### Programmes of Agricultural Research Council

#### Soil, Climate and Water

**Soil Science**

**Pedometrics**
- Distribution of the various soil types
- Suitability of soils for different uses, especially agriculture
- Soil data modelling
- Remote and close-range sensing techniques

**Soil Health & Remediation**
- Soil quality in terms of biological, chemical and physical properties
- Soil degradation and off-site impacts, especially soil erosion
- Nutrient and carbon cycles
- Bioremediation of mine soils

**Analytical Services Laboratory**
- Soil analysis
- Water analysis
- Plant analysis
- Animal tissue analysis

**Agrometeorology**

**Climate Monitoring, Analysis & Modelling**
- Analysis of climate variability and climate model simulation
- Use of crop modelling to assess the impact of climate on agriculture
- Development of decision support tools for farmers

**Climate Change Adaptation & Mitigation**
- National greenhouse gas inventory in the agricultural sector
- Improvement of agricultural production technologies under climate change
- Adaptation and mitigation initiatives, e.g. biogas production in small-scale farming communities

**Climate Information Dissemination**
- Communication to farmers for alleviating weather-related disasters such as droughts
- Dissemination of information collected from weather stations
- Climate change awareness campaigns in farming communities

**Water Science**

**Efficient Utilisation of Water in Agricultural Systems**
- Promote water conservation practices in rain-fed and irrigated systems
- Harvest rainwater for cropland and rangeland productivity
- Promote supplemental irrigation under rain-fed agriculture

**Water Quality Management in Agro-ecological Systems**
- Quantify microbiological, chemical and physical quality of water in agro-ecological systems
- Monitor waterlogging and salinity under irrigation
- Promote sustainable management of water resources in wetland ecosystems

**Water Security & Governance**
- Assess available water resources for sustainable development
- Assess linkage between water-energy-food security
- Strengthen institutional support for managing water
- Support achievement of equity and allocation reforms in the water sector

**Geoinformation Science**

**Decision Support Systems**
- Spatially explicit information dissemination systems, e.g. Umlindi newsletter
- Crop and land suitability modelling/assessments
- Disease and pest outbreaks and distribution modelling
- Precision agriculture information systems

**Early Warning & Food Security**
- Drought and vegetation production monitoring
- Crop estimates and yield modelling
- Animal biomass and grazing capacity mapping
- Global and local agricultural outlook forecasts
- Disaster monitoring for agricultural systems

**Natural Resources Monitoring**
- Land use/cover mapping
- Invasive species distribution
- Applications of GIS and EO on land erosion/degradation, desertification, hydrology and catchment areas
- Rangeland health assessments
- Carbon inventory monitoring

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**For more information contact:**
Adri Laas - Public Relations Officer
E-mail: adril@arc.agric.za

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**ARC-Institute for Soil, Climate and Water**
600 Belvedere Street, Arcadia • Private Bag X79, Pretoria 0001
Tel: 012 310 2500 • Fax: 012 323 1157 • Website: www.arc.agric.za