Influence of Small Scale Irrigation on Selected Soil Chemical Properties

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1. INTRODUCTION

Small scale irrigation agriculture plays significant role to attain food self sufficiency in Ethiopia. As a result, a number of small scale irrigation agriculture are practiced in the country. In humid and sub humid agroecology of western Ethiopia, farmlands used for small scale agriculture are also used in rain-fed agriculture. Therefore, monitoring their effects on soil properties are crucial for sustainability of the system.

Objective: to investigate the effects of small scale irrigation on selected soil chemical properties as compared with their adjacent rain-fed agricultural farmlands.

2. MATERIALS AND METHODS

The study was conducted in 2005 on selected small scale irrigation farms that located in East Wollega Zone of Oromia National Regional State, western Ethiopia. Six small scale irrigation farms (Gabar, Kastemach, Basaka, Nageso, Gibe-Lamu and Lugama) and their adjacent non irrigated farms were selected.

2.1. Soil Sampling and Analysis

A composite soil sample that consisted of 25 sub-samples was collected from the plow layer (0-20 cm). Standard laboratory procedures were followed for sample preparation and analysis of the selected soil chemical properties.

3. RESULTS

3.1. Organic Matter and Total Nitrogen

The organic matter and total nitrogen were lower in irrigated farms than their respective non-irrigated ones in all locations (Fig 1).

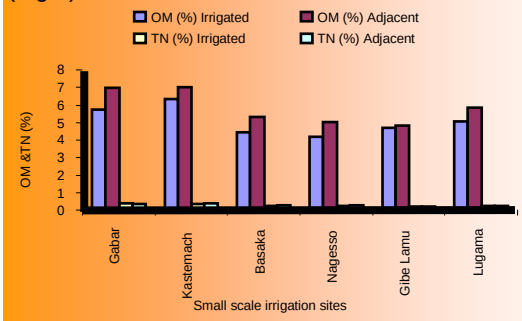

Fig. 1. Status of organic matter and total nitrogen in irrigated and their adjacent non-irrigated farms

3.2. Total Phosphors

Except at one location, total phosphorus was higher in irrigated farms than their counter non-irrigated farms (Fig. 2.)

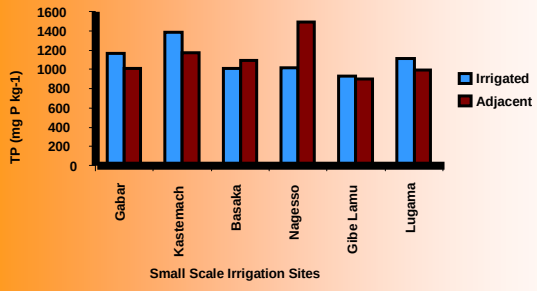

Fig. 2. Status of total phosphorus in irrigated and their adjacent non-irrigated farmlands

3.3. Soil pH and available Phosphorus

Soil pH and available phosphorus were higher in the irrigated farms than their adjacent non-irrigated farms (Fig 3)

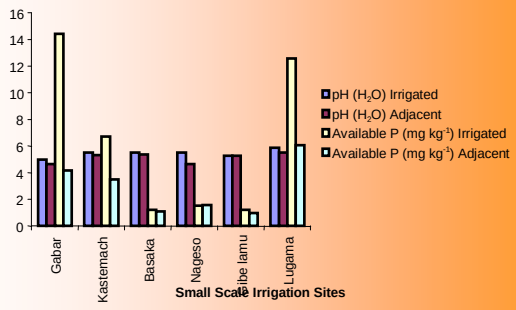

Fig 3. Soil pH and available P in irrigated and adjacent non-irrigated farmlands

3.4. Exchangeable bases, acidity and ECEC

Exchangeable bases were increased in irrigated farms, whereas exchangeable acidity was decreased and vice versa in non-irrigated farmlands (Fig. 4)

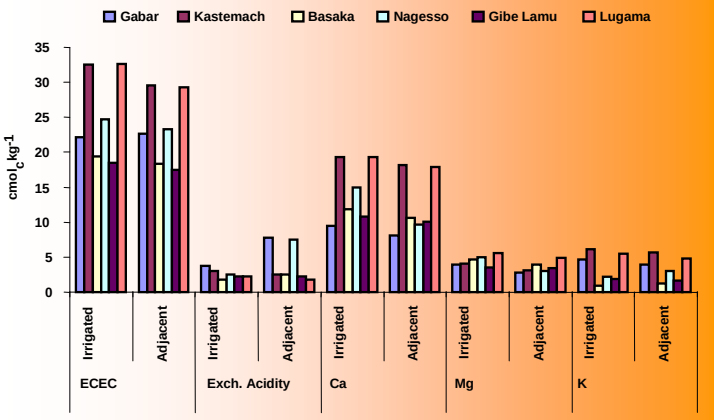

Fig. 4. Effective cation exchange capacity, exchangeable bases and acidity in irrigated and their adjacent non-irrigated farmlands

4. CONCLUSION

Most of the selected soil chemical properties were affected by the small scale irrigation as compared with their adjacent non-irrigated farmlands. Regardless of continuous cultivation through out the years, the values of the investigated soil chemical properties were higher in irrigated farmlands than their respective non-irrigated ones except for organic matter, total N and exchangeable acidity. Most of the selected soil chemical properties were in acceptable ranges in both land use systems. To sustain and/or improve the production and productivity of the small scale irrigation in the region, appropriate soil management practices should be adopted.

5. ACKNOWLEDGEMENT

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