



COST OF VARIOUS TILLAGE SYSTEMS FOR MAIZE PRODUCTION

by A.J. Arathoon, C.G. Archer, S.R. Bezuidenhout and A.J. Kent

INTRODUCTION: Crop establishment and the associated capital outlay in equipment, as well as the costs of using the equipment, form a major part of a farm budget. These costs will vary according to different tillage systems.

AIM: To determine the input costs of four tillage systems for the establishment of maize.

METHODS: The crop establishment costs included equipment costs, labour, applications of pre-emergence herbicides (including a glyphosate application to kill the weeds in the No-till system) and an insecticide for cutworm control. No costs were included for post-emergence herbicide applications, stalk-borer control, fungicide applications and harvesting, as these costs would have been the same for all the tillage systems. However, the cost of an additional 40 kg/ha nitrogen, applied as a side-dressing, was included for the No-till operation, because there is a yield response to higher nitrogen application rates.

RESULTS:

- Capital outlay, equipment costs, labour costs, and the number of hours per hectare and litres of fuel per hectare, decreased as the tillage systems changed from Conventional ploughing to No-till (Table 1).
- The cost of the glyphosate application and the additional nitrogen required for No-till resulted in this system having the highest cultivation cost.

TABLE 1 Capital outlay, cultivation costs, number of hours and litres of fuel required per hectare for four tillage systems

Tillage System	Capital Outlay (Rand)	Total Costs per Hectare (Rand)					Total Hours per Hectare	Total Fuel per Hectare (Litres)
		Equipment	Labour	Equipment + Labour	Agro-chemicals and Nitrogen	Cultivation		
Conventional (disc, plough and disc)	2 332 167	2 636.14	119.14	2 755.27	676.73	3 432.00	4.74	53.43
Chisel Plough and Disc	2 368 797	2 414.08	109.25	2 523.33	676.73	3 200.06	4.22	46.60
Stubble Mulch (Chisel plough)	2 228 067	1 876.44	86.45	1 962.89	676.73	2 639.62	3.02	30.83
No-Till	1 382 692	1 514.51	79.14	1 593.65	1617.66	3 211.31	2.38	20.34

CONCLUSION:

- No-till requires less capital outlay, labour and fuel than the other tillage systems, because less equipment and operations are used.
- The time spent in land preparation and planting of the No-till crop is less than with the other tillage systems.
- The additional nitrogen and herbicide costs required for No-till resulted in a similar establishment cost to the Chisel Plough and Disc system. However, the benefits obtained from conserving soil, nutrients and soil moisture with No-till outweigh those of the conventional ploughing systems. The higher levels of soil moisture conserved with No-till can result in yield benefits of ≥ 2 t/ha in dry seasons.