

The Impact of Population Pressure on Agricultural Land Use in Dirashe Special District, Segen Area People's Zone, Southern Nations, Nationalities and People's Region, Ethiopia

Silitanu Kaytesa, Belayneh Ayechev*

Department of Biology, Arba Minch University,
P. O. Box 21, Arba Minch, Ethiopia

Abstract. Population growth and economic development are contributing many serious environmental blows such as land degradation, deforestation, habitat destruction and loss of biodiversity. The impact of population pressure on agricultural land is a major problem in developing countries, including Ethiopia. Therefore, the intention of this research was to identify the major cause and consequences of population pressure on agricultural land use in Dirashe special district, Segen area People's Zone, Southern Nations Nationality and Peoples Region, Ethiopia. Study sites were selected using purposive sampling techniques, whereas respondents were selected using a systematic random sampling technique. Data were collected through household survey and direct field observation during September 2020. All the collected data were analyzed using SPSS version 20.0 software. The difference in land holding size between sampled households as well as population distribution were computed by Chi-Square test at $P < 0.05$ and percentage. Results are presented in the form of table. According to the respondents' response, high dependency on agriculture 19 (27.14%), uneven population distribution 16 (22.86%) and high population growth rate 15 (21.43%) are the three dominant factors causing population pressure on agricultural land use in the current study area. Land degradation, soil erosion, deforestation, overgrazing, improper cultivation practice, declining of crop yield and food shortage/famine are the predominate consequences of population pressure on agricultural land in the study area. So that, it is important to consistently implement food diversification program based on technology-oriented sustainable agricultural approaches to overcome such food shortages and to reduce population pressure on agricultural land in the area.

Key words/phrases: Agricultural land use, Dirashe special district, population pressure, overgrazing, uneven population distribution

Introduction

There are varieties of challenges facing Africa particularly sub-Saharan Africa of these, high population growth rate is the most predominate one (Jayne *et al.*, 2014). Due to the rapid population growth there is a diminishing of farm sizes for each household. Hence, there is a large impact of population pressure on agricultural land and there is inability of farmers to feed themselves and their families. Population growth and land constraints are noticeable throughout Africa, as most of the rural population resides in densely populated areas (Jayne *et al.*, 2012). Due to the high growth of population, they use intensive agriculture using of pesticides and fertilizers. Over exploitation of land and water resources and use of fertilizers and pesticides have increased many times and important source of contamination of water bodies. Shifting cultivation, intensive agriculture and irrigation contribute to land degradation (Sarapriya & Ishita, 2011).

Over 85% of employment in Ethiopia's economy is depending on agriculture, with the growing population relying on the land for their livelihoods. Environmental changes may be driven by many factors including economic growth, population growth, urbanization, intensification of agriculture, rising energy use and transportation. Both population growth and

*Corresponding Author

economic development are contributing many serious environmental calamities such as land degradation, deforestation, habitat destruction and loss of biodiversity. The impact of population pressure on agricultural land is major problem in Ethiopia. Therefore, the intention of this research was to identify the major cause and consequences of population pressure on agricultural land use in Dirashe special district, Segen area people's zone, Southern Nation Nationality Peoples Region, Ethiopia.

Materials and Methods

Description of the Study Area

The study was conducted in Dirashe Special District, Segen Area People's Zone, Southern Nations Nationality and Peoples Region, Ethiopia. It is located at 550 km from Addis Ababa and 55 km from Arba Minch (Godana *et al.*, 2020). The highest elevation in Dirashe district is 2545 above mean sea level (a.m.s.l) at Mount Gardolla. The main livelihood of the population is based on farming. There are two main rainy seasons which make the district to cultivate biannually. Wheat, barley, grain, teff and coffee are the most crops cultivating in the area.

Selection of the Study Site

Dirashe Woreda has 31 rural kebele and 1 town administration. The researcher has selected two rural kebeles namely Bure Bulishana and Kufana by purposively technique. These two kebeles have relatively higher population growth rate and population pressure on agricultural land than other kebeles in the District (Dirashe District Agricultural Office Report, 2020).

Sample Size and Sampling Techniques

Before taking the actual data, information about the intensity of population pressure on agricultural land and population growth was obtained from the agricultural office of the district. Then from the total of 32 Peasant associations in the District 2 namely, Bure Bulishana and Kufana were purposively selected based on the above information. A total of 70 sample respondents (10%) were taken from the total number of 700 land holder households from Bure Bulishana (385 land owners) and Kufana (315 land owners) Peasant associations following Gay (1996). Proportional number of randomly selected households (Bure Bulishana = 39 and Kufana = 31) were taken using a systematic random sampling technique.

Data Collection

Both primarily and secondary data were used. Primarily data were collected through interviewing population, resources development office and land administration office as well as direct filed observation was made to get background information about the study area. On the other hand, secondary data were collected by reviewing different related literatures. The concrete data collections were carried out during September 2020.

1. Household survey

A questionnaire survey was designed to get socio-demographic data (age, sex, marital status and educational background), to identify the major cause of population pressure, to examine population distribution and also to get the major consequences of population pressure on the agricultural land in the Dirashe special district. The structured questionnaires were prepared using Amharic language in which all of them (respondents) can easily communicate with it.

2. Direct observation

Furthermore, direct field assessment was conducted to acquire information about population distribution and their impact on natural resources, most agricultural practice used in the study area.

Data analysis

Data were analyzed by the computer software SPSS version 20.0 software. The difference in land holding size between sampled households, population distribution were computed by Chi-Square test at $P < 0.05$ and percentage. Finalized data were presented in the form of table.

Results

Socio-Demographic Profile

A majority 38 (54.29%) of the respondents were in the age category between 19 and 39. The age categories of 40-60 and above 60 were also represented by 25 (35.71%) and 7 (10.00%) individual of the total respondents, respectively. Regarding to their educational back grounds, 24 (34.29%) of the respondents are illiterate and the remaining 46 (65.71%) of the total sampled respondents were can read and write. Among the total sampled respondents 61(89%) respondents were males, while the remaining were 9 (11%) were females.

Regarding to the marital status of the respondents, 63 (90%) of the respondents were married while, only 7 (10%) of respondents were single. Most of the respondents 43(61.43%) have house hold members of 3-6 and 19 (27.14%) of the respondents have of 7-9 house hold members, on the other hand 8 (11.43%) have less than three house hold members.

Land Holding Size Sampled Households

There is a greater disparity in farm size among the different households of the respondents. Only a few respondents, 4 (5.7%) have a more land size than others (Table 1). Farmland holdings differed among household members. Thus, there was a significant difference in the size of farmland between house hold members ($X^2 = 19.486$, $df = 3$, $p < 0.05$).

Table 1: Land holding size of sampled house hold

Land holding size in hector	No household	Percentage
0.5-1.15	25	35.71%
1.15-2.15	27	38.57%
2.15-3.15	14	20%
3.15-4.15	4	5.72%
Total	70	100%

Causes of Population Pressure

According to the respondents' response, high dependency on agriculture 19 (27.14%), uneven population distribution 16 (22.86%) and high population growth rate 15 (21.43%) are the three dominant causing population pressure on agricultural land use in the current study area (Table 2).

Table 2: The major cause of population pressure on agriculture land use

Cause of population pressure	No of respondents	Percentage
High dependency on agriculture	19	27.14%
Uneven population distribution	16	22.86%
High population growth rate	15	21.43%

Natural disasters like flooding and degradation	9	12.86%
Low precipitation of environmental protection by farmers	8	11.42%
No idea	3	4.29%
Total	70	100%

Population Distribution

The greater populations, 36 (51.43%), are residence on steep slope, while a small number 2 (2.86%) of respondents were settled on mountainous/top hills of the study area (Table 3). As a result, there was significance difference between distributions of respondents in the study area ($X^2 = 29.600$, $df = 2$, $p < 0.05$).

Table 3: Area of the population settlement in the Woreda

Land features in the study area	No of respondents	Percentages
On steep slopes (hill sides)	36	51.43%
Plateaus	32	45.71%
On mountainous (top hills)	2	2.86%
Total	70	100%

Major Consequence of Population Pressure on Agricultural Land

There are many major consequences of population pressure on agricultural land in study area (Table 4).

Table 4: Consequences of population pressure on agricultural land use in study area

Major consequences	Frequency of respondents	Percentages
Natural resource degradation or depletion (Soil erosion, deforestation, overgrazing & improper cultivation practice)	33	47.14%
Food shortage/famine	17	24.29%
Emigration towards the town	6	8.57%
Declining of crop yield	14	20.00%
Total	70	100%

Discussion

Causes of Population Pressure

High dependency on agriculture, uneven population distribution, and high population growth rate are the most dominant factors causing population pressure on agricultural land use in the current study area. Similarly, studies in Nigeria by Achoja and Omani (2017) indicated that population growth exerts pressure on land use intensity. Hence, population growth leads to land degradation due to continuous cropping without rules governing its access too. If such continuous cropping exists in the area, the soil will become fragile and passed away through rainfall. Likewise rapid population growths in India are highly threatening the environment through intensification of agriculture, uncontrolled growth of urbanization and destruction of natural habitats (Sarabpriya & Ishita, 2011). This research shows majority of the respondents are categorized under adult ages and illiterate, which are productive and use agricultural land intensively, and may result more or less negative impact on land uses. Putri *et al.* (2019) stated that education has a significant role to reduce impacts of population pressure on land use resources and environment condition. There is a greater disparity in farm size among the different households of the respondents (see Table 1). Due to the landscape features and soil

fertility, high densities of populations are associated with smaller farm sizes (Anna *et al.*, 2014).

Major Consequence of Population Pressure

Natural resource degradation or depletion (e.g. soil erosion, deforestation, overgrazing & improper cultivation practice), declining of crop yield, food shortage/famine and peoples emigration towards the town are the major consequence of population pressure on agricultural land. Population pressure on agricultural land and food sufficiency in West Kalimantan have a negative correlation, and such conditions could threaten food security; increasing of population growth affect the requirement of community on the land (Riadi, 2018). The agricultural land is probably narrowed because of the massive conversion to the new land use, such as settlement or another more profitable land use (Putri *et al.*, 2018). Furthermore, population pressure on the land also affects agricultural productivity (Jayne *et al.*, 2014).

Conclusion

Decreasing of crop yield, famine and land degradation are the major consequence of population pressure on agricultural land use in the Dirashe special district. So that it is important to consistently implement food diversification program. Furthermore, it needs to enhance based on technology-oriented sustainable agricultural approaches in the area.

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Conflict of Interest

We have no conflicts of interest in this study.

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