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Influence of Irrigation on Soil Chemical Properties

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Abstract

The study aimed to investigate the likely changes of soil chemical parameters due to irrigation in the irrigated farms in comparison to the adjoining non irrigated farms. It was conducted on selected irrigation schemes in East Wollega Zone of Oromia National Regional State, Ethiopia in the sub-humid agro-ecology. Six irrigation schemes (both traditional and modern) were selected for sampling. These schemes were selected owing to their age in order to assess the long term effect of irrigation on soil properties. In addition, adjoining non irrigated lands were also sampled from each site for comparison. Composite (25 augers) soil samples were collected from the plow layer (0–20 cm) at each irrigation site while standard laboratory procedures were followed in analysing the soil samples.

The study indicated that irrigation increased the soil pH value in all of the sampled irrigated farms as compared to the adjoining non irrigated farms thereby improving the soil quality from more acidic to less acidic. Concurrently, available P and total P were found to be higher for the irrigated samples than for the non irrigated samples. Organic matter and total N content were lower in the irrigated samples. This can be attributed to the higher mineralisation (OM decomposition) rate of irrigated soils. Cation Exchange Capacity (CEC) was found to be slightly lower for the irrigated soils than the non irrigated ones which possibly occurred due to the relatively lower OM content. Individual basic cations (Ca, Mg, K and Na) as well as base saturation percentages were higher for the irrigated soils than for the non irrigated soils. Exchangeable acidity and exchangeable Al have shown a similar pattern to each other. Their concentrations were, in most cases, lower for the irrigated samples as compared to the non irrigated ones. Generally, irrigation has improved most of the soil quality parameters. However, appropriate management options geared at organic matter build up need still to be sought.

Keywords: Irrigation, soil quality