

# Impact of Size of an area on Coffee Production in Bench Maji, Ethiopia

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**ABSTRACT:** This study investigated the impact of size of an area used by coffee farmers on coffee production in nine coffee producing districts and one city administrative in Bench Maji zone of Ethiopia. Data for the investigation was collected from Bench Maji Zone Natural Resource and Agriculture department 2016-17. Correlation and simple linear regression analysis were used to analyze the data. The result of the investigation showed that there was high productivity difference among districts. The average productivity per metric tons was 0.587 which is low comparing with other producing areas in the country. The correlation coefficient indicates there was a strong relationship between coffee productions with size of area. The regression analysis also showed that a unit change in the size of area lead to 0.562 unit times of production increased.

**Key Words:** Impact, size, area, coffee, production.

## 1. Background Issues

Coffee was first discovered in Ethiopia in the 9<sup>th</sup> century by a goat herder named Kaldi and which was spread in several countries of Africa, Asia, and Latin America (Lokker, 2013). Coffee is an important cash crop grown in about 80 countries in tropics (Aderolu *et al.*, 2017). The green coffee is the second largest traded commodity in the world next only to petroleum and its products. Many developing countries depend on coffee as a major source of foreign exchange. Ethiopia is one of those countries and which is the largest producer of coffee and ranks fifth in the world and first in Africa by annual coffee production (Abu, 2016). The Ethiopian economy is depending on coffee production. In Ethiopia, Ninety-five percent of coffee is produced by smallholder farmers within less than two hectares of land and only five percent coffee produced by estate farm (Alemayehu, 2014). Coffee is an income source for more than fifteen million people; those, directly and indirectly, depend on coffee production processing.

Coffee plays a great role in the country economy in 2015-16 Ethiopia was earned 35% foreign exchange from coffee seals. In major coffee-growing areas (Oromia and Southwest Ethiopia) coffee is the major source of income for the rural population and rural livelihoods. In Ethiopia coffee is not only the source of income generating but also it is an inevitable beverage in their daily menu. From the total production of coffee, forty-five percent consumed in the country and the rest fifty-five percent is being exported to foreign countries. According to Abu (2016) in Ethiopia coffee is not only the source of income generating but also it is an inevitable beverage in their daily menu. Ethiopia is the largest coffee consumer in Sub-Saharan Africa and probably the second highest consumer after Brazil among coffee producing countries. Coffee consumption in Ethiopia is cultural and apart from its social, spiritual and cultural values, coffee ceremony is the platform for conflict resolution among individuals, groups or tribes. It is consumed at least three times daily (at breakfast, after lunch and in the afternoon) and even more frequently during social events. From the total production of coffee, forty-five percent consumed in the country and the rest fifty-five percent is being exported to foreign countries.

Even though the previous and present Governments of Ethiopia had given strong attention and efforts to strengthen the coffee sub-sector through establishing organizations responsible for development and research undertakings, coffee production and marketing problems not yet solved. Studies conducted in the area showed that various problems influence the productivity of coffee in Ethiopia. Mainly the lack of accessibility of finance, the lack of infrastructure facilities, shortage of farm land, usage of the traditional method, lack of experts support, climate change, source of seedlings, shortage of transportation, shortage of technology lead to low productivity.

According to Alazar (2017) Ethiopia is not benefited from coffee due to various problems in the area. This study was limited on the impact of size of an area on coffee production.

### Literature Survey

**Fethi *et.al* (2016)**, investigated major marketing problems of coffee cooperatives of farmers, major constraints exist that in the channel members and to recommend the better placement of coffee production as well as the positioning of Kurtu Cooperative Society. The result of the study identified shortage of land was one of the problems.

**Niguse (2013)**, analyzed marketing performance of coffee farmers' co-operatives union and members' satisfaction in west Harerge Zone Oromia Regional state of Ethiopia. The result showed that total land holding negatively influence the overall satisfaction of members on the study area.

**Abu (2016)**, on his annual report showed small farm size hampered productivity gains; the majority of production is on small backyard farms averaging less than 2 hectares in size. As a result of this coffee yields remain low at around 0.7 - 0.8 metric tons per hectare.

**Pasala (2017)**, examined trends in Paddy production in Andhra Pradesh 1994-95- 2013-14. The study found that area, production and productivity have decreased during the study period. Change in area and productivity both responsible for low production.

### Research Methodology

Data for this study was collected from Bench Maji zone Natural Resource and Agriculture department (9 districts and one city Administration) 2016-17 size of an area covered with coffee and coffee production. In order to examining the influence of size of area on coffee production in Bench Maji zone by using simple linear regression model.

$Y = \alpha + \beta x + \varepsilon$       Y = dependent variable,  $\alpha$  = intercept,  $\beta$  = regression coefficient

x = independent variable,  $\varepsilon$  = error term      Y = production X = area in hectares

Correlation and regression analysis were used to find the association with size of area and coffee production explained coffee productivity per tons. Independent sample t-test used to test the significance of hypothesis. Statistical Package for Social Science (SPSS) (version23) and excel in window ten has been employed for data analysis. In all cases, the level of significance tested at alpha 0.05.

### Objectives of the study

To examine the impact of size of land used for coffee production in Bench Maji zone of Ethiopia.

### The hypothesis of the study

H<sub>0</sub> "There is no significant impact of the size of land used for coffee production in 2016-17 in Bench Maji zone."

### Results & Discussion

In order to analyze the impact of size of an area covered with coffee on coffee production in Bench Maji zone of Ethiopia in 2016-17. Table 1 showed productivity of nine districts and one city administrative engaged in coffee production in 2016-17 size of an area measured in hectares whereas production measured in tons. There is difference in production from districts to districts. Mizan-Aman produced 1.038 ton per hectare whereas Maji district produces 0.402 ton per hectare. The average production per hectare was 0.587 tons which is low.

In Bench Maji zone coffee production there was large gap in coffee production among coffee producing districts. In 2016-17 the highest coffee producer area was Mizan Aman which produced more than double compared to the lowest producer Maji.

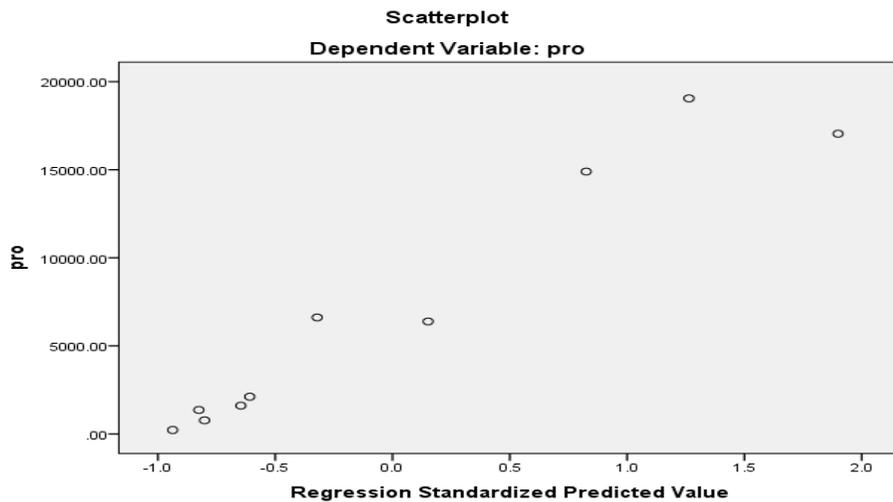
Table: 1 *Size of an area and coffee production of Bench Maji Zone (9 districts and one city Administration) 2016\_17 data.*

Name of districts	Area in hectare	Production in tonnes	Productivity per ha
Semen Bench	13,836	6,384.6	0.461
Debub Bench	27,749	19,049.92	0.686
Sheko	35,698	17,045.7	0.477
Guraferda	22,268	14,896.34	0.669
Shey Bench	7,920	6,613.6	0.835
M. Shasha	3,853	1,605.8	0.417
M.Golidia	4,327	2,113.32	0.488

Maji	1,917	771.7	0.402
Beru	1,612	1362	0.845
Mizan -Aman	215	223	1.038
TOTAL	119,393	70,065.98	0.587

Figure 1 showed the relationship between dependent and independent variables in the diagram. The size of area covered by coffee is being considered the independent variable, affecting coffee production (the dependent variable). The differences in size of an area lead to the difference in coffee production, the relationship between the two variables apparent in the following diagram.

In Figure 1 the size of an area covered with coffee in hectares are plotted along the horizontal axis, coffee production in tonnes is plotted on the vertical axis



Based on the above diagram showed there is the relationship between size of an area covered with coffee and coffee production; but the relationship is not perfect, some values appear below the straight line and also some values appears above the line.

Table: 2 Relationship between sizes of an area covered with coffee and coffee production

Criteria	Value of correlation coefficient	P -value (1-tails)
The area in hectares Vs Production in tonnes	0.965	0.000

Correlation is significant at the 0.05 level (1-tailed).

Correlation coefficient showed that size of an area covered with coffee and coffee production in 2016-17 had strong relationship in Bench Maji zone. the numerical evidence of this relationship in table 2 was correlated strongly 0.965 which is significant at 0.05. This implies that the increment of size of an area influences the production to increase.

Table 3 Testing dependency of coffee production of Bench Maji zone of Ethiopia

Criteria	Intercept	Regression coefficient	t-value	P-value
Regression	293.837	0.562	10.364	000

Simple linear regression model is fit for estimating the coffee production due to change in area in Bench Maji zone of Ethiopia in 2016-17. It was observed in table 3 that production significantly increased by 0.562 with unit change in the area. In the same way Pasala (2017) identified Change in area and productivity both responsible for low production.

**Conclusion**

In the study area, there was high productivity difference among districts (city) Mizan-Aman city administrative productivity per hectares was 1.038 metric tons whereas the low producer area in Bench Maji zone in the study period was Maji district with 0.402 metric tons per hectares. The correlation coefficient showed that there is a strong relationship between size of area covered with coffee and coffee

production. The regression analysis also showed that a unit change in the size of area lead to 0.562 unit times of production increased

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