

## Abstract

Making best use of available crop residues is an important component of integrated nutrient management. A field study was conducted over two seasons (1997 and 1998) in Kenya that examined use of wheat straw, soybean trash and nitrogen fertiliser as nutrient inputs for maize (*Zea mays* L.) production. The organic inputs were applied at the rate of 2 t ha<sup>-1</sup> per season and urea was added at rates of 0, 20, 40, 80 and 100 kg N ha<sup>-1</sup> in an incomplete factorial treatment structure that also included a complete control (no inputs) and 80 kg N ha<sup>-1</sup> as urea without organic inputs. Maize grain yield ranged between 751 and 6836 kg ha<sup>-1</sup> with lowest yields observed in the treatment receiving wheat straw alone and higher yields associated with soybean residue incorporation and during the second, wetter growing season. The 1998 crop benefited from more favourable rainfall, providing grain yield increase of 141% above control treatment as a result of combining 2 t ha<sup>-1</sup> soybean trash and 100 kg N ha<sup>-1</sup> urea. The generally high yields from soybean trash are explained in terms of its higher quality, faster decomposition and nutrient release compared to the lower quality wheat straw. A positive effect in increases of soil pH, C, N and P status as a result of cumulative use of crop residues was observed. Larger yields were obtained when organic and inorganic inputs were applied to soils, particularly when soil moisture was adequate and the organic inputs higher in mineralisable nutrients. Early indications of additional longer-term benefits through soil quality improvement were also measured. These findings suggest that better use may be made of crop residues than the burning following harvest as is currently practiced by many farmers in this area of western Kenya.