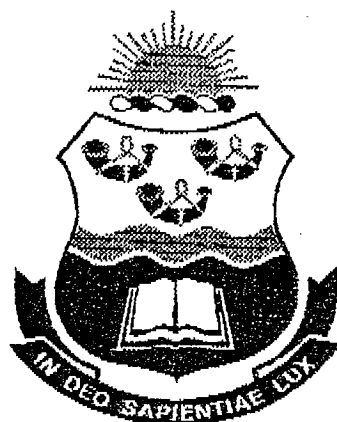


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A RISK ANALYSIS OF A CROP ROTATION TRAIL OF THE SMALL GRAIN INSTITUTE



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ABSTRACT

The Small Grain Institute of the Agricultural Research Council found that the gross margin of maize monoculture was higher than any other crop rotation system tested in a trail. In this paper the effect of different crop rotation systems on the farm's net cash flow are quantified. A whole farm simulation model that incorporates risk was used for this purpose. From a net cash flow point of view the maize monoculture crop rotation system was found to be the riskiest. However, the choice of a crop rotation system depends on the risk preference of the decision-maker since higher risks are also associated with higher profits.

UITTREKSEL

Die Kleingraaninstituut van die Landbounavorsingsraad het in 'n proef bevind dat monokultuur mielies se bruto marge hoër was as enige ander wisselboustelsels. In die artikel word die impak van verskillende wisselboustelsels op die boerderyonderneming se netto kontantvloei gekwantifiseer. 'n Geheelplaassimulasiemodel, wat risiko in ag neem, is vir die doel aangewend. Daar is bevind dat die monokultuur mieliewisselboustelsel die riskantste is uit 'n netto kontantvloei oogpunt. Die keuse van 'n wisselboustelsel hang egter van die risikovoorkoor van die besluitnemer af omdat hoër risiko ook geassosieer word met hoër winste.

1. INTRODUCTION

Monoculture cropping of wheat or maize may lead to various diseases and problems like root diseases, weeds and pests (Nel and Purchase, 1998). This normally results in reduced yields. This increases the risk of economic failure, especially during seasons with below-average or poorly distributed rainfall. According to Nel and Purchase (1998) crop rotation can solve this problem.

In 1991 a crop rotation trail was established at the Small Grain Institute (SGI) of the Agricultural Research Council to determine the potential of different crop rotation systems. Treatments included monocropped maize and wheat and rotations of wheat with lupin, sunflower, fallow land, maize and dry beans (Nel and Purchase, 1998). The preliminary results of the trail show that crop rotation increase grain yield, grain quality and yield stability of wheat significantly. According to Nel and Purchase (1998) the protein content of wheat was increased 12 out of a possible 14 times with crop rotation. Maize yields was also increased with the crop rotation, whilst the protein content was significantly increased in one of the two years of cultivation. The yields of maize and wheat were influenced by a year rotation interaction, with the yield increase due to rotation larger for years with below average rainfall.

Although the above results show significant improvements with crop rotation, these results do not tell the full story. Different crop rotation systems have different impacts on the cash flow of the farming business. For example, when land is left fallow no income is earned from that land for that particular season. When wheat is rotated with maize (i.e. a winter crop with a summer crop) income earnings are lagged.

It is clear from the above that the effects of the different crop rotation systems on the cash flow of farmers should be quantified before it can be recommended to them. It is for this