To evaluate the role of conservation farming as part of national and regional strategies to conserve biological diversity in South Africa.

The main achievement of the Conservation Farming Project was to provide a sound basis for evaluating the role of conservation farming in strategies to conserve biological diversity. Other projects funded by the GEF and CEPF in South Africa have already established that conservation on private land is an essential component of national and regional conservation strategies. This project showed how and where conservation farming can make a contribution.

- The clearest outcome was the case for Succulent Thicket. Here game farming has a clear biodiversity benefit, which is also more financially viable than goat farming, and corresponds to the greatest carbon benefit. The win-win outcome suggests that conservation farming can play an important role in conservation strategies.
- In Nieuwoudtville, there is a definite biodiversity benefit associated with practices that retain existing vegetation remnants and where the veld is periodically rested from grazing. However, these farming practices result in a financial loss for farmers unless they are able to increase revenue from ecotourism. Conservation strategies in this region therefore need to find ways of compensating farmers for lost income or increasing farmers’ access to revenue from ecotourism.
- In the southern Drakensberg, conservation farming practices occur within the context of dramatic conversions in land use from extensive rangelands to either afforestation or high intensity dairy farming. Although conservation farming provides benefits in terms of biodiversity, water provision, and carbon sequestration, there are limited benefits for farmers. Security problems, the high value of land, and the expansion of forestry have created a dynamic situation where land use and conservation planning are far more important for effective conservation strategies than the implementation of conservation farming practices.
- Finally, in the Nama Karoo, we were unable to discern any clear benefit associated with different grazing systems. However, Karoo ecosystems are known to take up to 40 years to respond to changes and part of the strategy for this area should be to monitor the status of biodiversity under different grazing systems.

III. Summary of Main Lessons Learned

- All farming systems have an impact on biodiversity, but some are better than others. However, it is important to develop objective criteria for assessments because factors such as land use history and the location of the farm (e.g. heterogeneity) can obscure the impacts of current land use.
- Farmers generally care about the environment and most view themselves as conservation farmers. This is partly due to confusion regarding what they are trying to conserve (soil, agricultural resources, or biodiversity) and it is important to make the case for biodiversity conservation more explicit.
- The social component of the study showed that land use decision making is a complex process that is influenced by a variety of needs and satisfiers. In addition to financial reasons, farmers may pursue certain practices because of support networks (extension services, social networks), quality of life decisions, or security needs. The mainstreaming of biodiversity in the agricultural sector needs to take this into consideration when developing enabling mechanisms.
- A review of past successes in conservation farming showed that enabling mechanisms (subsidies, extension services, research) were more effective at achieving a change in
behaviour than legal instruments, which were seldom applied. The challenge is to provide enabling mechanisms that focus on biodiversity.

Farmers identified three relatively simple needs that would enable them to accommodate biodiversity in their farming practices. These needs should be addressed by the newly formed South African National Biodiversity Institute.

- Information on WHAT biodiversity occurs on their farms
- Information on the IMPACT of farming practices on biodiversity
- Information on ALTERNATIVES. Most farmers articulate this as a need for further RESEARCH on sustainable land use practices

At present farmers do not derive any benefit from the downstream value of ecosystem services (water provision, carbon sequestration). Land use decisions in places like the Drakensberg may be quite different if water provision and carbon sequestration provided financial benefits to farmers.

The benefits to farmers from local (on farm) use of ecosystem services (pest control, soil health) is often too obscure to elicit a change in behaviour. This may be possible for services such as pollination, but is hard to demonstrate for many other services, especially services that may have different values at local and regional scales (e.g. water infiltration)

Conservation farming practices are often linked to charismatic individuals with a good understanding of the ecology of their farms. Unless their insights and ideas are more widely adopted in the community, the conservation value of the land will decline when the land passes on to new owners.

Farmers are inherently experimental, but often do not properly assess the outcomes of their experiments, either on farm production or the environment. Many farmers expressed interest in a research format that links scientists with farmers to test their ideas more rigorously. This should be taken up by research groups in South Africa.

Appendix A.
List of reports and publications arising from the Conservation Farming Project. (30 March 2004)

Scientific papers

1 Aug 2006 Extracts from final report of Cons Farm Project for information purposes
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Manuscripts under review

1. Bragg C.J. & Donaldson, J.S. Effects of porcupine foraging behaviour on the diversity and abundance of geophytes in a variegated agricultural landscape


3. Kerley, G.H., Landman, M., Schoeman, D.S. The effect of transformation on browse availability for indigenous (kudu, bushbuck, duiker) and introduced domestic herbivores (goats) in subtropical thicket, South Africa.


9. Mills, A.J., Kgope, B., Fey, M. & Donaldson, J.S. Can soil respiration be used as an early warning of impaired ecosystem functioning: investigations in karoo, thicket and grassland biomes of South Africa


12. O’Farrell, P., Donaldson, J.S. Using landscape function analysis and rainfall simulation to determine resource loss under three different grazing systems in the Nama Karoo


15. Perrot, N. & Donaldson, J.S. Effects of soils, land use and moisture availability on the dispersal and establishment of Brunsvigia bosmanae in a variegated landscape.


17. Theron L-J., Donaldson, J. Vegetation types in relation to soil and climatic variables in the central Nama-Karoo

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19. Todd, S & Donaldson, J.S. Plant communities of the van Rhynsdorp shale Renosterveld vegetation in relation to substrate on the Bokkeveld Plateau
20. Todd, S. Plant species richness and cover in relation to livestock watering points
21. Todd, S. The piosphere as a fingerprint of land use pattern. The impact of livestock watering points on plant cover and species richness on four ranches in the central lower Karoo, South Africa.
22. Todd, S. Plant species diversity and growth form richness in relation to substrate and landform. Landscape-diversity relations in the Central Lower Karoo, a semi arid region in South Africa.
23. Todd, S. & Donaldson, J.S. Current and potential future levels of vegetation transformation around Nieuwoudtville on the Bokkeveld Plateau, a hotspot of plant diversity and endemism.
24. Todd, S. & Donaldson, J.S. Species richness, endemism and growth form composition of Renosterveld vegetation in relation to substrate on the Bokkeveld Plateau
25. Wildy, E.J. Effect of different land use practices on invertebrate diversity in Underberg, KwaZulu-Natal, South Africa.

Technical Reports

2. Ellis F. Report on a soil investigation of selected trial areas in the Nieuwoudtville region of the Northern Cape Province
13. Robertson, H.G., van Noort, S. Effects of agricultural practices on ants and other Hymenoptera in four farming areas of South Africa.
14. Robertson, H.G Hymenoptera and plant species lists for the four study farms at Beaufort West.
15. Skowno, A. Classifying and mapping renosterveld vegetation and transformation around the town of Nieuwoudtville in the Northern Cape Province, South Africa.
18. Todd, S. Final Report to the Conservation Farming Project, Beaufort West Study Site.
20. Turpie, J.K. An ecological-economic appraisal of conservation on commercial farm land in four areas of South Africa

Theses

2. Kamineth, A. Forage availability for boer goats (Capra aegagrus) and bushbuck (Tragelaphus scriptus) in transformed and untransformed Thicket. – Hons. Project, UPE.

Popular publications
1. Bragg C. Porcupines: Are they a gnawing nuisance or valuable varmints. Farmers Weekly

Books
1. Essler K., Milton S., Dean R. (in preparation) Karoo veld Ecology. (with contributions from the Conservation Farming Project

Conference proceedings.

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