



# Programmes of Agricultural Research Council Soil, Climate and Water

## Soil Science

*The programme focuses on soil as a natural resource: its formation, classification and mapping; physical, chemical, biological and fertility properties - which are linked to the sustainable use and management of soils. The Soil Information System is maintained as a national asset.*

### 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

*The programme focuses on the use of weather and climate information and monitoring for the forecast and prediction of the weather elements that have direct relevance on agricultural planning and the protection of crop, forest and livestock. The Agro-Climate Network & Databank is maintained as a national asset.*

### 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

*The programme uses a holistic approach in research and technology development to promote efficient and productive use of water, as well as the improvement and protection of water quality, in order to contribute to sustainable agriculture, environmental quality and socio-economic well-being.*

### 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

*The programme focuses on applied Geographical Information Systems (GIS) and Earth Observation (EO)/Remote Sensing research and provides leadership in applied GIS products, solutions, and decision support systems for agriculture and natural resources management. The Coarse Resolution Satellite Image Archive and Information Database is maintained as a national asset.*

### 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