

Aerial Surveys Division (ASD)

Aerial Surveys Division (ASD) has been conducting census of livestock and wildlife populations in the Kenyan Rangelands (arid and semi-arid lands) since 1977 to obtain spatial data on animal numbers and distribution. The data is collected on county basis and areas of special interest every 3-5 years in line with the national and county governments' development plans.

ASD Activities

- Conduct aerial surveys of wildlife and livestock populations in the Kenyan rangelands - species abundance and distribution;
- Conduct studies on wildlife species composition (rare, threatened and endangered) and distribution in relation to habitat/ environmental attributes (human settlement, vegetation cover and structure, waterbodies, agricultural activities, conservation status, etc);
- Monitor trends in numbers and distribution of wildlife and livestock over space and time.

Objectives

- To collect geospatial data information on wildlife and livestock numbers and distribution in the Kenyan rangelands for planning purposes;
- To collect data on environmental attributes including human settlement, vegetation cover and structure, waterbodies, agricultural activities, soil erosion, etc that influence the abundance and distribution of wildlife in the rangelands;
- To monitor long-term trends of wildlife and livestock populations.

Application of ASD Data/Information

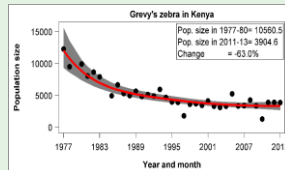
There are several uses of wildlife/livestock population and distribution data including planning and management of conservation areas and range infrastructure development.

Planning, conservation and management of wildlife

- Planning and management of protected areas (parks and reserves) and community conservancies - KWS, county governments, communities;
- Wildlife conservation and management e.g., endangered species (elephant, grevy's zebra, hunter's hartebeest, rhino, etc) - KWS, NGOs;
- Design of tourist infrastructure (airstrips, circuits, lodges) - MoTW, KTD;
- Human-wildlife conflict resolution - KWS, MoALF, county governments and local communities;
- Setting up anti-poaching mechanisms- KWS;
- Wildlife research- IUCN, WWF, AWF, Universities, professionals, etc.

Livestock production and range infrastructure planning and development

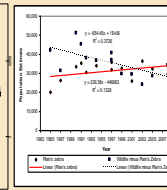
- Location of watering points (wells, boreholes, dams), cattle dips and inoculation campaigns (disease control)- county governments, ranches;
- Development of livestock marketing strategies - MoALF; and
- Range management practices (stocking rates) - MoALF, ranches.



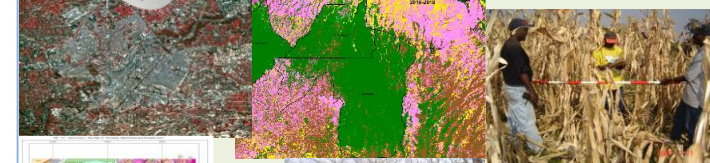
Achievements of DRSRS

Since its inception in 1976, the Directorate of Resource Surveys and Remote Sensing (DRSRS) has contributed immensely to biodiversity conservation, range resource planning and management, early warning system development and the application of Geographic Information System (GIS) and remote sensing in the country. Some of the directorate's achievements include:

- Biodiversity conservation through provision of data on plant and animal species indicating rare, threatened and endangered species;
- Wildlife and livestock management through provision of data and information on wildlife and livestock numbers, distribution and trends in the Kenyan rangelands;
- Livestock production and range infrastructure development through the provision of livestock numbers and distribution for water resource installation, marketing strategies, inoculation campaigns, etc;
- Maintenance of long-term trends (since 1977) geospatial databank on wildlife and livestock population in the Kenyan rangelands.
- Food security planning through the development of crop (cereals) forecasting and yield prediction assessments;
- Land cover/use assessment and mapping at national and county levels for policy formulation and strategic planning;
- Contributed to the development and standardization of aerial surveys techniques, land cover/use and vegetation assessments methodologies, and biodiversity conservation approaches;
- Establishment of a herbaria and database that serves as subsidiary repository and reference centre for plant taxonomy (second to the East Africa Herbaria at the National Museums of Kenya);
- Human and infrastructure capacity building in Geographic Information System (GIS) and Remote Sensing technology in Kenya, the directorate being the national centre for remote sensing;
- Research and development - produced numerous masters and doctorate theses in several institutions and universities locally and abroad;
- Has a highly trained workforce in various fields including GIS and remote sensing, wildlife/livestock aerial surveys, ecology, forestry, natural resource management, geo-information/cartography, herbarium techniques, botany and statistics among others, and supported by well-established geospatial technology facilities and lab, aircraft and field vehicles, aerial photography camera, data receiving stations, satellite imageries and library;
- Published more than 200 technical reports, journals and books in various areas related to planning, conservation and management of natural resources;



DIRECTORATE OF RESOURCE SURVEYS AND REMOTE SENSING (DRSRS)



EXECUTIVE OFFICE OF THE PRESIDENT

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Background

The Directorate of Resource Surveys and Remote Sensing (DRSRS) formerly known as the Kenya Rangeland Ecological Monitoring Unit (KREMU) was established in 1975 as a response to answering environmental concerns that were raised in the 1972 Stockholm Conference which created the United Nations Environmental Programme (UNEP). Funding came from the government of Kenya (GoK) and Canadian International Development Agency (CIDA). DRSRS main function was to monitor the condition of Kenyan rangelands through vegetation, livestock and wildlife surveys using ground and aerial surveys supplemented by satellite remote sensing.

In 1982, the Kenya government and World Bank funded a countrywide land cover and land use mapping exercise while the French government funded forest cover mapping. In 1986, KREMU became a fully-fledged government institution, the Directorate of Resource Surveys and Remote Sensing (DRSRS). Since the World Bank expiry of credit in 1998, the Directorate has relied heavily on GoK recurrent expenditure to support its programs, including purchase of the expensive satellite imageries.

Mission

To generate geo-spatial data and information on natural resources and environment to support planning and decision-making for sustainable development

Vision

To be a national centre of excellence in generation of data and information on the environment and natural resources for sustainable development.

Mandate

The DRSRS is mandated with the collection, storage, analysis, updating and dissemination of geo-spatial data and information on natural resources and the environment for sustainable development.

Objectives of DRSRS

- Collect geospatial data on numbers and distribution of wildlife/livestock and associated environment attributes in the Kenyan rangelands;
- Monitor, inventory and map the vegetation, wildlife habitats and livestock ranges (refuges);
- Undertake land cover and land use assessments and mapping;
- Develop early warning systems (crop yield forecast for food security, plant biomass monitoring for drought forecasting and landslide risk mapping);
- Develop environmental information management systems (EMIS);
- Coordinate the application of remote sensing technology in Kenya.

DRSRS Outputs

- Livestock/wildlife population estimates, spatial distributions and trends;
- Land cover/use maps and statistics;
- Land degradation maps;
- Landslide risk maps
- Plant biodiversity (species) inventory and checklists;
- Crop (cereals) yield prediction statistics;
- Aerial photographs, value added geospatial maps on natural resources, etc.
- Reference material - Technical reports, Journal papers, books, transcripts.

DRSRS Data Collection Methods

DRSRS gathers geospatial datasets on natural resources and generates outputs using several methods, including remote sensing, high and low level aerial surveys and ground sampling techniques. These datasets are analysed and integrated in a Geographic Information System (GIS). The survey methods have been tested and found to be reliable, replicable and cost-effective.

DRSRS Activities

The activities of the Directorate of Resource Surveys and Remote Sensing (DRSRS) are undertaken in four divisions namely: Remote Sensing (RSD), Aerial Surveys (ASD), Ground Surveys (GSD) and Geo-Information Services (GISD).

Ground Surveys Division (GSD)

The GSD conducts its activities on the ground concentrating on inventory, mapping and monitoring of the vegetation, land degradation assessment and landslide risk mapping using ground surveys sampling techniques and remote sensing.

GSD Activities

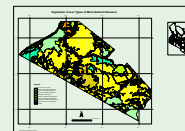
- Land degradation assessment, mapping and monitoring;
- Vegetation cover mapping and monitoring;
- Plant biodiversity assessment;
- Plant inventory and taxonomy (herbarium database development);
- Biomass monitoring for range management;
- Mapping areas prone to landslides.

Objectives

- Monitor, inventory and map plant biodiversity as habitats for wildlife and range for livestock production;
- Undertake land degradation assessment and mapping;
- Assess and monitor seasonal plant biomass production in the Kenyan Rangelands;
- Landslide risk mapping in mountainous areas of the country.

Application of GSD Data/Information

- Land-use planning using vegetation and habitat maps as baseline ecological information - Forest Services, KWS, MPND, NEMA;
- Range management including drought early warning system using biomass condition and trends - MoALF, KWS; OP; county governments;
- Land degradation assessment and mapping using plant cover, plant biomass and diversity as indicators of land degradation risk - NEMA, Kenya Forest Service, MoALF, UNEP, MoE, MoTIHUD, county governments;
- Plant biodiversity conservation - NMK, IUCN, NEMA, county governments;
- Conservation and management of water catchments – KFS, MoWI, MoE, county governments;
- Plant genetic resources, their utilization and conservation - Kenya Forest Service, NMK;
- Landslide risk mapping to delineate areas prone to landslides - Directorate of Geological Surveys, county governments.



Remote Sensing Division (RSD)

RSD is mainly involved in the application of remote sensing techniques that include satellite remote sensing and high level aerial photography to monitor changes in land cover/use, as well as provide early warning for food security, range condition and drought monitoring.

RSD Activities

- Map and monitor land cover/use and forest cover changes;
- Provide timely pre-harvest cereal production forecast;
- Develop early warning systems for drought and plant biomass prediction;
- Urban infrastructure mapping.

Application of RSD Data/Information

- Forest cover mapping for water, soil and biodiversity conservation -NEMA, KFS, MoE, county governments;
- Crop forecasting for national food security planning and management- MoALF, OP;
- Land cover/use studies for planning, policy formulation, and environmental management –NEMA, MoTIHUD, MoALFD, county governments;
- Urban land use mapping for physical and urban environmental planning- NEMA, MoTIHUD, MoALFD, county governments;
- Early warning system development - prediction of droughts and range conditions - OP, MoALF

Geo-Information Services Division (GISD)

This division is the custodian of all the geospatial databases.

GISD Activities

- Systems administration, maintenance and networking;
- Design, development, storage and retrieval of geospatial databases;
- Coordination of database development and management;
- Cartographic map development and production;
- Training on geo-information (geospatial databases development) for natural resources and early warning systems.

Application of Data/Information by GISD

The databases, information systems and value-added products developed are used for natural resource research and decision making leading to sustainable management in areas such as biodiversity conservation, environmental management, food security and disaster management.

