of avocado fruits sold by an individual farmer in one production season was 819 kg year⁻¹ which accounts 79.63% of the total production and the amounts used for consumption were only 20.37%. The collected information further showed that about 85.1% of sale of avocado was made in cash by selling the produce in small amount (split sale) where as 13.4% of the sale was made in bulk on cash basis. In addition to these advance sale was also practiced by very small number of farmers (1.5%). The availability of different terms of sale may initiate the farmer to expand their avocado farms because the numbers of avocado plants are considered as their account saved in bank. From the study it was recorded that an individual farmer averagely earned 2095.27 birr year⁻¹ in one production season from 6 fruit bearing avocado trees with the average price of 2.16 kg⁻¹ of avocado fruits (Fig. 4). These indicate that avocado plays a great role in generating an additional income and contributes much in the livelihood of farmers in the society. This finding was in line with Wondyifraw *et al.* (2008) who reported that individual framers were gained on average 2011.58 birr from avocado sales in a single production season.

Beside to its economic importance avocado plays a significant role in enhancing social interaction within the society. Avocado provides social values to farmers by improving social acceptance and respectation in the society, developing popularity by provision of fruits/seeds/seedlings to relatives and improving social interaction within the society during wedding, holidays and during other social problems faced among relatives. Hence, avocado plays significant role in improving social affairs among the rural society at the study area and further study is recommendable to identify the socioeconomic impacts of avocado production in the society.

Yield: Since, avocado is known for its alternate bearing the yield of avocado fruits per tree varies among years. According to the survey result at good harvest the yield ranges from 130 to 1200 kg year⁻¹ per tree while at poor harvest the yield can be reduced to a range of 54 to 500 kg. Furthermore, production per tree also varies among the study areas (Fig. 5). The result agrees with the findings of Smith (2006). The yield varies greatly with cultivar, age of tree, location, whether and other conditions. The level of yield depends on cultivars, effective pollination and crop husbandry practices (Edossa, 1997; Linda, 2006). The yield given on the literature vary from country to country but on average about 10 t ha⁻¹ with a tree density of 150 to 200 ha⁻¹.

Avocado production constraints: Even though avocado is contributing much in the socioeconomic life of the society, its production is confronted by a number of constraints.

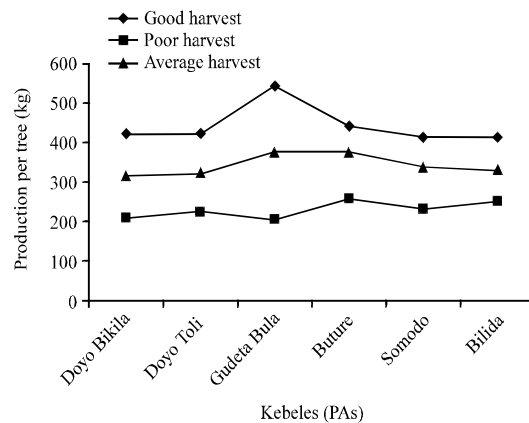


Fig. 5: Production per tree of avocado at the study areas



Fig. 6: Avocado tree attacked by root rot (*Phytophthora cinnamomi*)

Degeneration of fruits, disease problem and absence of improved agronomic practices were listed by the beneficiaries as major obstacles for avocado production in the study site. The avocado disease, root rot (*Phytophthora cinnamomi*) has been reported to occur in Jimma area (Fig. 6). Its symptoms are confusing because some times there is complete drying of the plants and some times the dried plant regenerate after certain period of time if the farmers maintained the dried plants in the field. Most people always confused whether that problem is really because of disease or because of physiological phenomena. From the survey result it was observed that about 2.98% of the sampled farmers faced a problem of complete drying of 1 to 2 avocado trees in their farms. Although, such complete drying of the plant is minimal in the sampling sites or peasant associations some times a number of dried avocado plants are observed in the field. Hence, avocado root rot is one of the intervention area on which research should focus to come up with solutions. Therefore, research on avocado disease and improved agronomic practices should further be taken in to account in order to avoid the great economic loss of avocado growing farmers and also to apply appropriate management practices. The other problem reported with avocado production was non bearing of avocado plants which is associated with not planting A and B avocado type together. Moreover, the long juvenile period of avocado raised from seedling was also reported as one the production problem in the study site. This can be solved by using asexual methods of propagation particularly grafting.

CONCLUSION

Avocado is one of highly demanding horticultural crop at the study area because of its production potentials. According to the survey result avocado is demanded by farmers. Because of its better source of income during off-season, nutrition-the rural society used avocado as traditional Wot as additive in their cultural feeding habit, beautification and requirement of little cost of production and marketing. However, less attention is given in avocado extension service which is seen in this study. Avocado root rot is one of the intervention area on which research should focus to come up with solutions. Research on avocado disease and improved agronomic practices should further be taken in to account in order to avoid the great economic loss of avocado growing farmers and also to apply appropriate management practices. Hence, the avocado extension service has to be re-strengthened and integrated agricultural extension system should be given to farmers by the responsible organization.

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REFERENCES

- Bergh, B.O., 1991. The avocado and human nutrition I. Some human health aspects of the avocado. Proceedings of the World Avocado Congress II, (WAC'91), University of California, California, pp: 25-35.
- Currier, W., 1991. New variety introduction under US condition. Proceedings of the World Avocado Congress II, (WAC'91), University of California, California, pp: 609-613.
- Edossa, E., 1997. Selection of avocado (*Persea American M.*) collection for desirable fruit characteristics and yield at jimma. Proceedings of the 8th Annual Conference of the Crop Science Society of Ethiopia, Feb. 26-27, Addis Ababa, Ethiopia, pp: 26-35.
- Gaillard, J.P. and J. Godefory, 1995. Avocado the Tropical Agriculture. Technical Center for Africa (CTA), Macmillan Education Ltd., Landon, UK., pp: 94-110.
- IAR, 1993. Jimma agricultural research center progress report for the period 1992-1993. Jimma, Ethiopia.
- Linda, S., 2006. All about avocados. Internet Document, America net/Q-A/News Paper Ltd.
- Nakasone, H.Y. and R.E. Paull, 1998. Tropical Fruits. CAB International, Oxford, Wallingford, UK., pp: 76-102.
- Samson, J.A., 1986. Tropical Fruits. 2nd Edn., Longman Group Ltd., London, UK., pp: 145.
- Seifu, G., 2003. Status of Commercial Fruit Production in Ethiopia. (EARO), Addis Ababa, Ethiopia.
- Smith, B., 2006. The Farming Handbook. Technical Center for Africa (CTA), Wageningen, The Netherlands, pp: 310-312.
- Wondyifraw, T., A. Haileab, E. Tadesse, A. Dawit and Y. Henok, 2008. Prodicing and commercializing fruits in coffee based farming system of southwestern Ethiopia. In: Girma, A., B. Bayetta, S. Tesfaye, T. Endale and K. Taye (Eds.). Coffee Diversity and Knowledge, pp: 443-448.
- World Bank, 2004. Opportunities and challenges for developing high-value agricultural exports in Ethiopia. Poverty Reduction and Economic Management to Country Department for Ethiopia. <http://siteresources.worldbank.org/INTETHIOPIA/Resources/PREM/OppandChallengesHighValueExports.pdf>.