

## Abstract

Participatory diagnosis of soil fertility problems and subsequent experimentation was carried out at Kibwezi Division, Makweni district, using Participatory learning and Action Research (PLAR) methodologies. results of the soil analysis showed that nitrogen (N), phosphorus (P) and carbon (C) were the most limiting nutrients to the crop production. Farmers were excited to learn how to identify deficiency symptoms of N and P by looking at plant leaves. Farmers also identified and implemented practical options under rain-fed and irrigated conditions for solving the soil fertility problems such as use of manure, fertilisers or a combination of both. Fertiliser application at the rate of  $40\text{N} + 40\text{P}_2\text{O}_5 \text{ ha}^{-1}$  and  $60\text{N} + 60\text{P}_2\text{O}_5 \text{ ha}^{-1}$  produced significantly yield responses under rain-fed conditions. However, application of  $20 \text{ t ha}^{-1}$  and  $40 \text{ t ha}^{-1}$  of farm yard manure had no effect on grain yield of maize. Maize gross margins were positive with increasing fertilizer application. Similarly, fresh yields of Chili showed marked yield increasing with increasing fertility conditions. In contrast, onions and tomatoes showed a corresponding smaller yield increase with fertility improvement. Chili, onions and tomatoes had positive gross margins as nutrient application was increased indicating that benefit was higher with increasing fertiliser inputs. The PLAR methodology provided farmers with knowledge and skills that helped them to change their attitude towards soil fertility improvement interventions