

# **GRONDVRUGBAARHEIDSBEHOEFTE VAN SOJABONE IN ROTASIE MET MIELIES**

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## **Abstract**

The objective of this research is to determine nutritional requirements for soybeans and maize in rotation systems but also to quantify the effects of soybeans to supplement the soil with N but to deplete the soil from P and K, which is important for following maize. An ureplicated 4 N x 4 P x 4 K trial was planted for the six season near Dirkiesdorp. Fertilizer treatments were split three ways for crop rotation i.e. monoculture maize, maize after soya and soya after maize. N treatments were however never applied to soya. Four out of six years could thus far be used in relationships between N applications and yield. For monoculture maize yield responses according to N rates varied between 4.73 and 7.33 kg/ha over years but for maize in rotation with soya between 6.21 and 7.26 kg/ha. Soya in rotation with maize only resulted in higher maize yields at the control plots but not at higher N rates. Soil sampling for N analysis, to a depth of 600mm on all plots was done for the first time during the 2000/2001 season. Excellent soil N responses were measured for all three systems in the top 600mm soil. Inorganic soil N at the control treatments during the season was 50 kg N/ha for both monoculture maize and rotation maize but 110 kg /ha for rotation soya. Relationships between soil N and relative yield were established for monoculture maize and rotation maize, but as was expected, not for rotation soya. Topsoil responses to P applications showed greater depletion of P from the soil for rotation soya, followed by rotation maize and monoculture maize. A relationship between extractable P and relative yield could thus far be established over years for monoculture maize but not for maize rotation or soya rotation. Soil responses to K applications measured to a depth of 600mm showed greater depletion from maize rotation followed by monoculture maize and soya rotation. Although only based on one year's data, significant relationships between extractable K and relative yield could be established for all three systems. Continuation is necessary to obtain reliable relationships between soil measurements and relative yield over years for all elements and systems.