STRATEGY OF THE MAIZE FORUM AND MAIZE TRUST FOR CONSERVATION AGRICULTURE RESEARCH AND PROMOTION IN SOUTH AFRICA

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Introduction to the Strategy

The Strategy for Conservation Agriculture Research of the Maize Forum (endorsed by the Maize Trust) comprises a Vision, Mission, Goals and Objectives. The practical application of research, adopting of principles and mind-change of farmers, as well as the mutually beneficial collaboration and networking amongst researchers from government departments, the ARC and Institutes, universities, agricultural input companies in South Africa, and international research data, are fundamental to the success of this strategy.

The Maize Forum envisages that the effective implementation of the Strategy would lead to the creation of a virtual Centre of Excellence for Conservation Agriculture Research in Maize (and other agricultural crops) in South Africa by 2014.

Elements of the strategy

1. Vision for Conservation Agriculture Research

   To produce more maize (food) on less land by making more efficient use of natural resources and with minimal impact on the environment.

2. Mission for Conservation Agriculture Research

   It is the mission of the Maize Forum to co-ordinate and provide resources for relevant research activities, facilitate practical applications and to harness farmers with useful information as a practical tool to use in Conservation Agriculture production system.

3. Goal for Conservation Agriculture Research

   - improve production, stabilise yields, productivity and income of farmers within a real energy conservation framework;
   - sustain and preserve South Africa's natural resources;
   - improve South African producer's competitiveness globally, and
   - benefit present and future generations.

   The focus of this strategic objective is to improve the efficient use of agriculture's natural resources for food production, ensure their sustainable use and management, reduce poverty

and increase the wealth of people and industries dependent on natural resource-based agriculture. The strategy will be to support the national strategy to accelerate the adoption of CA principles, mobilize, motivate, inspire, inform, empower and enable commercial, emerging and small scale farmers to promote and adopt conservation agriculture and practices in their production systems.

Main objectives

The objectives will be obtained in the following three areas:

(1). Co-ordination of basic scientific research projects: The funding of the activities and monitoring of the results. This will be done by the ARC institutes, Universities and post graduate students. This will also include literature studies of international research projects of CA. Research experts will play a key role in farmer field experiments in planning, design, observations, analysing and interpretation of results.

(2). Co-ordination of practical application, adoption and implementation of CA in the maize production areas in South Africa for commercial, development and small scale farmers. This will include farmer's trials and demonstrations, input suppliers and local advisers such as agricultural companies, fertilizer and chemical experts, seed company technical teams and local expert groups.

(3). Co-ordination, editing, grouping and publishing of information in popular agricultural magazines. The objective is to categorise information and to focus on area and soil type in order to help farmers select relevant information for specific applications. Assigning and initiating information topics to agricultural journalists and co-operatives. The objective is to develop a Field Management Guide or a Field Use Plan per area.

Goals and objectives of the research strategy:

The strive should be to develop research and development programmes to provide a common framework of knowledge, including a set of indicators for information collection and dissemination, that:

(i) quantifies and demonstrates the link between CA and soil health and confirms all the other benefits
(ii) compares the technical, social, economic and environmental benefits of CA for farmers with conventional agricultural practices,
(iii) ensures continuing improvements in CA over time; and
(iv) allows for integration of CA into farming systems.

National strategy:

Fowler, in 2005, reported the following: “To attain the maximum benefits from this revolution, however, commitment and dedication needs to be obtained and is essential from all levels starting with the Minister. A small dedicated conservation agriculture unit of professionals needs to be established, with its sole mandate being to promote the adoption of conservation agriculture in South Africa. This unit should preferably be outside of any existing structure and independent of any outside interference. It should be advised by a team including leaders in government (agriculture, environmental and water affairs, etc. drawn from national, provincial and municipal structures), finance, commerce, industry and especially farming, and so funded that it has maximum unfettered ability to inspire, inform, empower and enable small scale, emerging and existing commercial farmers to promote and adopt conservation agriculture principles and practices in their production systems”.

South Africa needs to formulate a National Programme by first reviewing all national policies and legislation in the light of this new understanding of agriculture as a strategic, holistic and integrated management of agricultural processes. There is a need to create awareness among especially senior Government leaders, departmental and university administrators and advisers, large and medium farmers, emerging and small-scale farmers, and consumers of the advantages of adopting conservation agriculture.

It is the strategy of the Maize Trust to support and co-operate in such a conservation agriculture unit of professionals.

Industry research strategies include:

- Participatory, farmer-centered research and development;
- greater assumption of responsibilities for agricultural innovation by farmer organisations, including catchment groups, and individual farmers;
- engaging the best modern scientific expertise for better understanding of underground processes and potentials driven by roots and soil biota;
- creation of incentives and certification of sustainable agriculture practices to recognize societal benefits and encourage uptake of sustainable farming systems; and
- establishment of a network and of bringing together diverse stakeholders around the world to give concerted support for changing mindsets, expanding institutional investments, sharing knowledge and experience, and promoting best practices.

Strategic issues

CA is characterized by three central principles of minimum soil disturbance, soil cover and crop rotations; but there are many specific technologies that have to be appropriately selected and

combined to apply the three principles in practice in ways that are attractive to farmers in very different agro-ecological settings. Whatever the technology combinations; good crop, land and livestock must be managed properly so that the system can function properly. CA is not a static technology but a dynamic system that will differ depending on biophysical and socio-economic conditions, and will evolve over time. Research programmess must respond to this need. Diverse providers and investors need to be involved in science and technology development for CA, including international agencies, multi-donor programmes, NGOs, government staff, academic institutions, commercial companies (seed, fertilizer, chemical, equipment) and agribusinesses, each bringing different expertise but achieving synergy through using common disciplines and indicator sets.

Research information

Before initiating research programmes, extensive evaluation of the existing scientific, popular literature and personal interviews needs to be undertaken. There is sufficient knowledge and information available locally and abroad, whereby this can be collated into production guidelines. Using these guidelines, the possibility of failure will be greatly reduced. For example, there can be guidelines for production, herbicides, pesticides, potential cover crops, etc.

The most important aspect in all of these recommendations is not to re-invent the wheel.

Care will have to be taken, however, to ensure that research is orientated towards the most pressing problems. This will require extensive and close consultation and co-operation by and between all stakeholders, especially farmers. On-farm participatory trials should also be an important component. Wherever possible research initiatives should be designed and undertaken by representative multi-disciplinary teams. Sufficient funding must be available as the systems being investigated may take many years to stabilise.

New SA agricultural project for Argentina's INTA

Argentina's National Institute of Agricultural Technology (INTA) announced plans to launch a South African agricultural project. INTA would be working in four experimental areas on Argentina's Southern Hemisphere competitor's home turf, aiming to share knowledge and explore new business opportunities. Included in this agreement, INTA disclosed to Grain SA all relevant CA research information that is available.

Co-ordination of basic scientific research projects:

This is a long-term investigation. Carefully selected areas should be identified and progress needs to be monitored.

The criteria for evaluation of basic research projects:

- The main objective of the research project needs to promote the principles of Conservation Agriculture.
- Maize, in combination with rotating crops, should be the main crop.
- Treatment of the experiments should not focus on practices that will adversely affect the practices of Conservation Agriculture e.g. burning, ploughing, disking or removing of organic material.
- The experiment needs to be carried out with interaction by a CA farmer in field conditions. Part of the experiment could take place in a glass house, but the results still need to be applied in practice.
- The application of the results should be multidisciplinary e.g. herbicide, pesticide, nutrition, et cetera.
- The duplication of research areas needs to be minimized.
- Personal development for PhD students, as experts in the future, will be important.
- The research projects need to address and identify key problem areas.
- The design of the research projects needs to focus on sustainability.
- The results of the research need to contribute to a *Land Use Plan* or *Field Management Manual*.
- The research information needs to be linked with international research results and literature and not duplicate research which has already been done.

Improve the information and knowledge management system

There is a lot of misconception about Conservation Agriculture and CA institutions in South Africa. Better information is necessary to promote the knowledge (and diffuse the misconceptions) on new methods of practicing sustainable agriculture using CA practices in South Africa. Every effort has to be made to bring publications, knowledge and CA technology to relevant institutions, researchers, advisers and farmers. Information needs to be categorised per agro-ecological zone (production area, soil and environmental conditions) and so presented in order to prevent misunderstanding and confusion. Information is the keystone in the CA system, especially as, although the CA principles are the same as in any part of the world, site-specific information plays an important role in achieving success.

The creation of a well structured website will be useful.

Experience has shown that farmers, in general, do not read lengthy papers and information must be short and contain actual, useful and practical information. It is recommended that several papers, of one or maximum two pages (front and back) be prepared and distributed among farmers at field days, workshops, conferences, etc. (Nampo Harvest Day). The papers could be placed in boxes and each

farmer can take the ones that are most relevant for his/her needs. In all instances the papers should be prepared by local technicians and experts, translated where necessary into appropriate languages, and their contents checked by a central co-ordinating group to ensure uniformity.

One of the main goals of these short publications is to change the mindset of farmers, but also that of extension officers, technicians, scientists and politicians. Some publications should focus on technical aspects to avoid failure when going into the CA technology. Farm magazines and agricultural sections of newspapers could publish these papers and help in the education process.

Education and information through the media is also important. Here it should be considered that massive multi-media approaches can be used to disseminate the CA technology among medium and big farmers, but at the same time individual advice by advisers and "experts" are also needed. In the case of smallholder farmers, strategies for massive adoption are not adequate and the individual orientation of farmers over several years is necessary to avoid failures, as it may otherwise result in discrediting the technology and possibly not adopting the CA system.

Education

An effort should be made to bring Conservation Agriculture into the curriculum of universities and agricultural schools. Without a commitment from the universities and research centres to try innovative ideas and to do away with conventional thinking, the process of technology development and transfer will be very slow. Multidisciplinary research is very important to support CA principles in the long-term. Besides soil science, it is necessary to have support of the different agronomic fields (plant breeding, crop science, agricultural engineer, plant pathology, weed science, etc.).

Education of farmers, advisers, researchers and the public at large

Adoption of CA is a permanent learning process and the best adviser is a successful CA farmer in a similar environment. Successful CA commercial farmers may adopt a social responsibility towards fellow and small farmers in showing them how the system works and in sharing experiences and information with them, as well as advising them on how to implement it on their farms. Despite successful demonstrations by fellow farmers, there still seems to be resistance to the adoption of CA. This lack of trust should be investigated and addressed.

Co-ordination of practical application, adoption and implementation of CA in the maize production areas in South Africa:

The Maize Trust assigned a co-ordinator for Conservation Agriculture research. However, the drive for adoption and promotion of Conservation Agriculture will primarily be Grain SA's function. The responsibility of co-ordinating and consulting may include:

- Harmonizing all relevant resources in support of the adoption of Conservation Agriculture. A paradigm shift would require the disruption of centuries of mental compaction and the empowerment of farmers. Farmers would need to farm in harmony with nature - not try to master it, and all role-players, policy-makers, educationists, researchers, advisers AND farmers would need to recognize that the choice of each component of a system must be that of the farmer him/herself, not the adviser. The role of the adviser must be to ensure that the farmer is aware of the widest range of potential solutions and their implications.
- Assess the status of the implementation of CA in the defined areas, referring to a number of farmers, area (hectares), levels of implementation and active groups. Mapping uniform production areas with uniform soil and environmental conditions. Categorise farmers in commercial, development and smallholder groups. The transforming strategy's approach and information will differ for the various categories. Believing that such a survey could best be conducted by sampling the maize farmer members of Grain SA. Sending out a relatively simple questionnaire to all members enquiring about their cultivation system, crop residue and crop rotation practices.
- Ensure that farmers assume a leading role in the process, developing an appropriate local, national and regional CA network/task force to facilitate capacity building, sharing of knowledge and active mutual learning.
- Promoting, stimulating and encouraging the forming of farmer groups. Identify innovators, producers that are hungry to change to CA practices and will share knowledge, experience and support with each other. Determine specific needs for each group and make sure the technology ownership belongs to the group and that their specific needs are addressed within the framework of CA principles. The progress of adoption and implementation of CA will be community driven; processed information will be owned by the people.
- Introduce mechanisms which provide incentives for farmers to change their production system to Conservation Agriculture. For small-scale, risk-averse farmers especially, introducing CA will often be stimulated by providing targeted incentives, fair cost-sharing and risk protection arrangements over several years. These may be perceived as an appropriate compensation for the many eco-services that adoption of CA is likely to generate for the benefit of society at large. Provide small-scale, risk-averse farmers with targeted incentives or cost-sharing to help them overcome a slow start-up of CA; and cover the costs and risks of learning and adapting technology to their particular conditions.
- The objective for smallholder farmers will be to transfer knowledge, demonstrate successful practices, and lobby financial recourses and sponsors for inputs, machinery and infrastructure expenses (fences). The approach will be to identify and respect the empowerment hierarchy and key role-players and decision makers to get commitment. This may be the Chief, Captain, or other recognized community leaders.
- Small Scale Demonstration Plots. "Seeing is believing". It is suggested that initially small plots of 0,1 – 0,25 ha be used to practice and demonstrate on and then these plots can be

increased in some places to 2,0 ha to demonstrate the complete system. At the same time, one must not forget the fact that, with these demonstrations, one often learns more from failures than from successes.

- The needs, technologies and potential for CA adoption by large-scale versus small-scale farmers are distinct and must be tackled in a different manner. Linking the learning and adoption processes of large and small farmers offers potential pay-offs in speeding up the adoption, but effective and equitable links must be built.
- Find solutions and practical adaptations, modifications of CA for specific and unique RSA conditions. Introduce international research and practical information to South African conditions on a farmer experimental basis. Conservation tillage does not work well on sandy soils that tend to harden, or on soil that is a water-logged risk. Specific research actions need to be conducted for successful implementation of CA in these areas. The current status needs to be assessed and criteria for improvement defined and measuring indicators identified.
- Animal factor in crop production: Prevent or reduce grazing of crop residues. Removal of crop residues does have a negative effect on the yield of the next crop.
- Strategies need to be developed towards accelerating the adoption of CA equipment. These should address both the supply and demand side, while at the same time there is a strong need for a research and development component that provides the necessary support services. Ensure adequate attention is given to supply chains for specialist inputs and equipment when they become necessary, as well as ensuring proper access to input and output markets.
- Involve all relevant partners and share expertise. Sustainable natural resource management requires an integrated and holistic approach, including effective collaboration between all stakeholders at national, provincial and local levels.
- Expose South African farmers to successful international groups. Facilitate and promote international expertise and exchange visits. Invite key researchers or farmers from areas with conditions similar to South Africa.
- Wherever possible, simultaneous adoption by farmers of all three CA principles is desirable in order to achieve the greatest impact. However, a step by step approach to the introduction of the principles may at times be better for farmers' constrained socio-economic situations, scarce resources and perceptions of risk.
- Organising of stakeholder workshops and training programmes and formulation of a strategy.
- The exposure by means of an international visit to South America or Australia and the promotion, facilitation, adoption and implementation of Conservation Agriculture throughout South Africa.
- Supporting the strategy for selecting key research areas and assigning and funding research institutes.
- Monitor research projects and interpret and publish results.

- Investigation of the creation of a South African National Federation of CA. The aim of creating a National Federation of Conservation Agricultural Clubs is, like those functioning in the Americas, Europe and Australia, to establish a farmer-owned forum which would serve to bring together all formally constituted and informal No-Till clubs and study groups throughout South Africa as members.
- Promoting all principles of CA and the adoption thereof and exchange of experiences amongst the commercial, developing and small-scale farming sectors. Archiving and disseminating international and local CA developments and practices. Convening an annual conference on a provincial rotational basis to which international and local CA experts are invited to give relevant presentations. Promoting the inclusion of the principles, practices and benefits of CA in the curricula of agricultural colleges, universities and other training institutions or organizations. Motivating the establishment of new CA clubs or study groups and supporting them to achieve their objectives. Acting as a link between South African and foreign CA agencies, institutions or individuals. Representing the SA National Federation for CA at national and international level on CA matters.
- Proactively seeking sponsorship from all state institutions and private agricultural input suppliers to fund the SA National Federation for CA.

  [Institutions in Europe and Australia who have been in existence for a number of years could be examined to determine if their structures and objectives are similar to those of the proposed Federation].