

Review Article

REVIEW OF THE EFFECT OF LAND USE CHANGE ON SOIL PHYSICAL PARAMETERS IN THE GHALND, BEHBAHAN, KHOUZESTAN PROVINCE

***Ali Gholami, Ehsan Bozorgian and Ebrahim Panahpour**

Department of Soil Science, College of Agriculture, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran

**Author for Correspondence*

ABSTRACT

Given the importance of land use change in the world and followed by Iran in the areas of agriculture and natural resources, including rangeland and forest degradation as well as land reclamation is reflected the effects of management on soil quality in the short-term and give the practical solutions for knowledge of sustainable management in each area. This study conducted with goal if the examined the impacts change of land use pasture to agriculture (cultivated dry and irrigated) on some physical properties of soil and land management. Therefore the sampling was carried out in the part of the land Ghaland of Behbahan (Khuzestan province) with an area of 6000 hectares and 0 - 30 cm of soil depth that with the land use change from rangeland to irrigated farming, porosity decreased to 4.8% and bulk density increased by about 0.22%, silt particles increased to 8%, clay particles increases to rate of 8% and sand particles increased to 20%, as well as land use change from pasture to dryland farming porosity is reduced by 15%, and bulk density increased by 0.4%, silt particles increased by 1%, clay particles increased by 4%, sand particles increased by 13%.

Keywords: *Land Use Changes, Physical Parameters, Indicators of Soil Degradation, Ghaland of Behbahan*

INTRODUCTION

Nowadays degradation and deterioration of soil threatens the human well-being and even her/his life. Threatening of soil erosion today is very grimmer than at any other time in history (Brady, 2006). In today's generation were forced farmers to increase food production to meet the needs of a record crowd of more than 2-fold. In low-income countries, the proportion of people to arable land available for use, which are already very high, is rising. While culture in the fertile flat focused lands, is helped to providing more food requirement, many nations have to develop the land under cultivation and act to burning and deforestation in steep slopes and plowing of pastures. The resulting cycle of evil is destruction or degradation of land quality, degradation is caused the reduced product, poverty of human and reduction vegetation on soil, which in turn causes accelerated erosion and many more of the people who needed, makes to cut down trees, plowing and land degradation.

Carter *et al.*, (2007) accordingly, soil degradation is a serious problem in the world right now and it has economic-social harmful effects on the local, regional, national and global level. Dealing with natural resources must be coordinated with the potential for long-term work, that is, the use of this resource must matched by all the phenomena and laws of nature of its survival, if not according to the law, to review the quality of the soil is reduced.

Gholami (2010), degradation and especially the destruction of land is a complex phenomenon and now farming in areas prone, degradation due to factors such as lack of proper use of agricultural land, land use change, rapid population growth, poverty of science and technology of utilization and other factors led to the destruction of habitats, and consequently have been caused by changes in soil physical and chemical properties. In between, the pastures are being of the planet's natural resources that with their multiple and positive roles is benefit to the inhabitants of the earth, so that the life of a large part of the inhabitants of the planet are dependent on these resources. In Iran, the pastures also are generally located in areas that have the high damage potential, the soil in this area for many years is established with the native species and have been the normal returns, but with the tillage out of natural state and become severely degraded,

Review Article

and would not have the lowest yields, whereas changes of uses pasture is major contributing factor to degradation of pasture.

MATERIALS AND METHODS

The Study Area

The study area is part of the land area of the land of Ghaland from Behbahan central city with 6000 hectares that is located in 205 kilometers from the city of Ahwaz in Khuzestan province, and geographically is located between 30 degrees and 36 minutes north and 50 degrees and 14 minutes and 15 seconds eastern than to Greenwich meridian. This city is limited from north to Cohgelooye and Boyer Ahmad province and Ramhormoz, and from eastern to Cohgelooye and Boyer Ahmad province, from western to mahshahr and from south to Booshehr province. Which normally has a capacity rangeland and in recent years have been located under the different applications; conventional management consists of three types: (1) pasture, (2) irrigated land (3) lands under rainfed cultivation, since the study area in terms of geological and physiographic units are located in a single homogeneous and is selected the close point of studying, is quite similar the climatic characteristics, radiographic and physical soil classification in the above-mentioned management systems.

Testing Methods

A total of 30 soil samples was transferred to the Maroon Green laboratory in Behbahan city for defined the physical properties such as (Porosity), (bulk density), (sand percent), (silt percent) and (clay percent) to assess degradation of soil.

Method of Data Analysis

After gathering and recording data in environment Excel software, for statistical analysis is used by the software SPSS16 and Duncan test at the significance level of 5%, and to help of this software are reviewed the presence or absence of significant differences of soil quality indicators between the three use of water land, dry farming and irrigated farming with probability of 95%.

RESULTS AND DISCUSSION

Table 1: Mean comparison physical properties of soils in different land uses in the area

Land Use	Unit	Physical properties
Croplands		
37.2	Percent	Porosity
1.66	gr/cm ³	Bulk density
47	Percent	Sand
44	Percent	Silt
25	Percent	Clay
Pasture		
39	Percent	Porosity
1.38	gr/cm ³	Bulk density
27.6	Percent	Sand
37.2	Percent	Silt
17.8	Percent	Clay
Dryfarming		
37.2	Percent	Porosity
1.66	gr/cm ³	Bulk density
47	Percent	Sand
44	Percent	Silt
25	Percent	Clay

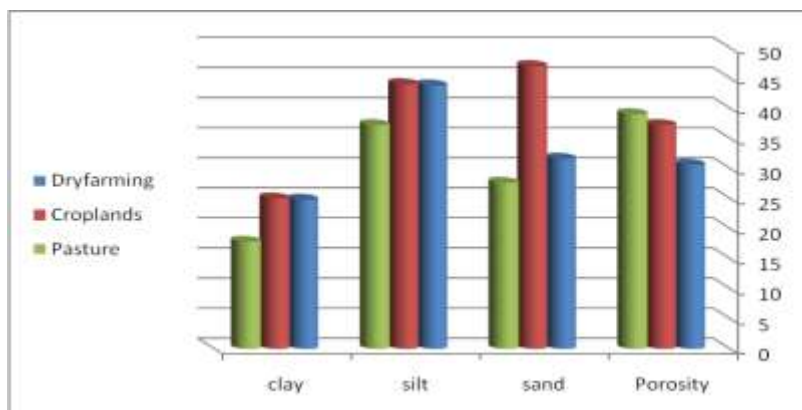


Figure 1: Mean comparison physical properties of soils in different land uses in the area

Review Article

Table 2: Mean comparison physical properties of soils in different land uses in the area

v		Unit	Physical properties
	Dryfarming		
	Pasture		
30.6	39	Percent	Porosity
1.84	1.38	gr/cm ³	Bulk density
31.6	27.6	Percent	Sand
43.8	37.2	Percent	Silt
24.8	17.8	Percent	Clay

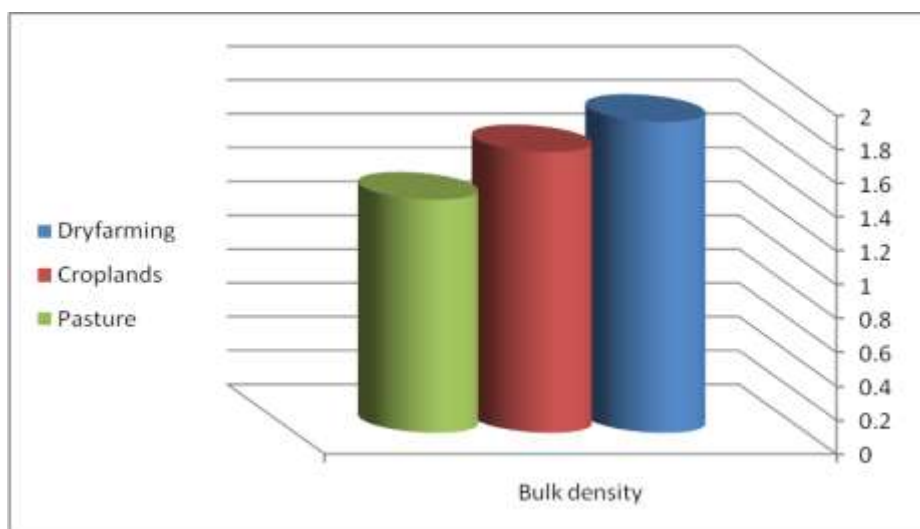


Figure 2: Mean comparison soil bulk density (gr/cm³) in different land uses in the area

Considering Figure 1, Comparison results of physical properties shows that the bulk density was greater in dry lands. Therefore bulk density has increased due to agriculture. The loss of organic matter due to the conversion of Pasture to arable land can be increased bulk density, in addition become aggregate to finer particles and place these particles in the pores of the soil increases soil bulk density. As well as density of surface soil by agricultural machinery and severe farming activities is charged from other reasons for increase soil bulk density in land under cultivation.

Chilick (2005), forest land use change, degraded the soil organic matter and the natural stability of soil aggregates weakens through them susceptible to damage caused by water and wind. When eroded soil particles, fill the soil pores, is reduced the porosity and bulk density increases. According to the results of the survey, conversion Pasture land to agriculture, has been involved the soil compaction layers with increasing bulk density.

the pressure exerted on the ground by livestock in pastures and agricultural tools in the fields also caused by soil compaction and porosity of the soil is reduces, especially in wet soil (Rezaei-nezhad, 2011). Increasing density of the soil as a result of land use changes can cause restrictions in root growth and poorly air and water movement in the soil, and may lead to shallow rooted plants and their poor growth, and the impact on performance of products and reduces the existing vegetation to protect the erosion soil. Soil compaction through reducing water infiltration into the soil can lead to increased runoff and soil erosion on sloping land or water-saturated soils in less steep lands. Disintegration of soil aggregates and

Review Article

increased soil bulk density indicates an increasing loss of soil binder materials, reduced soil biological activity, especially earthworms and plant roots, and is due to the land use change and significant reduction of clay and silt and instead of increasing the amount of sand in the soil texture. The reason may be knowledge the soil erosion, loss of surface layers and exposed the deep layer of the cultivated land, which is consistent with the results Haji and Besalatpour (2007). Also Gholami and Panahpour (2011), in their study observed that during the change of land use is reduced the amount of clay and silt and will be added the content of sand. Also Lal (1994) suggests that water erosion is a selective process, in which fine particles of soil with low density is detached and transferred and will increase the uses of land erosion.

Conclusion

Ghaland Region of Behbahan city in the Khuzestan province according to the importance of agriculture, pastures and diversity of soil physical properties were selected to assess the relationship uses and soil degradation indicators. Using statistical tests, indicators of soil degradation declined in irrigated land and dry land relative to pasture land and soil degradation is much larger in these area. The results obtained of the various parameters of the physical characteristics in 0 – 30 cm depth showed that the effects of land use change between studied users are significantly different on the bulk density of the soil, soil porosity and mineral content of the soil particles. Cultivation and tillage operations after the change of land use in the study area is from important factor in increasing the amount of soil bulk density in land under cultivation.

According to the obtained results in irrigated and dry land and pasture users, could said that if not applied the proper management in users, in the not too distant future, soils in the region are in crisis, and is field for the wind and water erosion and is a serious injury for soil degradation. In the agricultural soils due to tillage over many years have been mixed together the soil horizons and a layer of the same properties over time provides, that this event occurs for horizon of between zero and 15 cm because of dominant the plowing depth in this area. Therefore, in this layer we expect many of the characteristics of the soil has a less coefficient of variation than undisturbed soils with similar genesis. And during the selection process of erosion of the separation of soil particles, are separated the clay and silt particles and transported to downstream areas.

Finally by totalling results obtained suggest that:

Using information obtained from the field of statistics can be used to study the spatial and temporal variation of soil properties, that is very helpful in optimal use of agricultural inputs and preventing environmental pollution.

Proper soil management and conservation practices, because of existence the complex interactions between different soil properties, finally, helps to maintain fertility of the soil and stability of soil structure and as a result will be improved the hydraulic characteristics of land.

Should be in respective planning is considered to government reforms from the exploitation of natural resources, to achieve this, the exploitation of natural resources are required to (particularly use of his indigenous knowledge) restore degraded lands natural resources.

Recommended to prevent from the development and expansion of cultivated land due to created bad effects on soils of region.

REFERENCES

- Brady Nyle C (2006).** *The Natural and Properties of Soil*, first edition, translated By Sab S, Shaheei Member of Scientific Board of Agricultural Faculty University of Kurdis.
- Celik I (2005).** Land-use effects on organic matter and physical properties of soil in a southern Mediterranean highland of Turkey. *Soil and Tillage Research* **83** 270-277.
- Carter MR, Gregorich EG, Anderson DW, Dorn JW, Janson HH and Pierce FJ (2007).** Concept of Soil quality and their significance. In: *Methods for Assessing Soil Quality* (Soil Science Society of America Special publication) Madison, Wisconsin **49**.
- Lal R (1994).** Sustainable land use and soil resilience. In: *Soil Resilience and Sustainable Land Use*, edited by Greenland DJ and Szabolcs I (CAB International) Wallingford, U.K 41-67.

Review Article

Gholami A (2010). Study Area functional changes and their effects on the chemical and physical properties of soil mineralogy and Fereydoun Aghcheh study area. PhD Dissertation, Soil Science, Tehran Science and Research Branch 186.

Gholami A and Panahpour E (2011). Evaluation of Soil Quality-Environment (case study: Aghche Area- Esfahan). *Proceeding of the fifth National conference on Environmental Crisis and its Solution*, Khuzestan Science and Research Branch. Islamic Azad University, Ahvaz, Iran, 3-4 May.

Haji Abasi M and Besalatpour A (2007). The Effect of Changing the pastures to Agricultural Lands on hemo- Physical Characteristics in South and west south of Esfahan. *Journal of Agriculture and Natural Resources Science* (4) 525- 534.

Rezaei-nezhad R, Abtahi A, Zeyn al-dinie E, Zare S and Shahnazari Karbasaraei S (2011). The effect of land-use change on some of the chemical properties of soil. *Proceedings of Iran Twelfth Congress of Soil Science*, Tabriz, 3-5 September.