

VALUE ADDED TO SOYBEAN PRODUCTION

“Although pig farming is the core business enterprise of Benson Farming, soybean production plays a key role in the cycle of farming enterprises in our farming system”, says Mr. Tony Matchett who has been the agricultural manager at Benson Farming Enterprise in the Karkloof area of the midlands of KwaZulu-Natal (KZN) - for nearly 20 years.

Tony explained that their farming system is multifaceted adding value to their soybean production (Figure 1).

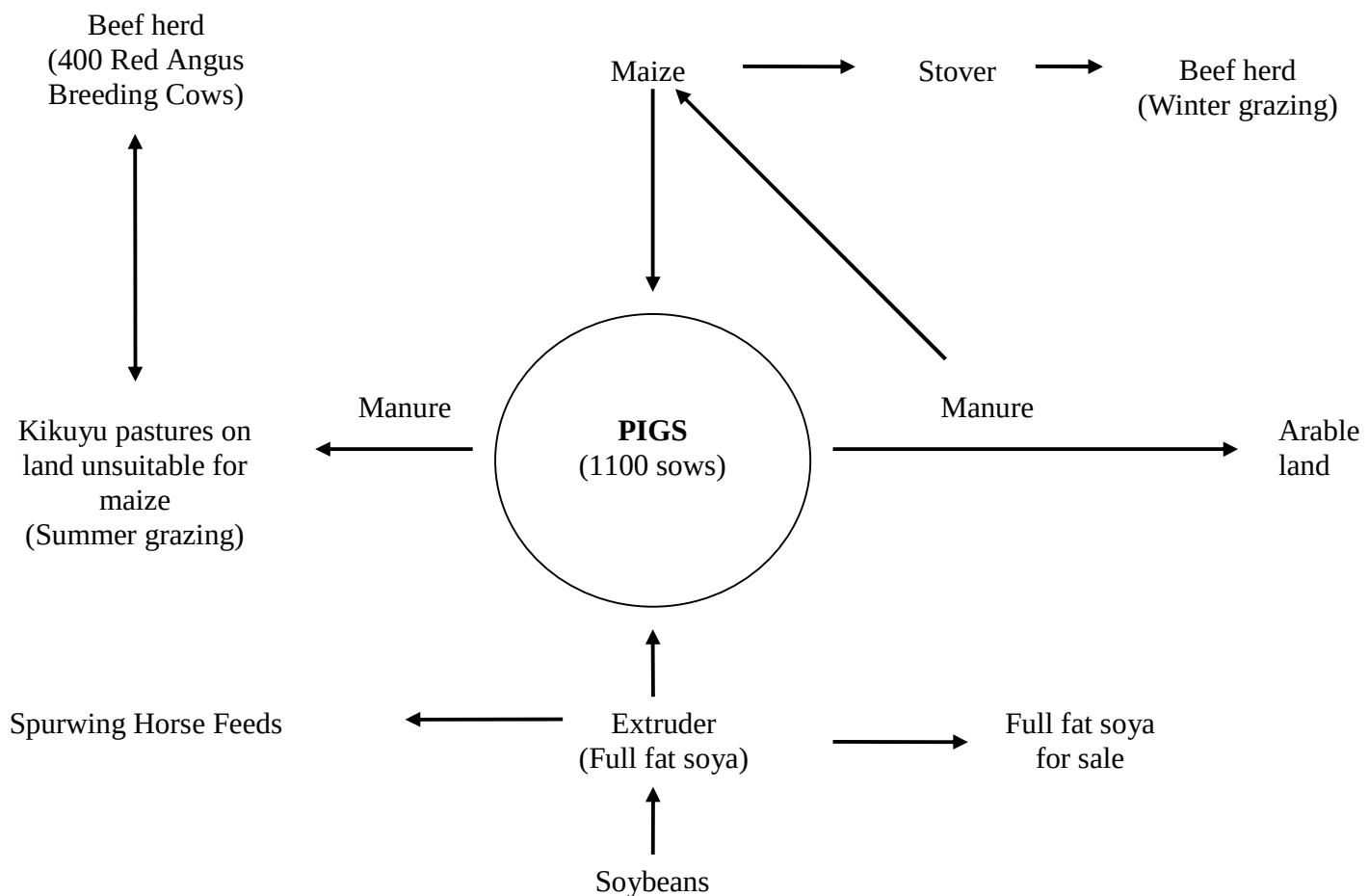


Figure 1. Soybeans play an important role in the Benson Farming system, adding value to the company's soybean production.

Benson Farms have their own extrusion plant where the trypsin inhibitor in the soybeans is expelled, making full fat soya that can be utilized by monogastric animals, e.g., pigs and chickens. Full fat soya from Benson Farms is used in their commercial horse feed (Spurwing Horse Feeds) and to feed the 1100 sows in their pig enterprise (Hogan Stud). Surplus full fat soya is sold commercially.

The other main crop on Benson Farms is maize which, together with soybeans, is also used in the pig feed. They are able to use reduced nitrogen applications on the maize because of the nitrogen fixation advantages of soy's. Average maize yields are 8 tons/ha.

The manure produced by the pigs is put back on the maize lands as well as the kikuyu pastures grown on land unsuitable for maize production which is used as summer grazing for their 400 Red Angus breeding cows. Stover from the maize is used as winter grazing for their beef herd.

Benson Farms have shown that soybean production has many different and often unquantifiable advantages and, used in a value added farming system, can be profitable depending on input costs and the prevailing price of soybeans.

Land preparation and weed control

As no-tillers, no land preparation takes place. Weeds are controlled by spraying glyphosate at 2L/ha approximately three weeks before plant to control winter weeds, if any. This is followed by a second spray of glyphosate approximately two days pre-plant to control Spring weeds. At planting, metalachlor at 1L/ha and a pyrethroid at 40 ml/ha are applied. At approximately 10 days after emergence, glyphosate at 2L/ha, Classic at 20 g /ha and Tronic at 200 ml/ha are applied. Two weeks later another glyphosate application at 2L/ha plus sodium molybdate at 100 g/ha are applied.

Crop rotation

The initial crop rotation was 50:50, maize: soybeans. Ideally a third crop, e.g. wheat, would have been introduced into the rotation but as dryland farmers, this was not practical. So, it was decided to plant a two year maize, one year soya rotation. Due to the poor soya price over the last three years, soybeans were not planted as it was considerably more profitable to produce maize.

Results from a study on maize yields from a soybean-maize rotation, in a no-till system, carried out on the farm by Mr Guy Thibaud, a Specialist Soil Science Researcher from the Department of Agriculture and Environmental Affairs at Cedara, shows the significant differences in yield when this rotation system is followed (Figure 2). There was a significant increase in maize yields when maize was planted following a soybean crop, compared to when maize was planted following a previous maize crop. The nitrogen-fixing characteristics of soybean are clearly visible particularly at the lower nitrogen applications (Figure 2).

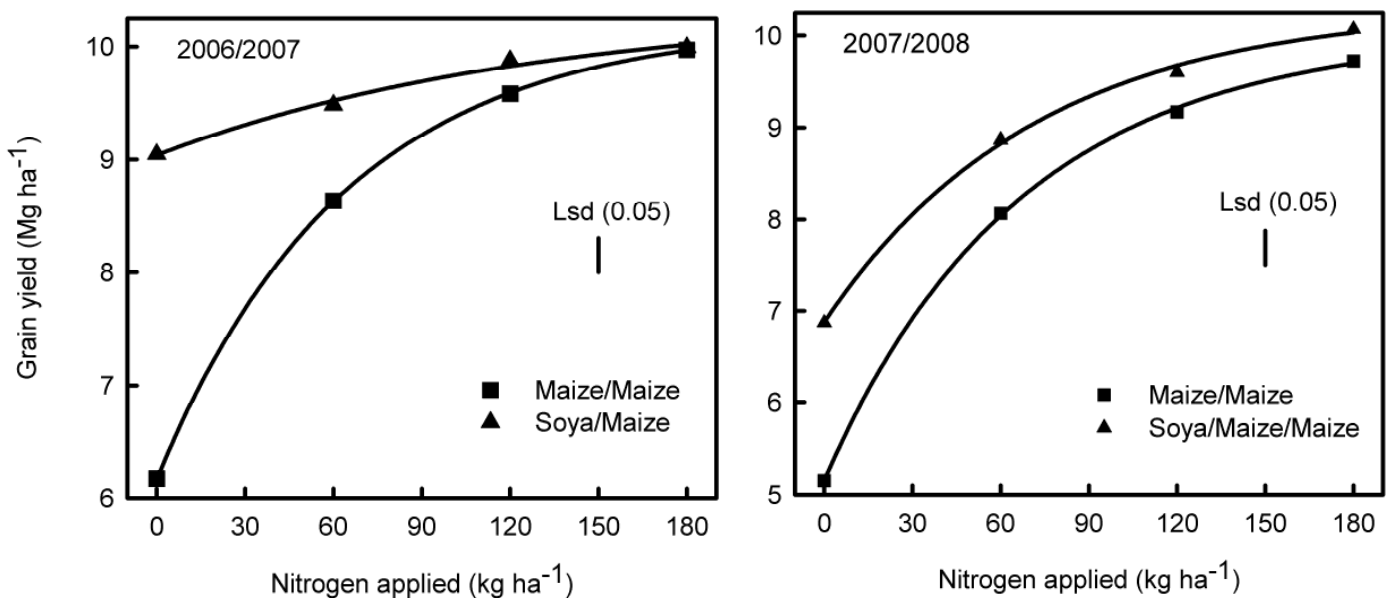


Figure 2. The increased maize yields are clearly visible in the maize:soyabean crop rotation system followed on Benson Farms.

Maize yields were once again significantly higher even when a second maize crop was planted following soy's, compared to when maize followed maize (Figure 2). It appears that in this case, there is not only a nitrogen effect but also an additional benefit, e.g. control of other biotic and/or abiotic factors. Even at the very high nitrogen applications, i.e., 180 kg/ha, yields from maize following maize were lower than when a second maize crop was planted following soybeans. Even after a third consecutive maize crop following soybeans, there was a statistically highly significant beneficial effect of 412 kg/ha maize.

"Soybean production must also be viewed in the bigger agronomic picture of soil health, nitrogen fixation and not just by looking at profit margins. Agronomically speaking, soybean production was not economically viable compared to maize over the past three years", says Tony. "Consequently, we did not plant soybeans. However, lack of a crop rotation system during this time played a marked role in reduced soil health and reduced maize yields on our farm. Because of this, and also with improved soya prices due to the increased demand for biodiesel and a world shortage of protein, we have been encouraged to re-introduce soybeans into the rotation", Tony explained.

With these points in mind, Benson Farms have rescheduled their farming practices for the 2009/2010 season, and have planted 300 ha to maize and 160 ha to soy's, i.e. a 2:1 ratio.

Seed treatments

Molyflo and Eco-T at 100g/100kg seed and inoculation with *Rhizobium* at double the recommended rate, are standard seed treatments. "Because we plant early in the season, the soil is still cold and so we can experience reduced germination, due to seed rotting. Eco-T has helped overcome infections from *Pythium*, *Fusarium*, *Rhizoctonia* and *Phytophthora* and improved germination considerably" says Tony. (Figure 3).



Figure 3. Good germination of soybeans ensures good plant populations in the maize stover from the previous maize crop in the no-till system practiced on Benson Farms.

Planting

No-till has been practiced for 15 years on this farm so direct drilling is the means of planting. RoundUp Ready soy's, i.e., AS 5409 and PAN 1666 are planted in narrow rows, i.e., 38 cm. Although plant populations are dependent on cultivar choice, Tony aims for 450,000 plants/ha in this instance. This allows plants to canopy early in the season reducing weed competition and the number of herbicide applications and consequently costs, as well as giving a noticeable nitrogen spin-off to the following maize crop. In addition, the retention of moisture through lack of soil exposure to direct sunlight is an added advantage of these narrow row spacings. Labourers are well trained to check the seeding rate at planting to ensure a good plant stand (Figure 4).



Figure 4. Labourers open the planting rows with a paint scraper to check that the planter is correctly set to ensure correct plant populations.

Planting takes place from about the 20th October to 20th November provided there has been sufficient rain. Planting during these four weeks has been found to give the highest yields based on experience at Benson Farms and other soya farmers in the Karkloof area. Based on the 1200 mm rainfall per annum in the area, only dryland soy's are planted.

Fertilizer applications

Soy's are planted with a fertilizer blend of 1:2:3 (38) with zinc at 240 kg/ha.

Control of diseases and insect pests

Sclerotinia and other soybean diseases can be a problem because of the optimum microclimate created by the narrow row spacings. As soybean rust is endemic to the area, Punch Xtra is sprayed as a preventative spray at 800 ml/ha at flowering and then again 28 days later. A synthetic pyrethroid is used to control bollworm where necessary.

Yield

The average yield for soybeans is 2.8 tons/ha which indicates that the agronomic principles used on Benson Farms work well. The added value farming practices related to soybean production increase profit margins making Benson Farms a highly successful operation carrying much pride together with hard work based on sound agronomic practices.

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