

THE IMPORTANCE OF CONSERVATION AGRICULTURE (CA) RESEARCH AND CASSAVA PRODUCTION FOR FOOD SECURITY

In recent years, the Mechanisation Division of the Agricultural Research Council - Institute for Agricultural Engineering (ARC-IAE) has focused its research efforts on specific areas such as conservation agriculture research and mechanised cassava production.

The vast majority of arable soils in South Africa area have been exposed to many years of conventional soil tillage methods that have resulted in degraded soils with low quality status. Application of conventional soil tillage methods for many years, with a mouldboard plough as the most commonly used implement, is a fundamental cause of soil degradation. Rigorous and continuous manipulation of soil destroys soil structure, leading to reduced soil-water-holding capacity, soil fertility and declining population of beneficial soil organisms. The challenge is to restore these soils to be more fertile, biologically balanced, nutritionally healthy and productive.

As conventional production methods have negative effects on all the components of soil quality, the search for an alternative system to ensure better sustainability of the land has become a high priority issue. In addition, most of the production systems are characterised by mono-cropping at the expense of more sustainable practices. In this context conservation agriculture (CA), which thrives on three major pillars of minimum or no-tillage, permanent soil cover and crop rotation, is seen as the alternative that can significantly not only improves soil quality, but also contributes to more economically viable farming systems that are environmentally friendly and sustainable.

The Institute for Agricultural Engineering has competent researchers that provide technical expertise in the no-till aspect of CA mechanisation especially in the areas of development, testing, calibration, modification, operation, repairs and maintenance of CA planters and sprayers. Additionally, the Division supports the training of farmer's regarding sprayer pre-check, calibration and operation methodology, basic environmental awareness principles, maintenance of sprayers and safe handling of chemicals. Planter operation and training consist of pre-check of the planter components before planting, basic planting principles, field setting, calibration methodology, and planter maintenance and repairs are taught to farmers.



ARC staff explaining the practice and experience of CA at a test site during a farmers' day



Inspecting components and working principles of CA planter during a farmer's day.

Mechanised cassava production

The Division is involved in the mechanisation technology transfer training for emerging farmers with focus on mechanised cassava plantation development in South Africa. Cassava is a lesser-known climate resilient crop in this country. Farmers are trained on mechanised production techniques in the sub-tropical areas, where there is comparative advantage for the growth of cassava and other root and tuber crops.

Experimental plots on pilot basis have been established at Empangeni in KwaZulu Natal, Nelspruit at Mpumalanga, University of Venda in Limpopo Provinces and IAE experimental farm at Silverton. Seedbed have been prepared and cassava planted on ridges to comply with mechanical harvesting at crop maturity especially during the dry season, when the ground is hard. Local planting materials have been sourced from farmers in pilot districts. Extension officers were trained on correct planting of the cassava cuttings to avoid node reversal at crop establishment. Drudgery evaluation in all the activities from land preparation, crop establishment through crop care and farm sanitation to harvesting are being monitored and evaluated.



Mechanised Cassava field plantation at Venda



The Mechanical Cassava Harvester



Mechanical cassava harvester testing for a field ploughing experiment at VOPI



Mechanical cassava harvesting during the peak of the dry season

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