



RCMRD

**REGIONAL CENTRE FOR MAPPING
OF RESOURCES FOR DEVELOPMENT**

**STRATEGIC PLAN
2015-2018**

OCTOBER, 2014

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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank.
AFREF	African Reference Frame.
AU	African Union.
AUBP	African Union Border Programme.
AUC	African Union Commission.
CAADP	Comprehensive African Agricultural Development Programme
CBD	Convention on Biological Diversity.
FAO	Food and Agriculture Organization.
GIS	Geographical Information System.
GNSS	Global Navigation Satellite System.
GPS	Global Positioning System.
HARTRAO	Hartbeesthoek Radio Astronomy Observatory.
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.
ICT	Information and Communication Technology.
IGAD	Inter-governmental Authority on Development.
ISO	International Standards Organization.
LMIS	Land Management Information System.
LPI	Land Policy Initiative.
MEAs	Multilateral Environment Agreements.
MDGs	Millennium Development Goals
NASA	National Aeronautics and Space Administration
NEPAD	New Partnerships for Africa's Development
NTRIP	Networked Transport of RTCM via Internet Protocol
PRSPs	Poverty Reduction Strategy Papers.
QMS	Quality Management Systems.
RCMRD	Regional Centre for Mapping of Resources for Development.
RISDP	Regional Indicative Strategic Development Plan.
RS/EO	Remote Sensing/Earth Observation.
RTK	Real Time Kinematic.
SADC	Southern Africa Development Community.
SDI	Spatial Data Infrastructure.
TNL	Trimble Navigation Limited.
UNCCD	United Nations Convention to Combat Desertification.
UNCED	United Nations Conference on Environment and Development.
UNCSD	United Nations Commission on Sustainable Development.
UNECA	United Nations Economic commission for Africa.
UNFCCC	United Nations Framework Convention on Climate Change.
UNFF	United Nations Forum on Forests.
UN-GGIM	United Nations initiative on Global Geospatial Information Management.
WCED	World Commission on Environment and Development.
WTO	World Trade Organization.
WSSD	World Summit on Sustainable Development.

EXECUTIVE SUMMARY

1.0 Introduction

1.1 The mandate of the Regional Centre for Mapping of Resources for Development (RCMRD) is to provide services to member States in the fields of surveying, mapping, remote sensing, Geographical Information System, Global Positioning System and in natural resources and environmental management. Under this mandate, the Centre has a significant role to play in promoting the development of geo-information and allied information communication technologies; timely provision of data and information; and building of capacity of member States in the application of geo-information so as to achieve sustainable development.

1.2 In order to deliver on its mandate and taking cognizance of the developments taking place at the national, regional and international levels, as well as the lessons learned, the Centre has developed this new Strategic Plan for the period 2015-2018. In developing this Strategic Plan, extensive consultations were made with key stakeholders, within and outside the Centre and in the region so as to ensure that it incorporates all constructive views and suggestions from all key stakeholders, builds on the current Centre gains and strengths, and contributes substantially to development in the region.

1.3 The implementation of the new Strategic Plan over the period 2015-2018 will require a projected total investment of USD 15,815,000. The Centre expects to raise the projected budgetary requirement through member States contributions and internally generated revenues which is projected to be USD 16,938,000 over the four-year strategic plan period. It is, therefore, expected that the member States will continue to meet their financial obligations to the Centre to enable it carry out all the planned activities.

2.0 Situational Analysis

2.1 The new Strategic Plan has been developed within the context and in conformity with new and evolving institutional and policy reforms while taking advantage of current and emerging opportunities to enhance the Centre's capacity to be proactive. In line with this approach, the Strategic Plan has taken into account the achievements and lessons learnt during the implementation of the previous Strategic Plan as well as development challenges facing the region and Africa as a whole.

2.2 As part of the lesson learned during the implementation of the previous strategic plan and considering the confusion that is normally associated with frequent changes in strategic direction and format, the new strategic plan has been developed along the format of the previous strategic plan which the staff have become familiar with. This is expected to enable the Centre to stay on the set strategic direction long enough so as to achieve meaningful outcomes and impact.

2.3 To facilitate the identification of the Centre's position in relation to the demands of the member States and other clients, a detailed internal and external environment analysis was

carried out to identify its strengths and weaknesses as well as available and emerging opportunities and threats that are likely to have significant impact to the Centre in the next four years. A detailed analysis of the relevant sectors of development and stakeholders was also conducted to identify the potential areas of collaboration and contribution in the implementation of the Strategic Plan.

2.4 Given the results of the situational analysis of the Centre’s operating environment, the broad critical strategic issues that need to be addressed in order to solve the major challenges facing the Centre’s mandate were identified. The identified critical strategic issues appeared in the broad areas of (i) Capacity and capability of the member States; (ii) Geo-information technologies, products and services; (iii) Geo-information related ICT technologies, products and services; (iv) Institutional capacity and corporate governance; (v) Institutional partnerships, marketing and policy advocacy; and (vi) Knowledge and information management and communication.

3.0 The Centre Strategic Direction

3.1 The critical strategic issues identified in the situational analysis formed the basis for formulating the Centre’s strategic direction. Addressing these broad critical strategic issues is expected to enable the Centre to improve its efficiency, effectiveness and impact in contributing to sustainable environmental and natural resource planning and management. This shall, in turn, enable the Centre to position itself strategically to contribute significantly to the regional sustainable development.

3.2 The RCMRD Vision that requires the Centre and its member States, stakeholders and partners to stretch their future expectations, aspirations and performance is **“To be a premier Centre of excellence in the provision of geo-information for sustainable development in the member States and beyond.”**

3.3 The RCMRD Mission statement that expresses its fundamental purpose and business is **“To promote sustainable development in the member States through generation, application and dissemination of geo-information and allied ICT technologies, products and services”.**

3.4 The guiding core values that the Centre and its member States, stakeholders and partners hold in common and endeavour to put into practice while performing their functional obligations include the following:

- (i)** Quality service, innovativeness and ethics.
- (ii)** Partnerships for collaborative advantage and synergies.
- (iii)** Effective knowledge and information management.
- (iv)** Regionality and environment conscience in delivery of services.
- (v)** Integrity, transparency and accountability.

4.0 The Centre Level Strategic Results

4.1 Given the institutional strategic direction, the Centre identified five strategic results that are necessary and sufficient to address the identified critical strategic issues and deliver on the Centre purpose of “**Generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States**”. Attainment of this purpose will contribute significantly to the realization of the overall goal of “**Promoting sustainable development in the member States and beyond.**”

4.2 The strategic results are designed to continue positioning the Centre strategically as a leader in promoting sustainable development in the member States and beyond. The five necessary and sufficient results include (i) Capacity and capability of the member States in the generation and application of geo-information and allied ICT technologies, products and services for sustainable development planning **strengthened**; (ii) Demand-driven geo-information and allied ICT technologies, products and services for sustainable development planning **generated and provided**; (iii) Institutional capacity, marketing and resource mobilization for geo-information generation, application and dissemination **improved**; (iv) Effective and efficient institutional partnerships and strategic alliances, advisory services and policy advocacy **established and operationalized**; and (v) Availability and application of geo-information technologies, products and services for sustainable development planning in the member States and beyond **improved**.

5.0 Strategic Growth and Transformation Areas of Focus

5.1 In order to deliver on the five Centre level strategic results, functional operations in Centre have been rationalized into three technical and three management support functions and services strategic growth and transformation areas of focus. These strategic growth and transformation areas of focus express a stronger Centre commitment to growth and transformation as the strategic orientation and positioning of the Centre as a leader in promoting sustainable development in the member States and beyond. The necessary and sufficient strategic growth and transformation areas of focus required to deliver the Centre level strategic results include:

- (a) *Technical strategic growth and transformation areas of focus:*** (i) Remote sensing, geographic information system and mapping; (ii) Land surveys and management; and (iii) Technical support functions and services.
- (b) *Management support functions strategic growth and transformation areas of focus:*** (i) Financial resource management and procurement; (ii) Human resource management and administration; and (iii) Centre corporate governance.

5.2 Each strategic growth and transformation area of focus shall be expected to contribute to the attainment of the five Centre level strategic results. To do this in the most effective and efficient manner, each strategic growth and transformation area of focus will be expected to deliver on a strategic purpose that is similar to the Centre level strategic purpose, but reduced in scale and scope to its specific area of interest for better outcome mapping and impact orientation.

5.3 The Centre strategic growth and transformation areas of focus form the critical areas in which the Centre will need to grow in capacity and competency so as to position itself strategically to meet the demands and commitments to service delivery to the member States and other clients. To do this, the Centre will need to institute appropriate transformation measures in these areas of focus designed to improve on their effectiveness and efficiency in responding to the demands from the member States and other clients. In order to be effective in bringing about the desired change, the transformation process shall be carried out in a structured and integrated framework capable of addressing the obvious and less obvious factors of transformation and change.

6.0 Strategic Plan Implementation Arrangements

6.1 One of the key lessons the Centre learned during the implementation of the previous strategic plan was the need to maintain the more conventional planning approach that entails preparation of three main planning and implementation documents that include the Corporate Strategic Plan, Operational Plan and Annual Work Programmes. To operationalize the new Strategic Plan, therefore, the Centre shall prepare a detailed Operational Plan covering the period 2015-2018. The three planning documents shall continue to be developed using a nested approach for better outcome mapping and impact orientation.

6.2 In the nesting approach to the Centre planning, the preparation of the Operational Plan for operationalizing the Strategic Plan shall take over the planning process from the intervention strategies level. The Operational Plan shall then be operationalized through rolling Annual Work Programmes in which the necessary and sufficient activities and their respective milestones required to deliver each yearly target shall be specified. The adoption of the rolling Annual Work Programmes shall be expected to facilitate review and adjustment of planned activities in the context of emerging priorities and funding opportunities. The Annual Work Programmes shall be expected to provide full details on the outputs and their respective activities, milestones, operational budgets and collaborating institutions/organizations.

6.3 During the implementation of this new strategic plan, the centre will capitalize on the lessons and experiences learned during the implementation of the previous strategic plan to move the Centre towards becoming a “Strategy-Focussed Organization” defined as that organization that places its strategic plan at the centre of its management and change processes by clearly defining the strategic plan, communicating it consistently internally and externally, and linking it to the drivers of change to create a performance-based culture that links everyone and every unit to the unique features of the strategic plan. To achieve this and deliver on its inspirational mission, the Centre will need to excel in set critical strategic factors of success that provide the means for the Centre to align and focus every dimension of its operations on achieving its strategic results as well as to oversee and monitor the overall performance of the Centre.

7.0 Monitoring and Evaluation

7.1 During the implementation of the different activities, a continuous participatory and rigorous self-monitoring and evaluation shall be undertaken. In order to do this, the Centre shall finalize the development and operationalization of a suitable monitoring and evaluation system capable of tracking the implementation of the planned activities. The monitoring and evaluation system shall include the use of result frameworks, work plans, site/field visits, semi annual and annual reports, mid-term internal and external evaluations, conferences and end-of-term external evaluations. The abridged version of the semi annual reports shall form the Centre annual reports which will in turn feed into the mid-term internal and external evaluations. The mid-term evaluation results will, in turn, assist in the external evaluation whose results will form a major input in the preparation of the subsequent strategic plans.

7.2 The outputs of all Centre activities undertaken will be consolidated into annual reports and shared among member States, collaborating institutions and organizations and other stakeholders. The results obtained will also be presented in conferences, symposia and published as journal articles for wider information and knowledge sharing. In addition, all data captured will be appropriately stored for ease of retrieval and will form the basis for subsequent impact evaluation of projects.

1.0 BACKGROUND

1.1 Introduction

Africa is endowed with rich and diverse renewable and non-renewable natural resources, yet the continent remains the least developed, the most technologically behind, the most indebted, the most food-insecure and the most marginalized. In addition to this, malnutrition, disease, environmental degradation, natural resource depletion, poor and inadequate infrastructure, unemployment and weak institutional capacities continue to pose serious development challenges for Africa. This state of affairs is exacerbated by recurring natural disasters and the AIDS pandemic, which is reversing decades of economic gains and imposing costs on Africa at least, twice those in any other developing regions, thus undermining sustainable economic growth. Technology, particularly new information and communication technology, is now one of the most important assets to compete on the global arena. In this regards, African countries require improved access to data, information, knowledge and understanding about the environment, natural disasters affecting the region and natural resources including socio-economic opportunities to achieve sustainable development.

1.2 Regional Centre for Mapping of Resources for Development

1.2.1 Historical Background

The Regional Centre for Mapping of Resources Development (RCMRD), previously known as the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) was established in Nairobi, Kenya in 1975 under the auspices of the United Nations Economic Commission for Africa (UNECA) and the then Organization of African Unity (OAU). RCMRD was set up as sub-regional non-profit intergovernmental institution in the belief that substantial cost-effectiveness could be achieved by sharing common facilities and services in surveying, mapping and remote sensing with a view to enabling the member States to derive greater benefits than setting up individual country institutions. The Centre's current contracting member States are Botswana, Burundi, Comoros, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Swaziland, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. The countries affiliated to the Centre are Angola, Mozambique, Madagascar, Djibouti, Eritrea and Democratic Republic of Congo.

1.2.2 The Role of RCMRD in Development

The Centre member States are at various stages of development in both infrastructure and exploitation of their natural resources. In order to fully exploit these resources in the most optimal way, there is need to ensure availability of geo-information for use in sustainable development planning processes. Geo-information is crucial for proper planning, sound policy formulation and for timely delivery of services. However, much of the geo-information products and services in most of the member States are lacking, and where available, its content and context are in forms that are not readily accessible and usable in sustainable development planning. The need for this information to be structured, stored, easily retrieved and

disseminated to member States to facilitate their development processes cannot be overemphasized. Given this understanding, therefore, the Centre has a very significant role to play in promoting the development of geo-information, timely provision of data and information, and building of capacity of the member States to enable them achieve sustainable development.

In the context of the sustainable development planning, the expression “Geo-information” refers to information products that have direct association to geographic locations or places. Geo-information is created by manipulating geographic (or spatial) data in a computerized system. It involves collection, processing, analysis and interpretation, management and presentation of data and information with geographic location for applications in such fields as planning, land evaluation, land registration, cadastral, environmental observation and hydrology. Geo-information science encompasses the major scientific disciplines such as Surveying, Geodesy, Cartography, Remote Sensing, Photogrammetry and Geographic Information System.

1.2.3 The Centre Mandate, Objectives and Core Functions

The mandate of the Centre is to provide services to member States in the fields of surveying, mapping, remote sensing, Geographical Information System (GIS), Global Positioning System (GPS) and in natural resources and environmental management. Under this mandate, the Centre is required to accomplish the following objectives as indicated in the revised principal agreement:

- (a) To provide quality geo-information and allied information and communication technology (ICT) products and services in environmental and resource management for sustainable development in the member countries and beyond;
- (b) To promote the development and use of geo-information and information and communication technology in the sustainable development of member States by assisting in human resource and institutional capacity building;
- (c) To provide problem solving applications in natural resource and environmental management;
- (d) To provide formal and on the job training for nationals of the Contracting Parties in geo-information and information communication technology;
- (e) To offer customer tailored geo-information and information technology courses on demand to contracting Parties and other customers;
- (f) To provide advisory services upon request on problems relating to geo-information and ICT to the Contracting Parties;
- (g) To provide services in the repair, maintenance and calibration of surveying and mapping equipment;
- (h) To conduct research and development activities in all fields of its expertise in collaboration with its partners;
- (i) To make available to the Contracting Parties data and results of the studies, research and tests carried out by the Centre; and
- (j) To provide competitive services on demand-driven basis and in a business-like manner.

In order to deliver on its mandate and accomplish the objectives stated above, the Centre undertakes the following core functions:

- (i) Resource mapping and surveying.
- (ii) Environmental management and impacts assessment.
- (iii) Research and Development.
- (iv) Early warning and disaster management.
- (v) Dissemination of geospatial data.
- (vi) Project implementation and advisory services.
- (vii) Training/capacity building in geo-information and basic information technology.
- (viii) Maintenance and repair of surveying and mapping equipment.

1.2.4 The Centre Operational Structure

The overall policy and political organ of the Centre which reviews and approves the implementation of the Centre's Strategic Plans as well as promoting its activities at national and regional levels is the Conference of Ministers. The meeting of the Conference of Ministers is convened once every two years. The Governing Council (GC), which is composed of the officials of the rank of Permanent Secretary or its equivalent representing contracting member States, forms the main policy and management organ of the Centre. The Governing Council meets every end of the calendar year to assess the progress for that particular year and approve the work plan and budget for the following year as well as address any management and policy issues. The Governing Council has three Committees namely the Appointment, Promotion and Remuneration Committee; the Finance Committee; and the National Geo-Information Committee. The Director General is the Chief Executive and is responsible for the day to day management of the Centre. The operations of the Centre are funded in major part by contributions from contracting member States and internally generated revenue. In addition, some of the Centre programmes and projects are supported by development partners.

1.3 Summary of Achievements Realized During the Previous Strategic Plan

The previous Centre Strategic Plan that covered the period 2011-2014 was expected to lay the foundation and build on the achievements that had been realized as the result of the restructuring of the Centre and subsequent implementation of two Strategic Plans. In order to achieve this, the Centre undertook to deliver on five Centre level strategic results that were necessary and sufficient to achieve the Centre purpose. To deliver on the five Centre level strategic results, functional operations in the Centre were rationalized into three technical and three management support functions and services strategic growth areas of focus. Each strategic growth area of focus was expected to contribute to the attainment of the five Centre level strategic results.

The strategic results and intervention strategies formed the basis for preparing annual work programmes and budgets that were regularly prepared in each year of the Strategic Plan period. The progress on the implementation of the annual work programmes by each Department was tracked throughout the Strategic Plan period through preparation of annual progress reports and commissioning of external mid-term and end-of-term evaluations. During

the implementation of the strategic plan, the Centre was able to achieve over 85% of the 2011-2014 Operational Plan implementation plans that were formulated to implement the strategic plan. This achievement was realized against a backdrop of limited financial and human resources. The overall Centre achievement is accumulation of achievements realized by the individual strategic growth areas of focus implementation plans.

(a) Remote Sensing, Geographic Information System and Mapping: This strategic growth area of focus promised to strengthen the generation and application of remote sensing, geographic information system and mapping technologies, products and services through the implementation of broad activities under five intervention strategies. The strategic growth area of focus was able to achieve over 90% of the performance indicator targets set in its 2011-2014 implementation plan.

(b) Land Surveys and Management: This strategic growth area of focus promised to strengthen the generation and application of Land Surveys and Management technologies, products and services through the implementation of broad activities under four intervention strategies. The strategic growth area of focus was able to achieve over 80% of the performance indicator targets set in its 2011-2014 implementation plan.

(c) Technical Support Functions and Services: This strategic growth area of focus promised to strengthen institutional technical support functions and services through the implementation of broad activities under seven intervention strategies. The strategic growth area of focus was able to achieve over 80% of the performance indicator targets set in its 2011-2014 implementation plan that was formulated to implement the relevant section of the strategic plan.

(d) Procurement and Financial Management: This strategic growth area of focus promised to strengthen the institutional financial and procurement management systems, processes and services through the implementation of broad activities under three intervention strategies. The strategic growth area of focus was able to achieve over 80% of the performance indicator targets set in its 2011-2014 implementation plan.

(e) Administration and Human Resource Management: This strategic growth area of focus promised to strengthen administration and human resource management systems, processes and services through the implementation of broad activities under three intervention strategies. The strategic growth area of focus was able to achieve over 80% of the performance indicator targets set in its 2011-2014 implementation plan.

(f) Institutional Corporate Governance: This strategic growth area of focus promised to strengthen institutional corporate governance systems, processes and services through the implementation of broad activities under five intervention strategies. The strategic growth area of focus was able to achieve over 90% of the performance indicator targets set in its 2011-2014 implementation plan.

1.4 The New Strategic Plan

The current Centre Strategic Plan is coming to an end in 2014. In addition to this, various new developments have taken place in the regional and global arena in the last few years including major changes in the Centre operating and policy environments as well as advances in science and technology. Several of the Centre member States and collaborating partners within the region have revised their strategies and development plans, indicating areas of future collaboration. In addition, development programmes in the region have gained a higher profile for national and external development assistance. These developments offer the Centre excellent opportunities for collaboration in the area of environment and natural resource management for sustainable development. Taking cognizance of these developments that are taking place at the national, regional and international levels, therefore, the Centre has developed this new Strategic Plan covering the period 2015-2018.

The previous Strategic Plan laid a very strong foundation for strategic orientation and positioning of the Centre towards becoming a leader in promoting sustainable development in the member States and Africa as a whole. The new strategic Plan is, therefore, designed to continue on the same direction charted by the previous strategic Plan and build on the achievements realized and lessons learned so as to position the Centre strategically as a key driver in providing geo-information technology and capacity for sustainable development in the member States and beyond.

The new Strategic Plan has been developed within the context and in conformity with new and evolving institutional and policy reforms while taking advantage of current and emerging opportunities to enhance the Centre's capacity and competency to be proactive in responding to current and emerging challenges facing the member States. In line with this approach, the Strategic Plan has taken into account the achievements and lessons learnt during the implementation of the previous Strategic Plan. The Strategic Plan has also taken into account the strategic thrust of various natural resources and environmental planning and management initiatives in the region. In this regards, extensive consultations were made with the member States and partners, within and outside the Centre and in the region so as to ensure that the new Strategic Plan incorporates all constructive views and suggestions from all key stakeholders, builds on the current Centre gains and strengths, and contributes significantly to sustainable development in the member States and beyond

2.0 SITUATIONAL ANALYSIS

2.1 Introduction

This situational analysis provides a constructive mechanism for evaluating and rationalizing the current status in the Centre's general and operating environment to guide the decisions to be made by the Centre in formulating its new strategic direction. In addition to this, the analysis is expected to increase the Centre's understanding of major national, regional and global trends towards sustainable development, including the focus on how these trends are likely to affect the future of natural resource management, environmental conservation and sustainable land management in Africa.

2.2 Africa's Sustainable Development

Improving the welfare of people in Africa requires sustainable development supported with peace and stability as well as with human, institutional and organizational capacities to address immediate challenges, such as poverty and diseases. The overriding sustainable development challenge in Africa is poverty eradication. Indeed, the "African Ministerial Statement to the World Summit on Sustainable Development identified poverty eradication as an indispensable requirement for sustainable development. Sustainable development has, however, remained elusive for many African countries with poverty remaining a major challenge.

The World Commission on Environment and Development (WCED, 1987) defined sustainable development as that which meets the needs of the present without compromising the ability of future generations to meet their own needs. On the other hand, the Food and Agriculture Organization defined sustainable development as the management and conservation of natural resources base and the orientation of technological and institutional changes in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development that conserves land, water, plant and animal genetic resources is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

Sustainable development is, therefore, a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development, and institutional change are made consistent with the future as well as present needs. The approach embodies the notion and commitment to a development process that is equitable and socially responsive, recognizing the extensive nature of poverty, derivation, and inequality between and within nations, class and communities. This has led to profound changes in the way development is understood, conceptualized and measured worldwide.

Africa is at the crossroads of sustainable development as it searches for policy mixes, programmes, strategies and appropriate institutional mechanisms and arrangements to improve the quality of life of the people. Progress towards achieving sustainable development will ultimately lead to the attainment of the international and regional development goals and targets. It is, therefore, important to continuously assess the progress of Africa on the

economic, social and environmental dimensions of sustainable development and their integration through supportive and sustainable institutional arrangements as outlined below.

(i) Economic Sustainability Dimension: The economic approach to sustainability is based on the concept of maximum flow of income that could be generated while at least maintaining a good stock of assets or capital, which yield these benefits (Solow, 1986; Maler, 1990). This is based on the underlying concept of optimality and economic efficiency applied to the use of scarce resources. While Africa maintained positive growth rates during the 2000s, very few countries have achieved and maintained the growth rates necessary to reduce poverty. African countries still face the critical challenge of raising the rate of GDP growth and sustaining high growth rates over an extended period in order to accelerate progress towards meeting the Millennium Development Goals (ECA, 2006).

(ii) Social Sustainability Dimension: The social concept of sustainability entails continuous improvement in the social well-being and quality of life. The social sustainability is, therefore, people-oriented and seeks to maintain the stability of social and cultural systems, including the reduction of destructive conflicts (Munasinghe and McNeely, 1995). Equity is an important aspect of this approach to sustainable development. Modern society would need to encourage and incorporate pluralism and grassroots participation into a more effective decision-making framework for socially sustainable development. The current status of social sustainability in Africa reflects a stagnant, and sometimes, declining levels of quality of life and the social environment.

(iii) Environmental Sustainability Dimension: The environmental sustainability refers to the maintenance of the integrity of different environmental systems to ensure that their functions and beneficial uses are upheld for present and future generations. The environmental view of sustainable development, therefore, focuses on the stability of biological and physical systems (Munasinghe and Shearer, 1995). Of particular importance is the viability of subsystems that are critical to the global stability of the overall ecosystem. Natural resource degradation, pollution and loss of biodiversity reduce system resilience and, therefore, the emphasis is on preserving the resilience and dynamic ability of such systems to adapt to change.

(iv) Institutional Sustainability Dimension: Reconciling the economic, social and environmental sustainability dimensions of sustainable development and operationalizing them is a major challenge because all the three dimensions must be given balanced consideration. Sustainable development, therefore, calls for integrating economic growth, social development and environmental management as interdependent, mutually supportive and reinforcing dimensions of long-term development supported by well-defined, functional and responsive sustainable institutional arrangements to ensure holistic and integrated sustainable development as illustrated in Figure 2.1.

2.3 Institutional Arrangements that Support Sustainable Development

The linkages and interdependency between the economic, social and environmental dimensions of sustainable development as well as the need for a balanced integration of these

dimensions in Africa needs to be done within an enabling environment of well-defined and responsive institutional and strategic frameworks. The institutional arrangements for coordinating the implementation of the sustainable development agenda at the global, regional and national levels should be seen as mutually supportive where the global forum/agencies develops and oversees the implementation of global agenda and agreements; the regional and sub regional bodies help to bridge the gap between global agreements in sustainable development; while the national priorities and concerns are articulated and addressed at the national level.

2.3.1 Global level Institutional Arrangements

The United Nations Commission on Sustainable Development (UNCSD) was established by the United Nations Conference on Environment and Development (UNCED) to serve as a forum for consideration of issues related to the integration of the three dimensions of sustainable development among other functions. The UNCSD has, over the years, organized forums to push forward the agenda on sustainable development and also held review and policy sessions with the involvement of all regional commissions. All these have been held against a back drop of various international treaties, conventions and agreements providing directions to different countries in their development agenda. One of these is the Millennium Declaration which acknowledges a number of international conferences and conventions whose implementation would be part and parcel of efforts made to meet the targets of the Millennium Development Goals (MDGs) in the medium term and sustainable development in the long-term.

(a) International Treaties Relevant to Sustainable Development

Many international treaties provide legal frameworks for sustainable development governance at the global level ranging from economic, social and environmental issues. Together, they represent the collective will of states to pursue the path towards sustainable development. But signing the frameworks by many African countries without political commitment to effectively implement the actions falls short of the international vision to progress towards sustainable development.

At the international level, a number of steps towards establishing standards or norms for environmental protection in the form of Multilateral Environment Agreements (MEAs) have been agreed upon. These agreements also play a significant role in developing countries, either by influencing their domestic policies or by inducing them to follow higher environmental standards. Some of the important MEAs include the Vienna Convention for the Protection of the Ozone Layer, 1985; Montreal Protocol on Substances that Deplete the Ozone Layer, 1987; Convention on Biological Diversity, 1992; United Nations Framework Convention on Climate Change, 1992; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989; the Rio Declaration on Environment and Development, 1992; The Rio Earth Agenda 21 of the United Nations Conference on Environment and Development; and World Trade Organization among others.

Although many of these agreements relate to the environment, others link environment with trade. The Rio conventions which include the Convention on Biological Diversity (CBD); United Nations Convention to Combat Desertification (UNCCD); and United Nations Framework Convention on Climate Change (UNFCCC) are particularly important and are related to biodiversity, desertification and climate change. The United Nations Forum on Forests (UNFF) is also gaining importance for global forest issues. The UNFCCC, the UNCCD and the Kyoto Protocol provide important frameworks for harnessing financial resources, technology or other conservation-related natural resources management needs in Africa. Although these agreements have an influence on the economies of countries, many African countries face challenges in collection, analysis and presentation of environmental data and information. This hinders periodic analysis of environment conditions and trends that are essential for forecasting and early warning and subsequent development of appropriate strategies and policies for environment management and sustainable development.

(b) United Nations initiative on Global Geospatial Information Management

The United Nations initiative on Global Geospatial Information Management (UN-GGIM) is an important new initiative which aims at playing a leading role in setting the agenda for the development of global geospatial information and to promotion of its use to address key global challenges. The initiative provides a forum for liaison and coordination among member states, and between member states and international organizations. UN-GGIM acknowledges that rapid advances in information and geospatial technologies have made geospatial information an invaluable tool in policy planning. In many sectors of development, it is becoming increasingly recognized that the use of geospatial information would enable more effective responses to global humanitarian, environmental and development issues. An increasing amount of geospatial data is being created and captured by using high-resolution satellite imagery and other data collection techniques, and is quickly processed on a variety of levels, from the local to the global, for further analysis and for the expansion of the knowledge base.

Among the objectives of UN-GGIM is to enhance the management and promotion of sharing of geospatial information in a variety of ways from the local, national, regional and global levels. Many countries are individually building their national geospatial infrastructure and are recognizing it as critically important for socio-economic development. At the country level, the role of governments is shifting from being a primary supplier of authoritative geospatial data to being an acquirer of data for national programmes, and also playing a coordinating and regulatory role as well as facilitating partnerships among the producers and consumers of geospatial information. At the regional and global levels, there is also a general recognition of the need for a country-driven regional/global mechanism that can play a leadership role in setting the agenda for the development of global geospatial information and promote its use to address key development challenges, promote liaison and coordination among member states, as well as between member states and international organizations whose objective is to serve as the apex entity of the global geospatial information community.

2.3.2 Regional Institutional Arrangements

The regional commissions of the United Nations and other regional institutions have been called upon to promote the integration of environmental concerns in regional and sub regional development policies. Regional bodies are also required to improve regional and sub regional consultative processes to facilitate the exchange of data, information and experiences in the implementation of regional programmes. In particular, the regional commissions have been tasked by the WSSD to facilitate and promote a balanced integration of the economic, social and environmental dimensions of sustainable development into their work, and into the work of regional and sub regional bodies through facilitation and strengthening of the exchange of experiences, best practices, case studies and partnership experiences.

The Economic Commission for Africa (ECA), as the UN regional arm in Africa, has continued to play an important role in the region regarding the implementation of the international frameworks aimed at sustainable development. In 1997, the Ministers responsible for economic and social development and planning in Africa established the Africa-Committee on Sustainable Development (Africa-CSD). Since then, a number of institutional strengthening measures have been undertaken at the Ministerial, Committee and the Commission levels to enable ECA respond adequately to this mandate as well as the mandates from other related international frameworks. ECA works in partnership with a number of regional and sub regional bodies including UN agencies operating at the regional level to support African countries in the implementation of the sustainable development agenda.

Within the African region, the African Union (AU) has a strong and shared Vision to build an integrated, prosperous and peaceful Africa, an Africa driven and managed by its own citizens and representing a dynamic force in the international arena. The Union's ambition is to achieve, by the year 2025, greater unity and solidarity between African countries and peoples through the promotion of accelerated social, economic and political integration of the continent. Promotion of peace, security and stability is fundamental to the AU Vision of having a united and strong Africa. Under the auspices of the AU, various initiatives have been developed to facilitate the implementation of its programmes.

(a) New Partnership for Africa's Development

Realizing that Africa region can only take its proper place in the international community if it gains economic strength, African Heads of State and Government set an ambitious target of 7% annual growth rate in GDP over the next 20 years to eradicate poverty, achieve food security and build the foundations of sustainable economic development on the continent. The African Union/New Partnership for Africa's Development (AU/NEPAD) is a comprehensive and integrated development plan for the continent that makes peace, security, democracy, good economic and corporate governance preconditions for sustainable development on the continent (NEPAD, 2004, 2005). The African Vision by AU/NEPAD of attaining 6% increase in agricultural growth through to 2015 is of particular interest given that one of the avenues identified to achieve this target is stimulation and promotion of a culture across Africa of sustainable utilization of the natural resource base.

At continental level, NEPAD hopes to eradicate poverty in Africa and to place its countries on a path of sustainable growth for the next 15 years. It is a commitment of African countries, both individually and collectively, to the Millennium Development Goals (MDGs). NEPAD believes that improvement of the performance of the agricultural sector is a prerequisite in meeting its set targets for economic development. It further recognizes that improving the productivity of agriculture rests on dealing effectively with a number of critical constraints such as climatic variability, poor rural infrastructure, unsupportive policies, and weak institutional and regulatory frameworks. Regional and sub-regional institutions are expected to play a lead role in spearheading science and technology in food systems to address food insecurity and environmental degradation and natural resources management. Among the programmes that NEPAD has initiated to enhance sustainable development include the following:

(i) Comprehensive African Agriculture Development Programme

The Comprehensive African Agriculture Development Programme (CAADP) was established by the AU/NEPAD in July 2003 as the highest policy level framework for the coordinated development of agriculture in Africa. The overall goal of CAADP is to “Help African countries reach a higher path of economic growth through agriculture-led development which eliminates hunger, reduces poverty and food insecurity, and enables expansion of exports.” CAADP is a growth-oriented agriculture development agenda aimed at increasing agriculture growth rates to 6% per year to create the wealth needed for rural communities and households in Africa to prosper. To achieve this goal, CAADP focuses its interventions in four key pillars that include (i) Expansion of the irrigation sub-sector and promoting sustainable land management (Pillar I); (ii) Strengthening trade capacity, improving physical market infrastructure and market support areas (Pillar II); (iii) Promoting food and nutrition security and dealing with the challenges of the vulnerable and food insecure populations (Pillar III); and (iv) Strengthening research institutions and supporting dissemination and farmer adoption of productivity enhancing technologies (Pillar IV).

(ii) The Climate for Development in Africa Programme

Climate for Development in Africa Programme (ClimDev-Africa Programme) is an initiative of the African Union Commission (AUC), the United Nations Economic Commission for Africa (UNECA) and the African Development Bank (AfDB) that is mandated at the highest level by African leaders to create a solid foundation for the African response to climate change. Through the establishment of a solid science and observational infrastructure; strong working partnerships between various stakeholders; and creation and strengthening of knowledge frameworks, ClimDev-Africa Programme aims at facilitating wide availability and access of climate information, quality analysis of data and information for decision support and management, and promotion of awareness and advocacy.

(b) Africa Land Policy Initiative

The Land Policy Initiative (LPI) is a joint programme of the tripartite consortium consisting of the AUC, the AfDB and UNECA. The purpose of this initiative is to enable the use of land to lend

impetus to the process of African development. After having developed the framework and guidelines on land policy in Africa, and received the mandate from AU to use it in support of national and regional land policy processes, the LPI is now moving towards assisting AU member States in developing or reviewing their land policies as well as in implementing and evaluating these policies.

The goal of the initiative is to assist member States in the implementation of the declaration on land issues and challenges in Africa in accordance with the framework and guidelines on land policy in Africa in order to achieve socio-economic development, peace and security, and environmental sustainability. The mission of LPI is to ensure all land users have equitable access to land and security of all bundles of land rights, by facilitating effective partnerships, dialogue and capacity building for participatory and consultative land policy formulation and implementation, as well as efficient and transparent land administration in both customary and statutory jurisdictions.

(c) African Union Border Programme

The African Union Border Programme (AUBP) that was launched in 2007 is an initiative aimed at uniting and integrating Africa through peaceful, open and prosperous borders, and prevention and resolution of border-related disputes and the promotion of regional and continental integration. Since African countries gained independence, the borders which were drawn during the colonial period in a context of rivalries between European countries and their scramble for territories in Africa, have been a recurrent source of conflicts and disputes on the continent. Most of the borders are poorly defined, and the location of strategic natural resources in cross-border areas continues to pose additional challenges. By adopting the AUBP, African leaders have clearly expressed their commitment to maximize the junction and bridge aspects of the African borders to ensure that they are managed in such a manner to contribute to the achievement of two key objectives of the AU, namely the structural prevention of conflicts and the deepening of the on-going integration processes.

The AUBP is being implemented at national, regional and continental levels on the basis of the principle of subsidiarity and respect of the sovereignty of States. The programme's core components include border delimitation and demarcation, cross-border cooperation, institution building and capacity development, resource mobilisation and advocacy. AUBP is closely working with States to undertake and pursue bilateral negotiations on all issues relating to the delimitation, demarcation and management of their borders, while aiming to protect and promote the interests and rights of border populations. The Programme is also assisting the States in mobilizing the necessary resources and expertise needed to delimit, demarcate and manage their boundaries, and ensuring that cross-border cooperation is included in the major international initiatives launched in favour of the continent, as well as playing a coordination role and facilitating the exchange of information and good practices.

(d) Inter-governmental Authority on Development

The Inter-Governmental Authority on Development (IGAD) was established with the mandate of enhancing cooperation and co-ordination of macro-economic policies in the horn of Africa region; promoting sustainable agriculture development and food security; conserving, protecting and improving the quality of the environment; ensuring the prudent and rational utilization of natural resources; cooperating in increased sustainable utilization and development of energy resources in the sub region and in the gradual harmonization of their national energy policies and energy development plans; and cooperating in the gradual harmonization of their national policies in scientific and technological research and development, transfer of technology, and their policies on capacity building in science and technology in the sub region.

The IGAD region has a wealth of resources with the potential to drive economic growth and social development. Unfortunately, the full environmental and natural resources potential is not being realized for a number of reasons including a fast rate of growth of a largely rural, peasant and heavily natural resources dependant population; natural disasters; and institutional weaknesses among others. The region experiences persistent economic crises, which to a large extent, have roots in severely degraded natural resources and the environment. This, exacerbated by recurrent droughts and other natural and man-made disasters, result in perpetual poverty and under-development which accelerates the degradation of natural resources and the environment, thereby closing the vicious cycle.

(e) Southern Africa Development Community

The Southern Africa Development Community (SADC) owes its origin to historical, economic, political, social and cultural factors that have created strong bonds of solidarity and unity among the peoples of southern Africa. The SADC was formed in 1980 with the objective of enhancing economic and social development in the southern African region. To enable it develop its regional development programmes, SADC formulated the Regional Indicative Strategic Development Plan (RISDP) whose vision is that of a common future, a future within a regional community that will ensure economic well-being, improvement of the standards of living and quality of life, freedom and social justice and peace and security for the people of southern Africa. Its Mission is to promote sustainable and equitable economic growth and socioeconomic development through efficient and productive systems, deeper co-operation and integration, good governance, and durable peace and security so that the region emerges as a competitive and effective player in international relations and the world economy.

The RISDP recognizes the importance of science and technology in economic development and increasing competitiveness and has given priority to this area of intervention to develop and strengthen national systems of innovation in order to provide scientific and technological solutions for sustainable socioeconomic development, regional integration and poverty eradication. The Strategy considers environment and sustainable development as a vehicle to ensure equitable and sustainable use of the environment and natural resources. The RISDP also recognizes the importance of information as a resource and a tool for development and in providing relevant, timely, accurate and comparable information for planning, policy formulation, implementation, monitoring and evaluation of SADC integration activities.

2.3.3 National Institutional Arrangements

At the national level, Government decision-making processes in Africa are constantly evolving giving rise to institutional arrangements such as decentralization of decision-making and devolution of authority that is becoming a major trend in many African countries. This trend is expected to influence the way policies are developed and implemented, especially those related to natural resources and environment management, property rights, poverty reduction, agricultural development, forestry and land use. The trend toward democratic institutions has helped empower local communities, especially women and resource-poor households. This is particularly important, given that many African countries are among the poorest and most ecologically-fragile, making them hotbeds for strife rooted in competition for scarce and dwindling natural resources. In this regards, many African countries have adopted different combinations of policies, strategies and plans to address sustainable development issues. Some of these policies, strategies and plans include those addressing national and rural development; poverty including Poverty Reduction Strategy Papers (PRSPs); environment; natural resources; agriculture; social issues; economic development; and sustainable development in the broad sense.

In the case of governance, more countries in Africa are increasing space for popular participation in electoral processes; giving more rights to minority and marginalized groups making governance institutions more inclusive along ethnic, religious, racial and gender lines; promoting commitment towards macro-economic stability, accountability, resource mobilization, reform of financial and monetary institutions, and trade liberalization; adopting reforms that facilitate private sector development such as macro-economic stability and transparency, political stability and peace and security; and embracing conflict resolution mechanisms. All these are institutional developments, which, if strengthened, will create beneficial linkages to policies, programmes and strategies focused on the achievement of sustainable development. It is, therefore, expected that these developments will set the platform for Africa's future concerted effort for progress towards sustainable development.

2.4 The Role of Geo-Information in Sustainable Development

To achieve sustainable development, African countries require access to data, information, knowledge and understanding about the environmental degradation, natural disasters affecting the region and natural resources including socio-economic opportunities. This information is currently not readily available and accessible due to lack of harmonized and co-ordinated development of Spatial Data Infrastructure (SDI) among other many reasons. The SDI entails the technology, policies, standards and institutional arrangements necessary to acquire, process, store, distribute and improve the utilization of geo-spatial data from many different sources and for a wide group of potential users. This is contrary to the situation in developed countries where the development of national SDI is advanced and forms the backbone for economic development.

In order to rationally and comprehensively address development agenda, the African countries need to urgently adopt the use of information on the nature, extent, spatial distribution along with the potentials and limitations of natural resources which is a pre-requisite to achieving the goals of sustainable development. Geo-information offers an ideal environment for integrating spatial and attribute data on natural resources and environment, and for subsequent generation of optimal land use plans. The expression “Geo-information” refers to information products that have direct association to geographic locations or places. Geo-information is created by manipulating geographic or spatial data in a computerized system. It involves collection, processing, analysis and interpretation, management and presentation of data and information with geographic location for applications in such fields as planning, land evaluation, land registration, cadastral, environmental observation and hydrology among others. Geo-information science encompasses the major scientific disciplines such as Surveying, Geodesy, Cartography, Remote Sensing, Photogrammetry and Geographic Information System (GIS).

2.4.1 Uses of Geo-information

The applications of geo-information are vast and continue to grow. By using geo-information for example, scientists can research changes in the environment; engineers can design road systems; electrical companies can manage their complex networks of power lines; governments can track the uses of land; and fire and police departments can plan emergency routes. Many private businesses have begun to use geo-information to plan and improve their services. Geo-information plays five important capabilities that include (i) What is it? - To find out what exist at a particular location; (ii) Where is it? - To identify what exist at a given location and what could exist; (iii) What has changed since? - To find the differences within an area over time; (iv) What spatial pattern exists? - To know the concentration of certain activities and where they are located; and (v) What if? - To determine what happens, if a certain action is taken by the use of modelling and scenario analysis.

New developments in geo-information not only offers unprecedented opportunities for the interaction between social information scientists and geographic information scientists, but have also opened a wide area for the integration of geo-information technology and spatial models into the day-to-day activity of institutions and individuals. Such developments have brought substantial changes in the conception of what spatial information is, and consequently, in the way the products are produced, stored, accessed and used. These changes have lead to a wide range of new applications, with new producers and users, and new commercial markets for spatial data and information. The following are some of the development challenges facing the Africa continent in which geo-information technology can play a crucial role in finding appropriate solutions:

(i) Land administration: Africa is becoming increasingly aware of the underlying economic and social issues related to land and is beginning to see the need to define land administration policies while considering their specific needs and contexts. The need to guarantee land tenure and the importance of a secured land title is crucial in securing the property rights of its owner. The lack of land titles to secure property rights, the deterioration of documents and the storage of official documents in poor conditions are challenges that continue to cause numerous delays

in transactions, fraud and conflicts that hinder investments and consequently the country's productivity. In addition to this, the limited capacity within the African countries present challenges in the establishment of functional land administration systems that are transparent, accurate and up to date so as to make land transactions easier, more secure and affordable for all.

(ii) *Enhancing sustainable management of resources:* Poor resource management continues to be a major development constraint in the African countries. This situation has negatively affected national development including sustainable land use, environmental degradation, land tenure insecurity, encroachment, unplanned settlements and loss of revenue among others. Natural resource degradation, low level agricultural productivity, declining share from the global trade and limited success of industrial development have weakened the position of African countries to fulfil the basic needs of its people. As a result, 51% of the population of Sub-Saharan African countries are living below the poverty line and Africa is the only continent in which poverty is expected to rise during the next decades. Hence, breaking the vicious cycle of poverty-environmental degradation-poverty is the key challenge in the context of sustainable development in Africa.

(iii) *Coping with urbanization and informal settlement:* Many cities in Africa are finding it difficult to cope with the rapid population growth and face enormous challenges in creating sufficient employment; in providing basic services such as drinking water, sanitation, basic health services and education; in planning and maintaining of green spaces; and in managing urban wastes and waste water. The availability of urban land cover data is, therefore, critical to policy makers, particularly for planners, because of their ability to monitor the impact of planning policies, the direction of urban growth and the development progress. There is need to establish appropriate land administration systems to make land available to those who need it and provide land tenure security. Efficient land administration supports economic growth, food security, poverty reduction and infrastructure development.

(iv) *Managing scarce water resources:* Water scarcity is fast becoming a critical issue in many African countries and could lead to a severe water crisis if water productivity is not increased. Water is crucial for the future of the region because of the need for more water fulfil the increasing demand for food, feed and fibre, associated with increasing population and changing demands; increasing water conflicts that may emerge from poor water governance and cross-boundary demands; and the trade-off in water use with other ecological services such as wetlands.

(v) *Arresting land and soil resources degradation:* Land degradation ranges from soil loss through erosion to habitat loss to soil fertility decline, and can be attributed to the interaction between short-term local and long-term global processes. The regional trends in land degradation suggest that the structure and functioning of ecosystems is changing rapidly as a result of habitat conversion. The major causes of degradation in Africa include growing population and increasing demand for food and cash income, intensification of agriculture rather than intensification, inadequate use of conservation practices, and lack of support by local governments among others.

(vi) Protecting forestry and agroforestry resources: The Africa's forest ecosystems are considered among the world's most fragile ecosystems facing the challenge of deforestation and degradation. Forests and tree crops provide important ecosystem services such as supply of timber and non-timber forest products including wild foods, medicines, pharmaceuticals and genetic resources; regulating services such as flood and climate; cultural services including spiritual, aesthetic, as well as recreational values; and supporting services including primary production, nutrient cycling, soil formation and biodiversity conservation among other products and services.

(vii) Reducing degradation and subsequent loss of biodiversity: The Africa's biodiversity of the sub-region is under high degree of threat due to a variety of forces, man-made and natural factors such as natural habitat degradation, social and political unrest, invasion by alien species and inadequate recognition of the value of indigenous and/or traditional knowledge systems. Desertification is rapidly changing plant associations with rapid loss of biological resources. The sub-region's biodiversity has economic, social, ecological and cultural values. There are environmental service functions of biodiversity that include nutrient recycling, soil formation, watershed protection, waste disposal, pollination, climate regulation and carbon sequestration, among others. Value goods are food source, drugs, fiber, resins, dyes, waxes, fuel and timber, while the non-consumptive utilization includes ecotourism.

(viii) Managing fragile ecosystems: Fragile and dryland ecosystems in Africa are some of the world's most unstable ecosystems facing the challenge of land degradation. These ecosystems are characterized by limited and erratic rainfall, overused due to intense population pressure, sensitive to climatic shocks, highly erodible soils, increasing population pressure, and populations highly vulnerable to food insecurity. Some of these fragile ecosystems include drylands, wetlands, water catchment areas (water towers) and biodiversity corridors.

(ix) Managing population growth and spatial distribution: Population growth rates in the Eastern, Central and Southern Africa countries are high ranging from 2 to 3%. These high population growth rates increase the demand for food and natural resources such as land and water. The increased demand for natural resources usually leads to scarcity and consequently triggers conflicts over access and environmental degradation due to excessive use. Consequently, poverty and food insecurity have continued to effect large population in the region. Poverty in both the rural and urban areas is the most complex and daunting challenge facing most countries in eastern, central and southern Africa.

(x) Coping with increasing demand for food: Agriculture is the major economic activity in many African countries. In almost every country, the rural economy supports most of the agricultural production, water, energy, forestry, fishery and other natural resources. As the dominant economic activity, agriculture provides food and fibre; employs the largest share of the human population; generates income, and; provides inputs into other sectors of the economy. Agriculture also provides opportunities for investments in other sectoral development activities. Despite the importance of agriculture in the African countries, challenges such as low productivity, limited diversification, and continuous degradation of the

environment, and recurrent droughts and in some instances floods threaten the viability of the agricultural sector.

(xi) Adopting and mitigating climate change: Climate change and global warming are global phenomena that transcend national boundaries. In the recent years, human development activities have significantly contributed to atmospheric greenhouse gas emissions and hence global warming, with serious consequences for mankind and other life forms. These phenomena have affected performance of the agricultural sector and food security; increased the prevalence of human, crop and livestock pests and diseases, and impeded road transport and the delivery of goods and services at times of need and trade. This is visible in the increasing average air and ocean temperatures, the widespread melting of snow and ice, and rising sea levels. However, the use of information and technologies to mitigate these aspects in the Africa region are minimal resulting in increased environmental degradation and poverty.

(xii) Coping with recurrence and management of natural disasters: Flood, drought, epidemic diseases and landslide are major natural disasters affecting the development of the region. This situation is made worse by the absence of early warning systems in the region and limited capacity on disaster predictions and management.

(xiii) Addressing health, medicine and diseases impact: Despite the significant strides in certain areas of social and economic development in Africa, the large disease burden of preventable and treatable health problems whose solutions are known continues to be a barrier to faster development on the continent. This scenario is exacerbated by the triple burden from communicable and non-communicable diseases, and injury and trauma, including the social impact of these, which have adversely affected development in Africa. Africa is still not on track to meet the health millennium declaration targets and the prevailing population trends could undermine progress made.

(xiv) Building adequate infrastructure: Infrastructural development is vital for optimising the productive use of a country's human and natural resources, communicating the country's comparative advantage for investment, promoting investment by reducing investor risk and lowering transaction costs, improving all aspects of governance and empowering people to directly participate in development. The development of the infrastructure will further promote business in the provision, analysis and presentation of information and hence information will become a "commodity" at the market place.

2.4.2 Challenges to the Application of Geo-information Technology in Africa

Despite the numerous advantages that accrue from the use of geo-information technology, the adoption and implementation of the technology in Africa is still faced with a lot of challenges as outlined below.

(a) Data availability and management

(i) Data Exchange Standards: With the rapid expansion of geo-information in the last

decade, standards to guide the way the broad community of providers and users of information operate are lagging behind and are only starting to be developed. By adopting specific standards, a number of benefits can be obtained such as facilitating the transfer of digital information between incompatible systems while preserving the meaning of the data being transferred; allowing users to evaluate the data by supplying them with information of data quality; reducing project costs by sharing data; and maintaining data and supporting efforts to update a database using multiple sources by smoothening the flow of information.

(ii) Availability of geographic datasets: While many African countries have successfully incorporated geo-information technology in their sustainable development programmes, the effective use of geo-information disciplines in the decision-making process has continued to be elusive mainly due to non availability of geographic datasets needed to understand and solve a particular problem.

(iii) Purchase of datasets and products: A major indicator of the utilization of geo-information technology is the purchase of datasets and products such as satellite imagery by both national and regional organizations. Organizations in Africa are currently purchasing far less datasets and satellite imagery than similar organizations in other developing countries throughout the world. This lack of demand for datasets and satellite imagery is not necessarily as a result of lack of interest in remote sensing but rather an indication that resource development has not yet generated a strong demand for land resource and environmental data in most of the African countries.

(iv) Impact of globalization on data availability: Geographic Information Systems are part and parcel of the globalization phenomenon. There is now a vast amount of spatial data in digital form, stored by several organisations at various locations across the globe. The integration and subsequent querying of spatial datasets, locating and obtaining of datasets across various networks and maintaining interoperability among dissimilar spatial datasets has become a major challenge for many African countries.

(b) Geo-information System and technology

(i) Application Environment: The successful implementation of geo-information programmes in many developing countries depend upon a reasonable degree of similarity of infrastructure environment of both producer and the user. However, most developing countries use geo-information systems designed, developed, tested and evaluated for conformity with the scientific, cultural, and social environments of the developed countries and apply them the way they were designed which may not work as was anticipated.

(ii) Incompatible systems: In many developing countries, various institutions often buy systems from different sources which results in incompatible systems. The use of different products in the same country leads to building of isolated systems based in many organizations that are difficult to integrate nationally due to heterogeneity of systems used in geo-information applications.

(iii) Awareness of the Technology: Many see geo-information as a “beyond-the-reach” technology, while some mystify it. This has kept many people from taking advantage of the immense opportunity and power of the geo-information technology especially in decision making and planning. These views capture the position of many African countries as far as the implementation and application of geo-information is concerned. This has slowed the pace of the geo-information technology implementation and application in Africa.

(iv) Cost of acquiring the geo-information components: The cost of geo-information components such as the hardware, software and methodologies is a major problem hindering the acquisition and consequently the use and application of geo-information in Africa. Some of these components include servers, workstation, global positioning system (GPS), and Geospatial software and conversion equipment such as digitizer, scanners, and plotters.

(v) Utilization of geo-information technologies: While Africa has not been left out from the rapid changing technology, there are still many problems confronting the access and utilization of geo-information technologies. Because of this, these technologies have not been incorporated in a systematic manner in the implementation of national programmes and, therefore, applications are normally done on an ad-hoc basis and are limited or are project driven.

(c) Capacity, Communication and infrastructure

(i) Human Resources: The problem of geo-information training is very severe in Africa because of lack of expertise in the region. Universities and other higher institutions generally lag behind in geo-information development. Very often, government agencies acquire and use geo-information technology long before courses are offered by the learning institutions. The training of geo-information personnel is often carried out by private software companies by either sending their staff (vendors) to give short courses on site or sending the operators and users to be trained in the company’s headquarters. The quality of training by the vendors is not guaranteed as they may be more concerned with increasing their profits by selling their product rather than building capacity.

(ii) Access to Internet: Access to Internet enable users to access data and information that is available in the Information Highways that allows the sharing of selected data and information among users within countries and around the world. In developed countries, Intra/Internet technology has been found to be invaluable by the users in identifying and locating geographic data from a wide number of producers, and for producers to disseminate their services and data and assess user's needs. However, this is not the case in Africa because the datasets are not readily available and most national information policies do not incorporate the geo-information component.

(iii) Information communication infrastructures: Most African countries have taken the initiative to develop and establish national information communication infrastructure policies and plans as a major component of their National Information policies. In most cases, however, these policies do not incorporate geo-information infrastructures. Because of this, most African

countries are yet to acquire ultra-modern well developed physical and infrastructural capacity for offering quality geo-information

(iv) Organizational Issues: Consideration of organizational matters is very important in the implementation of geo-information facilities. The organizational problems are often more complex and more crucial to the success than the technical problems involved. Technical problems can be solved in a direct manner by acquiring and installing new equipment or new software modules. However, organizational issues require more continuous management attention because changing the organization alters staff authorities and relationships, and staff changes always bring in human factors that are difficult to predict or control.

(v) Conservatism: Conservatism is another factor slowing down the implementation of geo-information in many African countries. A lot of professionals are not willing or are reluctant to change from the old methods of collecting and analyzing data. Many are yet to change their focus from the traditional drawing board, pens, and T-square. Many organizations still acquire, store, process, sort, retrieve and display data manually.

(d) Policy and legal framework

(i) Legal frameworks: The legal framework within which information is controlled has to consider the increasing desire to capture and distribute information both as part of the function of government and for commercial gain. However, the laws and regulations governing the data acquisition and management were enacted before the introduction of geo-information technology in most of the African countries and, therefore, may not offer adequate guidance in the capture, distribution and use of information.

(ii) Data ownership and copyright: The problem for most generators and users of geo-information technology is how to know who owns the data and what rights one has to use the data. There are also issues of integrating datasets for the purposes of analysis and what rights exist for passing such derived data on to third parties. The problem of ownership and copyright also lead to the questions of ownership of “value added” dataset and to legal issues of responsibility for data accuracy, currency and use. There are also legal questions related to the liability of geo-information systems and who is responsible for quality of the result produced.

(iii) Enactment of policies and frameworks: The enactment of enabling legal frameworks take time to prepare and to put into place, not only in the developing countries but also in the developed ones. As a result of this, the legal framework in which information transactions are conducted in many African countries was not designed to meet the evolving needs and, therefore, may not deal adequately with every aspect of information revolution in an appropriate manner. In addition to this, the inadequacies of the system may take time to be recognized, particularly where legal precedents may not be available. The result of this is a legal framework that is inconsistent with a rapidly developing technology and increasingly information-based society.

(iv) Commitment among policy-makers: Probably the major obstacle accounting for the low demand for datasets and satellite imagery is the lack of awareness and commitment by policy-makers regarding the potential benefits of geo-information. As a result of this, financing geographic data is seen as costly expenditure and not as an investment. The challenge, therefore, is in changing this conception and raising the required awareness among decision and policy-makers on the importance of such data sets in supporting development of public policies. In this regard, appropriate resources need to be provided to strengthen the capacity of institutions in generation geo-information and for the purchase of hardware, software and data.

2.5 Centre Internal and External Environment Analysis

The Centre is mandated to play the critical role of providing products and services while building capacity in the use of geo-information and allied ICT needed for planning to spur growth and development in the region. In order to identify the Centre's strengths and weaknesses in relation to its set mandate, an internal environment analysis was carried out. Through this analysis, the Centre aimed at identifying its requirements with the view of assessing its current capacity to deliver on its mandate and objectives. Since the Centre is a knowledge and information producing as well as capacity building institution, the most relevant aspects that were analyzed were those related to the availability, utilization and management of inputs (human, financial and physical/infrastructural resources), the processes carried out to transform the available inputs into outputs and products (knowledge, information and technology) produced.

With respect to the external environment analysis, the Centre operates within a "General External" environment which is the macro-environment that affects the Centre no matter what sort of programmes it performs. At this level, events are beyond the control of the Centre. On the other hand, the "Operational External" environment is the environment in which, and for which, the Centre develops its technologies, products and services. Although the Centre does not have a direct control over this operational external environment, it does have some chance of exercising some influences over it. In this regards, a situational analysis of the Centre's external environment was carried out to:

- Study the relationships between the Centre and its relevant external environment in terms of current and emerging opportunities and threats.
- Provide the Centre's management with the capacity to respond to critical questions from the external environment.
- Explore future scenarios of the external environment so as to include them in the decision-making process.
- Identify and prioritize emerging opportunities and threats to effectively devise strategies to address them.
- Build a vision for the Centre, based on indications given by the emerging realities in the external environment.
- Understand market dynamics in order to develop need-driven customer-oriented services and products.

The analysis of the opportunities and threats focused on the Centre's general and operational external environments that include Political, Economic, Socio-cultural, Technological, Institutional, Legal and Environment factors (PESTILE).

2.5.1 The Existing Strengths

The existing strengths that allow the Centre to take advantage of the available opportunities and those that protect it from external threats include the following:

- (i) **Human capacity:** Over the years, the Centre has invested in the development of a critical mass of skilled and experienced technical and support staff with the capacity and capability to carry out its mandate. This strength is enhanced by collaboration mechanisms that allow the Centre to partner and collaborate with other reputable organizations as well as retaining a pool of highly qualified consultants.
- (ii) **Financial support:** The Centre has access to basic financial resources from member States' annual contributions to support training and research activities in geo-information technologies, products and services.
- (iii) **Physical and infrastructural capacity:** The Centre has an ultra-modern well developed physical and infrastructural capacity for offering quality geo-information and allied ICT services and products for member States and other clients.
- (iv) **Client orientation:** The regional and national capacity of client-orientation gained by the Centre staff through many years of exposure to development and application of geo-information products and services for sustainable development in the member States provides a good base of enhanced focus on client needs.
- (v) **Donor support and confidence:** The Centre has developed a culture of accountability, transparency and impact orientation leading to building of confidence and credibility among development partners.
- (vi) **Regional and international reputation:** As a result of its extensive collaboration with partners, the Centre continues to maintain a regional and international reputation of excellence in research, development and application of geo-information for sustainable development.
- (vii) **Partnerships and collaboration:** The Centre has over the years established strategic partnerships and collaboration with other reputable institutions within and outside the region in research, development and application of geo-information and ICT for sustainable development.
- (viii) **Products and services:** The Centre has accumulated experience in geo-information and allied ICT technologies, products and services offered over time which it can leverage upon to respond to different client-demands.
- (vii) **International Standards Organization:** The Centre has acquired the international standards organization (ISO) certification that provides quality systems requirements and frameworks to which all the internal processes have now been accredited making it possible for the Centre's products and services to compete regionally and internationally.

2.5.2 The Current Weaknesses

The current weaknesses that may prevent the Centre from taking advantage of the available opportunities and those that do not protect it from external threats include the following:

- (i) **Lack of clear human resource management and development policies and strategies:** Weak staff development and management policies, unclear terms and conditions of service, non-competitive remuneration and incentive schemes to reward outstanding performance has led to low motivation and high staff turn-over.
- (ii) **Inadequate human resource capacity:** Currently, the Centre is operating below the optimum staff level in terms of numbers, skills and disciplinary mix required to enable it realize its mission/mandate.
- (iii) **Inadequate and unpredictable financial resources:** Due to dependence on contributions from member States, financing of the Centre programmes and projects has been inconsistent leading to inadequate service delivery to member States. National Mapping Agencies (NMA) lack adequate resources and this impacts the Centre too.
- (iv) **Reliance on donor funding for projects:** A substantial proportion of the Centre funding comes from development partners, rendering the Centre unable to deliver its programmes within planned timeframes and challenging its financial sustainability.
- (v) **Weak strategic links with development partners:** The Centre has not yet developed elaborate strategies and mechanisms to reach out to development partners to assist in funding some of its programmes and development of facilities.
- (vi) **Weak coordination and linkage mechanism:** Lack of better coordination and management mechanism and overlap of functions between departments and stakeholders has resulted in inadequate coordination in the implementation of activities.
- (vii) **Lack of institutional intellectual property rights policy:** Currently the Centre lacks an Intellectual Property policy to spell out issues of ownership rights, disclosure and management mechanisms, distribution of royalties, commercialization strategies and other pertinent issues that would make it possible to apportion benefit to deserving recipients.
- (viii) **Inadequate marketing strategy of the Centre products and services:** Inadequate budgeting and marketing/promotional strategy and low investment in products development and service delivery has led to low awareness and uptake of the Centre's services and products.
- (ix) **Limited ability to access modern technologies:** The Centre has not taken full advantage of the available modern technologies to enhance its efficiency and effectiveness in research and development of products and services due to funding limitation.
- (x) **Lack of offices in member States:** The absence of the Centre's branch offices in member States limits the extent of service provision especially for non-line ministries, nongovernmental organizations and the private sector at national level.
- (xi) **Lack of in-house residential facilities:** The lack of residential facilities at the Centre has caused the cost of training to be high leading to reduced volume of trainees attending the Centre's courses from the member States.
- (xii) **Heavy 'technology push' orientation:** The Centre's technical strategic growth areas cast an image of being heavily technology-focused rather than service-focused, thereby inherently creating detachment with potential clients and donors who are otherwise very much in need of the Centre's products and services.

2.5.3 The Available and Emerging Opportunities

The following are the available and emerging opportunities and prospects that are likely to have a significant impact on the Centre's operational and business environment over the next eight years.

- (i) **Political goodwill:** The impact orientation of the Centre in the development and application of geo-information and allied ICTs, coupled with the increasing awareness in the significant role of these technologies in sustainable national and regional planning and development has enabled it to continue enjoying good political will from the member State governments.
- (ii) **Supportive Government policies:** The prevailing policy frameworks for member State governments are increasingly mainstreaming geo-information and ICTs as integral in achieving their national and regional socioeconomic development priorities, thereby widening the potential for increased reliance on the Centre's products and services.
- (iii) **Environment and climate changes:** The environmental degradation and climate change provide the Centre with opportunities to engage in the development of appropriate mitigation measures to reverse/arrest these situations.
- (iv) **Availability of skilled labour and capacity within member States and the region:** There is a critical mass of well trained professionals and technicians in geo-information and allied ICTs in the member State government agencies and universities, and an emerging vibrant private sector, all of whom the Centre can work with to deliver diverse timely and quality products and services needed for sustainable national and regional planning and development.
- (v) **Potential for enhancing partnerships:** There is increasing demand for the formation of strategic partnerships with national, regional and international geo-information and ICT products and service providers as well as research institutions and development agencies on issues of mutual interest to the Centre's mandate.
- (vi) **Potential for donor funding:** There is increased donor funding for Africa and the region that the Centre can tap from by aligning its programmes and projects to donor priority areas of focus and further establishing strategic consortia networks so as to increase its tapping on donor funds.
- (vii) **Advancement in information and communication technology:** Emerging advances in ICTs offers the Centre the opportunity for increased data/information acquisition, sharing and dissemination for provision of timely interventions to member States and clients, further reducing operational costs.
- (viii) **Strategic location:** The current location of the Centre provides easy communication to the region and has the proximity advantage to a hub of key relevant international institutions that the Centre can work with.
- (ix) **Increasing regional and global integration:** More countries are interested in getting membership so as to benefit from the geo-information products and services offered by the Centre and sharing of experiences with member States leading to further benefit from pooled donor resources.

- (x) **Access to eastern and southern Africa market:** The Centre's regional coverage offers an expanded market for geo-information and ICT products and services thus allowing it to address both national and trans-boundary issues.
- (xi) **Income generation opportunities:** The Centre has well-developed products and services that can be marketed to improve its financial sustainability.
- (xii) **Tax exemption:** The availability of this facility enables acquisition of technology, equipment and services at subsidized costs that in turn enables the Centre to access resources for establishing a state of art facility.
- (xiii) **Availability of land:** The Centre has a substantial amount of land both at Kasarani and Ngong, which if optimally used can increase its products and services portfolio.

2.5.4 The Current and Emerging Threats

The following are the current and emerging threats that are likely to have a significant negative impact on the Centre's operational and business environment over the next eight years:

- (i) **Lack of support by some member States:** Due to varied national interests and priorities, some member States have not accorded adequate support to the Centre's programmes and projects.
- (ii) **Competition:** Globalization and regional integration are increasingly creating opportunities for other international institutions to offer geo-information services similar to those offered by the Centre.
- (iii) **Inconsistent remittance of subscriptions by member States:** The inconsistent remittance of subscriptions has affected the implementation of the Centre's programmes and activities
- (iv) **Brain drain:** Various institutions are able to provide better incentives which could lead to high staff flight from the Centre.
- (v) **HIV/AIDS pandemic, high incidences of malaria and substance abuse:** These can severely affect rural household labour and skilled manpower in various fields and disciplines, impacting negatively on sustainable management of environment and natural resources in the region.
- (vi) **Weak policy coordination:** Inadequate policy coordination among different environment relevant sector ministries in one country and among countries can undermine the development, application and dissemination of geo-information and ICT products and services among the member States.
- (vii) **Inadequate budgeting by member States:** Most member States do not adequately budget for geo-information activities, leading to reliance on donor support hence posing challenges for the Centre to implement annual plans.
- (viii) **Poor NSDI infrastructure:** Most member States have poor ICT infrastructure that limits timely transmission of data and information from and to the Centre.
- (ix) **Lack of national NSDI policy:** Most member States have no NSDI policy, a situation that inhibits them from fully benefiting from the large array of geo-information and ICT products and services currently available in the market.
- (x) **Increasing availability of free data:** The Centre model of redistributing Earth Observation data at a cost is increasingly being challenged by the emerging trend of data democracy that is advancing free offer of the data.

2.6 Analysis of Sectors of Development and Stakeholders

2.6.1 Analysis of Relevant Sectors of Development

Development in the member States is organized into sectors of development most of which require Geo-information for sustainable development planning. Given this understanding, therefore, an analysis of the relevant sectors of development was carried out to identify potential areas of collaboration and contribution during the implementation of the Centre corporate Strategic Plan as shown in Table 2.1

Table 2.1 Relevant sectors of development and their potential areas of collaboration and contribution

Relevant Sectors of Development	Potential Areas of Collaboration and Contribution
Agriculture/Livestock	Monitoring of crop status, crop yield estimation, crop identification, precision agriculture, Livestock identification, location and spatial distribution
Lands	Land use planning, land policy, land administration, basic mapping, geodetic reference systems, land information management, identification of land degradation, erosion, desertification, land ownership mapping
Health/Public Health and Sanitation	Health service availability mapping, disease outbreak forecasting and monitoring
Energy	Suitability mapping of solar, wind and hydro power sites
Security and Defence	Topographic mapping and GIS
Roads, Infrastructure and Public Works	Topographic mapping, high resolution imagery, GPS and GIS systems
Water Resources	Mapping and setting up of GIS systems for integrated water resources management and water quality analysis of water bodies
Transport	Geospatial Information systems for transportation analysis and design
Education	Curriculum development, training of trainers
Environment and climate change	Green House Gases Inventories, land degradation mapping, biodiversity mapping, vulnerability mapping of impacts of climate change
Mineral Resources	Exploration and mapping of mineral resources
Tourism	Mapping of areas of interest sites, providing GIS systems
Forestry	Assessment of magnitude, rate and pattern of forest cover changes, analysis of relation of forest cover changes and landscape attributes
Wildlife	Identification, spatial distribution, location and tracking of the movement and migration of wildlife

Housing and Urban Planning	Provision of geospatial data for planning, setting of GIS systems
Information and Communication	Spatial data infrastructure management and policy issues
Statistics and population distribution	GIS spatial analysis, mapping of enumeration areas and spatial distribution of population
Disaster Management and Early Warning	Flood forecasting, hazard and risk assessment mapping, fire monitoring
Heritage and Culture	Mapping of sites, providing GIS systems

2.6.2 Stakeholders Analysis

In carrying out its functional obligations, the Centre interacts with many internal and external stakeholders. These stakeholders can either provide opportunities for the Centre to enhance its efficiency and effectiveness or present threats that are likely to have a significant negative impact on the implementation of the Strategic Plan. The purpose of stakeholder analysis was, therefore, to identify the interests, roles/responsibilities, comparative advantages and contribution of the various stakeholders in the development and implementation of the Centre corporate Strategic Plan as shown in Table 2.2.

Table 2.2 Broad stakeholder categories and their expected contribution in the implementation of the strategic plan

Stakeholder Categories	Potential contribution to the implementation of the strategic plan
a. Member State Governments and relevant Sector Ministries	<ul style="list-style-type: none"> • Collaboration in programme development and implementation, provision of policy guidelines, synergies and capacity building and community mobilization for collective action. • Enactment of environment and natural resource management policies and legislations and approval of budgets and bills. • Planning, maintenance and management of infrastructure and sanitation, co-financing of critical planning and research projects.
b. Research Institutions and Universities	<ul style="list-style-type: none"> • Provision of expertise, professionalism, capacity building and promotion of science, technology and innovations. • Collaboration and partnerships in the development and implementation of research and development programmes.
c. Regional and International Research and Development Organizations	<ul style="list-style-type: none"> • Collaboration in the areas affecting environment and natural resource research, implementation of agreements and treaties, capacity building, resource mobilization, international lobbying and technical support.

d. Local and International Non Governmental Organizations	<ul style="list-style-type: none"> • Mobilization of resources, communities and up scaling of geo-information technologies, products and services. • Community empowerment, awareness creation, capacity building, advocacy networking, linkages, lobbying and information dissemination.
e. United Nations Organizations/Agencies	<ul style="list-style-type: none"> • Collaboration in the areas affecting sustainable development, implementation of agreements and treaties, capacity building, resource mobilization, international lobbying and technical support.
f. Development Partners	<ul style="list-style-type: none"> • Provision of technical support, finance assistance, capacity development and Consultancy.
g. Private Sector	<ul style="list-style-type: none"> • Partnership in research and development, resource mobilization, investment in facilities development and research endowment fund management.
h. Electronic and Print Media	<ul style="list-style-type: none"> • Dissemination of information through their wide coverage and communication networks and awareness creation.
i. Regional and International Professional Bodies	<ul style="list-style-type: none"> • Assurance of professionalism and best practises in research and development, provision of technical expertise, ethics and standards.

3.0 THE CENTRE STRATEGIC DIRECTION

3.1 Introduction

There is a rapidly growing importance of geo-information and information technology services in planning, developing and managing natural resources; service provisions in infrastructural development and management; and environment management. However, this information is currently not readily available and accessible to provide the fundamental basis for sustainable development in the Centre member States and Africa as a whole. This is contrary to the situation in developed countries where the production of fundamental geospatial data sets and development of national Spatial Data Infrastructure (SDI) are advanced and form the backbone for economic development. The SDI entail the technology, policies, standards, and institutional arrangements necessary to acquire, process, store, distribute, and improve the utilization of geo-spatial data from many different sources and for a wide group of potential users.

To achieve sustainable development, the Centre member States requires access to data, information, knowledge and understanding about the environment, natural disasters affecting the region and natural resources including socio-economic opportunities. In this regards, provision of the basic information for a variety of applications such as urban mapping, regional planning and development, urban transportation and utilities, as well as aspects of natural resource development such as minerals, agriculture, forestry, wildlife, water resources, disaster management, peace and security in the member States is very crucial. Given this state of affairs, the Centre has a very significant role to play in promoting the development of geo-information; timely provision of data and information; and building of capacity of member States in the application of geo-information and allied information communication technologies in sustainable national development. In order to deliver on this, the Centre will need to reorient and position itself strategically as the regional leader in promoting sustainable development in member States and beyond.

3.2 Critical Strategic Issues

Following critical analysis of the Centre operating environment and considering the need to contribute significantly to sustainable development in the member States, the critical strategic issues that need to be addressed in order to solve the major challenges facing the Centre's mandate area and take advantage of the available and emerging opportunities and prospects were identified. Addressing these critical strategic issues is also expected to enable the Centre improve its efficiency, effectiveness and impact in contributing to sustainable environmental and natural resource planning and management. This shall, in turn, enable the Centre to position itself strategically to contribute significantly to the regional economic development. The identified critical strategic issues have been grouped into broad categories as outlined below.

(a) Capacity and capability of the Member States

- (i)** Strengthening of the capacity and capability of the member States in the generation and application of geo-information and information technology in planning and sustainable development.

- (ii) Improvement on the provision of technical guidance and advice to the member States on establishment and operationalization of geo-information laboratories and national geo-information advisory bodies.
 - (iii) Improvement on repair and servicing of equipment and capacity building of member states and other clients in maintaining and servicing their equipment.
 - (iv) Provision of assistance in human resource and institutional capacity building to enhance the development and use of geo-information and allied information and communication technology in sustainable development planning in the member States
- (b) Geo-information technologies, products and services**
- (i) Provision of quality geo-information products and services in land, natural resources and environmental management for sustainable development in the member States.
 - (ii) Promoting the development of national and regional geo-information standards in line with ISO geo-information standards and facilitate the availability and application of existing international standards for customization at national and regional levels.
 - (iii) Establishment and operationalization of early warning systems for food security and disaster management in member States and at regional levels and capacity building on early warning and disaster predictions.
 - (iv) Strengthening of research and development in sustainable land, environmental and natural resource management in collaboration with member states' national institutions and international collaborators and partners.
 - (v) Institutionalization of a paradigm shift aimed at transforming the current orientation of the Centre's strategic growth areas from "technology push" to "societal benefit pull" supported by an appropriate feedback mechanism for assessing the usefulness and impact of its products and services.
- (c) Geo-information related ICT technologies, products and services**
- (i) Provision of quality information and communication technology (ICT) products and services in land, natural resources and environmental management for sustainable development in the member countries and beyond.
 - (ii) Provision of Geo-information and ICT problem solving applications and advisory services in sustainable land, natural resource and environmental management.
 - (iii) Provision of formal and on the job training in geo-information and allied information communication technology to member state nationals.
- (d) Institutional capacity and corporate governance**
- (i) Strengthening of the Centre's internal capacity and capability in the generation and application of geo-information and information communication technology in sustainable development planning.
 - (ii) Strengthening the capacity and capability of the Centre to provide demand-driven geo-information and ICT training programmes to regional clients from the member States.
 - (iii) Establishment and implementation of appropriate institutional arrangements and mechanisms for effective and efficient planning, development and management of the Centre's human resources to attract and retain well qualified staff.

- (v) Establishment and implementation of appropriate institutional arrangements and mechanisms for effective and efficient financial resource mobilization and management to improve the Centre's financial stability and sustainability.
 - (vi) Strengthening of the Centre's infrastructure and corporate governance processes and procedures aimed at moving the Centre towards becoming strategy focused organization
- (e) Institutional partnerships, marketing and policy advocacy**
- (i) Establishment and operationalization of marketing strategy, functional and beneficial linkages, partnerships and collaboration among relevant stakeholders in the development, application and dissemination of geo-information technologies, products and services.
 - (ii) Continuous lobbying and advocacy for formulation and implementation of appropriate environmental and land use policies and legislation frameworks for sustainable environmental and natural resources management for development.
 - (iii) Development of institutional Intellectual Property Rights Policy that spells out the issues of ownership, disclosure mechanisms, intellectual property management, distribution of royalties, commercialization strategies and other pertinent issues that would make it possible to apportion benefits to deserving recipients.
 - (iv) Development of strategies to respond to different challenges brought about by cross-cutting issues such as HIV/AIDS, malaria, gender, and drug and substance abuse in all the Centre's programmes.
- (f) Knowledge and information management and communication**
- (i) Establishment and operationalization of appropriate mechanism for data holding, analysis and dissemination including acquisition, standardization, archival and dissemination of satellite and auxiliary data.
 - (ii) Development and operationalization of innovative delivery pathways for promoting the dissemination and utilization of geo-information technologies, products and services in sustainable development planning.
 - (iii) Establishment and operationalization of appropriate regional hub to serve as a focal point for geo-information and allied ICTs knowledge and information one stop centre.
 - (iv) Establishment and operationalization of appropriate communication mechanisms for improving the centre's profile and visibility nationally, regionally and internationally.

3.3 Centre Strategic Focus

3.3.1 Strategic Vision

The Centre Vision that requires the Centre and its member States, stakeholders and partners to stretch their future expectations, aspirations and performance is **“To be a premier Centre of excellence in the provision of geo-information for sustainable development in the member States and beyond.”**

3.3.2 Mission Statement

The Centre Mission statement that expresses its fundamental purpose and business is **“To promote sustainable development in the member States through generation, application and dissemination of geo-information and allied ICT technologies, products and services”**.

3.3.3 Guiding Core Values

The guiding core values that the centre, as well as its member States and collaborating partners hold in common and endeavour to put into practice while performing their functional obligations include the following:

- (i) **Quality service, innovativeness and ethics:** The Centre believes that the stakes in generation and application of geo-information for sustainable natural resource and environment planning and management are extremely high in terms of the investments that are necessary for meaningful outcomes and will, therefore, remain focused on quality service delivery, innovativeness and adherent to ethics and standards so as to meet and exceed client’s expectation.
- (ii) **Partnerships for collaborative advantage and synergies:** The Centre will pursue productive and beneficial partnerships and strategic alliances with clearly defined roles, responsibilities, governance and supportive mechanisms so as to ensure effective collaboration and synergies that have a direct bearing on the Centre’s Mission.
- (iii) **Effective knowledge and information management:** The Centre is committed to nurturing a strong culture in the generation, sharing and application of geo-information for sustainable natural resource and environment planning and management within the member States and beyond.
- (iv) **Regionality and environment conscience in delivery of services:** The Centre is a regional organization committed to the achievement of economies of scale and scope while ensuring optimal availability of regional public goods with respect to geo-information technologies, products and services while maintaining the quality of environment.
- (v) **Integrity, transparency and accountability:** The Centre upholds virtues of integrity through honesty, fairness and professionalism in all its operations while remaining committed to effective and efficient utilization of all resources entrusted to the Centre by the member States and development partners in the most transparent, accountable and cost-effective manner.

3.4 Centre Level Strategic Results

The Critical Strategic Issues identified above have formed the basis for setting the Centre’s strategic focus and five centre level strategic results shown in Table 3.1. Attainment of the five strategic results is deemed necessary and sufficient to address the identified Critical Strategic Issues leading to delivery of the Centre’s purpose of **“Generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States”**. Attainment of this purpose will contribute significantly to the realization of the overall Centre goal of **“Promoting sustainable development in the member States and beyond.”** The strategic results are designed to continue positioning of the Centre strategically

as a leader in promoting sustainable development in the member States and beyond. The Centre level result framework is shown in Annex 1.

Table 3.1: Centre level strategic results

Results	Statement
Result 1	Capacity and capability of the member States in the generation and application of geo-information and allied ICT technologies, products and services for sustainable development planning strengthened.
Result 2	Demand-driven geo-information and allied ICT technologies, products and services for sustainable development planning generated and provided.
Result 3	Institutional capacity, marketing and resource mobilization for geo-information generation, application and dissemination improved.
Result 4	Effective and efficient institutional partnerships and strategic alliances, advisory services and policy advocacy established and operationalized.
Result 5	Availability and application of geo-information technologies, products and services for sustainable development planning in the member States and beyond improved.

3.5 Strategic Growth and Transformation Areas of Focus

In order to deliver on the five Centre level strategic results, functional operations in the Centre have been rationalized into three technical and three management support functions and services strategic growth and transformation areas of focus as shown in Table 3.2. These necessary and sufficient strategic growth and transformation areas of focus express a stronger institutional commitment to growth and transformation as the strategic orientation and positioning of the Centre as a leader in promoting sustainable development in the member States and beyond. The strategic growth and transformation areas of focus are considered as integrally linked rather than as isolated areas.

Each strategic growth and transformation area of focus shall be expected to contribute to the attainment of the five Centre level strategic results. To do this in the most effective and efficient manner, each strategic growth and transformation area of focus will be expected to deliver on a strategic purpose that is similar to the Centre level purpose, but reduced in scale and scope to its specific area of interest for better outcome mapping and impact orientation.

Table 3.2: Centre strategic growth and transformation areas of focus

Technical strategic growth and transformation areas of focus	Management support functions strategic growth and transformation areas of focus
(i) Remote sensing, geographic information system and mapping	(i) Financial resource management and Procurement
(ii) Land surveys and management	(ii) Human resource management and Administration

The strategic growth and transformation areas of focus outlined in Table 3.2 are the critical areas in which the Centre will need to grow in capacity and competency so as to position itself strategically to meet the demands and commitments to service delivery to the member States. To do this, the Centre will need to institute appropriate transformation measures in these areas of focus designed to improve on their effectiveness and efficiency in responding to the demands from the member States and other clients. The transformation measures to be carried under each area of focus shall, however, not be treated as a separate undertaking but shall be integrated into the action plan for each area of focus. In order to be effective in bringing about the desired change, the transformation process shall be carried out in a structured framework capable of addressing the obvious and less obvious factors of transformation and change. In this regards, the transformation framework shall be guided by the following logical change management steps:

- (i) Why is transformation required? - Situational analysis.
- (ii) What needs to be transformed and to what? - Substance of transformation.
- (iii) How should the transformation process be carried out? – The process of transformation.
- (iv) Who does what in the transformation process? – Roles and responsibilities.

3.6 Strategic Factors of Success

During the implementation of its strategic plan for the period 2011-2014, the Centre learned a lot of lessons and experiences. During the implementation of this new strategic plan, the centre will capitalize on these lessons and experiences to ensure that the Centre moves towards becoming a “Strategy-Focussed Organization”. A strategy-focussed organization has been defined as that organization that places its strategic plan at the centre of its management and change processes by clearly defining the strategic plan, communicating it consistently internally and externally, and linking it to the drivers of change to create a performance-based culture that links everyone and every unit to the unique features of the strategic plan. To achieve this and deliver on its inspirational mission, the Centre will need to excel in the critical strategic factors of success outlined below. The set of critical strategic factors of success provide the means for the Centre to align and focus every dimension of its operations on achieving its strategic results, as well as to oversee and monitor the overall performance of the Centre. The critical strategic factors of success include the following:

- Translating the Centre strategic plan to realistic and well aligned operational and annual work plans.
- Aligning the Centre to the strategic plan to create synergies through integration of operations of different Centre units.
- Making the strategic plan everyone’s every day business by ensuring that all the Centre employees understand the strategic plan and conduct their day-by-day business in a manner that contributes to the success of the strategic plan.
- Making the strategic plan a continual process by linking it to the Centre management, budgeting and performance contracting processes.

- Mobilizing organizational change through executive leadership that establishes a sense of urgency, creates the guiding coalition and ensures effective communication throughout the Centre.
- Aligning and integrating the Centre's intangible assets (human, information and organizational capitals) to the strategic plan for sustainable value creation.
- Ensuring continuous Centre learning and growth to enhance knowledge management capabilities, close skills gap and achieve positive staff climate.

4.0 TECHNICAL STRATEGIC GROWTH AND TRANSFORMATION AREAS OF FOCUS

4.1 Introduction

As outlined above, the technical operations in the Centre have been rationalized into three technical strategic growth and transformation areas of focus that include (i) Remote sensing, geographic information system and mapping; (ii) Land surveys and management; and (iii) Technical support functions and services. This chapter goes further to elaborate on each technical strategic growth and transformation areas of focus in terms of its rationale and justification; the challenges facing the area of focus; and the strategic focus to be followed in order to address the identified challenges and contribute to the achievement of the overall Centre purpose.

4.2 Remote Sensing, Geographic Information System and Mapping

4.2.1 Rationale and Justification

Geo-information has become an important tool for decision making in almost all sectors of development in each of the Centre member State. The application of Geo-information has been highly diversified and it has been used effectively in the main sectors of development such as environment, forest and wetland, land, water, agriculture, health, disaster risk management and early warning, service provision management among others. These sectors require high quality and timely spatial data, efficient processing tools, institutional capacity building (setting up GIS laboratories and training) and support in projects formulation and implementation.

Geo-information technology is relatively new as compared to other disciplines. It is rapidly growing discipline benefiting from rapid growth in information and communication technology (ICT), Computer Programming, Space Science, Solid State Physics, Satellite technologies (building and launching satellites) and Astrophysics. Because of this, continuous research on the technology, testing and validation of data and products of the technology is highly required. Remote Sensing (Earth Observation), Photogrammetry and Field mapping are the bases of primary data capture or acquisition using different medium, tools and methodologies. Whereas GIS, Cartography and spatial database are tools and methodologies for data analysis, interpretation, output preparation, archiving and retrieving. Therefore, the five disciplines in the Department of RS, GIS and Mapping are interrelated. One feeds to the other in the process of producing products and information that are vital in day to day activities of the different sectors of development. Without use of these geo-information tools, it would be difficult and costly to produce high quality information that is required in policy development, in day to day service provision, in natural resources management and development.

All the Centre member States require geospatial data from different sources, tools for processing the data, capacity development on how to process and interpret geospatial data, joint project implementation and product development and spatial products output preparations. In this regards, there is a need for prompt respond to the demands from member

States and provide timely and high quality services to the different sectors of development as well as to other users in a coordinated and efficient manner.

4.2.2 Challenges

The challenges experienced in the area of Remote Sensing, Geographic Information System and Mapping include the following:

(i) Dealing with environmental changes and degradation: Due to climate change and rapidly growing human population, the natural environments, ecosystems biodiversity hotspots are under continuous threats and pressure. Rapid and widely dispersing environmental degradations are taking place in most of Centre's member States. Some of the degradations are irreversible and, therefore, make it difficult to achieve sustainable development. Therefore, using multi-temporal geospatial data (satellite images and aerial photographs) these environmental changes and degradations can be continuously monitored and quantified for presentation to the policy makers so that the necessary mitigation actions and policies are made.

(ii) Ensuring availability and effective management of water resources: Water is one of the most precious and rapidly depleting resources in the region. River basins and catchments of the main water bodies in the region are highly degrading. The discharge of most of the rivers is rapidly declining. Water quality in most of the natural reservoirs is also deteriorating. These negative impacts are again mainly as a result of climate change and poor management of important water towers or catchment areas. The tool that are being developed in the Department of RS, GIS and Mapping can help in understanding the water balance in a basin, in identifying recharge and discharge areas and also developing efficient monitoring and management tools for water resources.

(iii) Improving availability and quality of Geospatial data: Availability of data at required resolutions (spatial, temporal and radiometric) is still a problem affecting most of the sector development activities in the Centre member States. Data for urban mapping, base maps updating, agricultural statistics, geological exploration, forest mapping and management, water exploration among others are not available in time and at a required quality. There is, therefore, a need to ensure timely availability of data by all users using different modalities of data access.

(iv) Strengthening geospatial analysis and modelling: Geospatial analysis, multi criteria evaluation (MCE), Decisions Support System (DSS) and Modelling have become very efficient and effective methodologies in simulating natural processing and forecasting results or outputs of a natural event or phenomena such as draught, flooding, landslide as well as in undertaking scenario analysis such as crop yield analysis, vegetation condition monitoring, land suitability analysis. It involves integration and analysis of geospatial data, socio-economic data, bio-physical data from different sources and different time intervals to come up with integrated analytical results. Currently, the member States are faced with the challenges of establishing a common standard for data collection, archiving, updating and integration as well as

development of requisite capacities and enabling policies and strategies for establishing National Spatial Data Infrastructure.

(v) Improving map making and production: Cartography is one of the oldest discipline of Geo-information that deals with making and production of standard maps that are comparable at universal level. If there is no standard cartographic procedures for map production, the maps produced by different institutions in different countries cannot be comparable and understandable. Therefore, cartography responds to challenges related to map making and map production. It sets standards and procedures of map making from data collection level to final map printing.

(vi) Responding to natural disasters: A natural disaster is a serious disruption of the functioning of a community by a natural hazard causing widespread human, material, economic or environmental losses which exceed the ability of the community to cope with using its own resources. Due to global climate change and regional environmental degradation and lower coping capacity, most of member States are highly vulnerable to natural disasters such as flooding, drought, epidemic diseases and landslides. Timely and accurate forecasts and warnings of potential occurrence of natural hazards and effective coordination and cooperation between responsible agencies, institutions, officials and the media has continued to pose a major challenge to most of the member States.

(vii) Building capacity in the area of GIS, RS and mapping: Since the whole of Geo-information disciplines are relatively new and rapidly growing, there is a challenge in keeping professionals in member States abreast with this rapidly growing new technology. In this regards, therefore, there is a need for regular capacity needs assessment and continuous capacity development to facilitate effective adoption of new technologies.

4.2.3 Strategic Focus

The Remote Sensing, Geographic Information System and Mapping strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Generation, application and dissemination of remote sensing, geographic information system and mapping technologies, products and services in the member States”**. In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following five intervention strategies:

- (i)** Improvement on remote sensing services and environmental management.
- (ii)** Strengthening the photogrammetric data processing and application.
- (iii)** Strengthening the application of geographic information system and geospatial database management.
- (iv)** Improvement on the development and application of digital mapping and cartography.
- (v)** Improvement on the development and application of early warning and disaster management systems.

4.3 Land Surveys and Management

4.3.1 Rationale and Justification

The economies of most African countries rely heavily on agriculture and other land-based activities such as tourism, mining and livestock production. Indeed, these are the core activities through which African countries participate in the global economy. Moreover, land is the key to food security and the social-cultural needs of most communities in Africa. It has also been established that the performance of most sectors of the economies of African countries is indeed tied to the land sector. The management of this sector must, therefore, be accorded priority attention in all countries in order to unlock the overall performance of national economies.

Land administration is an implementation of land-related policies and land management strategies that help ensure social equality, economic growth and environmental protection. Implementation of land administration directly supports economic development, social justice and equity and political stability. Land administration is associated with security of tenure; land markets particularly land transactions and access to credit; real property taxation; sustainable management and control of land use, natural resources and the environment; the provision of land for the poor, ethnic minorities and women; and measures to prevent land speculation and to manage land disputes.

Implementation of land administration functions ensures proper management of rights, and restrictions and responsibilities in relation to property, land and natural resources. These functions include the areas of land tenure (securing and transferring rights in land); land value (valuation and taxation of land and properties); land use (planning and control of the use of land and natural resources); and land development (utilities, infrastructure, construction planning, permits and implementation). Modern Land Administration Systems facilitate sustainable development through public participation and informed and accountable government decision-making in relation to the built and natural environments. The land administration functions are based on, and are facilitated by appropriate land information infrastructure that include cadastral and topographic data sets that provide access to complete and up-to-date information of the built and natural environment.

Information about the location, condition and type of interest over the land is needed for proper planning, sound policy formulation and for timely service delivery to people. However, much of the information in most of the Centre member States is lacking. Where available, it is in analogue form making processing and digital analysis difficult. Poor land management also continues to be a major development constraint in the Centre member States. This situation impacts negatively on national development in a number of ways including unsustainable land use, environmental degradation, land tenure insecurity, encroachment, unplanned settlements and loss of revenue among others.

For efficient and effective management of land, land-based resources and land related transactions, timely access to up to-date and accurate land information is required. However, such information is not readily available to inform decision making. In view of this, the Land

Surveys and Management Department aims at building capacity of the land sector in the Centre member States for efficient and effective land administration and management as well as modernization of land information capture, processing, storage, retrieval and dissemination.

4.3.2 Challenges

The challenges experienced in the area of land surveys and management include the following:

(i) Establishing uniform coordinate reference system: Most of the Centre member States have different coordinate reference systems. However, cross-border, national, regional, continental and global geo-referenced applications, services and products require a uniform coordinate reference system. In addition to this, there are no up-to-date charts of rivers, harbours and oceans. There is also inadequate coastal zone management, hazard response and mitigation in some of the Centre member States and scarcity of trained personnel and equipment.

(ii) Migrating to digital data acquisition and processing system: The advances in Global Positioning System (GPS) and Total Stations, have made it easy to acquire land related data. These advances are relatively new in the member States and are posing a major challenges to many countries. In addition to this, most member States have very little cadastral coverage and have a lot of informal settlements where most residents cannot afford registered rights. In some of the member States, optical mechanical equipments are still in use and with the introduction of digital equipment, surveying is more automated but member States do not have the required equipment and human capacity to enable them migrate.

(iii) Land management information system: Information about the location, condition and type of interest over land is needed for proper planning, sound policy formulation and for timely service delivery to people. However, much of the information in most of the Centre member States is inadequate and/or when available, it is in analogue form, making processing and digital analysis difficult. This information should be structured and stored in digital databases and digital maps which are linked together for easier storage, retrieval and analysis. Further to this, most of the member States are still using outdated, manual and conventional method of managing land information and would, therefore, need assistance to build their capacity and capability to establish and manage Land Management Information System (LMIS).

(iv) Servicing, repair and calibration of surveying instruments: The Geo-information technology is becoming more dynamic and the surveying instruments becoming more and more sophisticated. Surveying instruments play a big role in the development of any country such as cadastral survey (survey of plots) in cities, towns and villages, construction of roads, railway lines and buildings, survey of dams and irrigation systems. There are many manufacturers of surveying and mapping equipment in the world from which the member States procure surveying and mapping equipment. However, majority of the member States do not have the capacity and capability to carryout servicing, repair and calibration of their surveying instruments and would, therefore, require assistance from qualified engineers who are trained in all available equipment in the market.

4.3.3 Strategic Focus

The Land Surveys and Management strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Generation, application and dissemination of land surveys and management technologies, products and services in the member States”**. In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following four intervention strategies:

- (i) Improvement on the generation, dissemination and application of geodetic and hydrographical survey products and services.
- (ii) Strengthening the generation, dissemination and application of cadastral and engineering survey products and services.
- (iii) Development and operationalization of efficient and effective land information management systems.
- (iv) Improvement on servicing, repair and calibration of surveying instruments and other scientific equipment.

4.4 Technical Support Functions and Services

4.4.1 Rationale and Justification

The Centre’s technical departments are largely focused on delivering products and services that are basically geospatial and allied ICT in nature that are required to fulfil the Centre’s core mandate. In cognizance of the nature of the demands placed on the technical departments, it is critical that they fully concentrate on core geospatial activities and be provided with technical inputs that cut across departmental lines to fulfil their mandates. It is for this reason that the Technical Services Department exists to perform both internally and externally oriented role of providing technical inputs and services that cut across departmental lines. The technical inputs and services provided to support the geospatial functions are, to some extent, non-core but technical in nature.

The services and functions under the Technical Services Department are rationalized into several units. The Project Coordination and Quality Assurance Units ensures overall coordination and management of the projects implemented by the Centre as well as setting and enforcing international quality standards for services and products of the Centre. The Business Development and Marketing Unit is concerned with strategic planning, business development and marketing of the Centre’s products and services. The Data Management Unit is responsible for managing the geospatial database of the Centre that includes acquisition, quality assessment, archiving and dissemination of data to both internal and external clients. The unit is also involved in research on new geospatial data products available in the market and offers advisory services on data availability and suitability for different applications to clients.

Another unit under the Technical Services ambit is Information Technology Support Service unit which provides information technology support function to all Departments. Lastly, the Training Coordination Unit which has two sub-units, one responsible for geo-information training coordination, while the other one is concerned with ICT training. The geo-information training coordination is mainly a capacity building function in geo-information provided to member States and other clients. The ICT training, on the other hand, supports application of ICT to promote sustainable development in Africa and generate income to ensure the Centre's financial sustainability. This is done by providing ICT training to support the Centre's geo-information role and includes preparation of potential entrants into the geo-information field. Programmes delivered by this unit are basic ICT training, certificate and diploma in information technology. Another function performed by the department is to provide ICT solutions such as Management Information Systems, facility management systems and monitoring and evaluation systems to member States and clients.

4.3.2 Challenges

The challenges experienced in the area of technical support services include the following:

(i) *Strengthening geo-information training:* The demand for training at different levels is continuously increasing with arrival of new technologies, mainly hardware and software, development and diversification of geo-information application. There is, therefore, a need for regular short-term trainings to respond to these increasing demands in the member States. Tailor-made training and on-the-job training are also requested in packages with application projects. Graduate and undergraduate geo-information training programmes are also demanded by many clients from the host country and other member States. In addition to this, there are tertiary education institutions in the region that are demanding for partnership with the section to start joint longer training programmes. The section need to respond to these demands without compromising the quality of training service.

(ii) *Improving data management and dissemination:* Among the challenges faced by the Unit include a high demand for satellite remote sensing data by research institutions for analyzing environmental change as well as an increasing demand for free distribution of commercial high resolution satellite images for analyzing urban land use change. Due to increase in demand for geospatial data within the region, the Unit is accumulating huge amount of data sets that is exhausting the data storing capacity. There is, therefore, a need to upgrade the capacity of the Unit's data handling systems hardware (processing servers, storage disks and internet speed) in order to increase efficiency and productivity. The increase in client requests and data handling tasks has also created a need for strengthening of the human resource capacity of the unit.

(iii) *Strengthening information technology support service:* The Centre's ICT support has made a significant contribution over the years in backstopping the GIS function which is highly IT-based. The fulfillment of the demands on this service is not without its challenges. The old networking infrastructure has resulted in some costly down time on the IT communication, thus affecting key processes. Shortage of IT equipment such as computers has also compromised some services such as training support. To be able to provide top notch IT support to all

departments, there is need for adequate human capacity in the section. The acquisition and upgrading of state of the art technology requires substantial resources, in an environment of competing demands.

(iv) Improving ICT training coordination: The challenges that the Information Technology Training Centre is trying to address in the information technology training includes basic and advanced computing; professional training in database management systems; software development; website design and management; computer networking; graphic design; and personal computers (PC) maintenance and support. Another challenge is how ICT solution design and development could be employed to improve rural lives through interventions in health, agriculture, human rights, e-government and education

(v) Improving project management: Although the project management function is provided for under the current Centre organizational and management structure, the positions have remained vacant. Currently, this role is undertaken by the department heads and other senior technical staff. This arrangement has resulted in less attention being accorded to the project management function due to time constraint on the part of those currently undertaking the role.

(vi) Maintaining quality assurance: The role of Quality Assurance is to ensure that the Centre continues to provide its customers and all stakeholders with quality products and services that meet or exceed their expectations by ensuring compliance with ISO as well as Quality Management Systems (QMS). Although the Centre has acquired ISO certification, it will need to continuously maintain the high quality assurance standards so as to maintain the status of Centre of Excellence in the provision of quality products and services that meet or exceed their expectations.

(vii) Strengthening business development and marketing: The major draw-back is in the limited resources to aid the Centre to market more visibly. Further efforts have been curtailed and exacerbated by the lack of advocates of the Centre's agenda within member States. Networking with the relevant agencies is hampered due to high staff turnover. Fund raising to continuously mount marketing initiatives is a challenge coupled with pressure arising due to lack of additional human resources.

4.3.3 Strategic Focus

The Centre Technical Support Functions and Services strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Strengthening institutional technical support functions and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States.”** In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following seven intervention strategies:

(i) Improvement on the provision of tailor-made geo-information training.

- (ii)** Improvement in geospatial data acquisition, archiving and dissemination.
- (iii)** Strengthening of the information technical support systems, processes and services.
- (iv)** Strengthening of information technology, business training, and development and implementation of IT solutions.
- (v)** Development and operationalization of an effective project management and coordination system.
- (vi)** Development and implementation of quality assurance system.
- (vii)** Development and strengthening of business development and marketing strategies.

5.0 MANAGEMENT SUPPORT FUNCTIONS STRATEGIC GROWTH AND TRANSFORMATION AREAS OF FOCUS

5.1 Introduction

The successful implementation of the technical strategic growth and transformation areas of focus outlined in chapter four will depend largely on the availability, effectiveness and efficiency of the management support functions and services in the Centre. This chapter, therefore, focuses on the Centre capacities and competences that are required to implement the priority programmes and projects to be identified under the technical strategic growth and transformation areas of focus. The capacity describes the state of the Centre with its human, financial, infrastructure and institutional arrangements that will be required to adequately address the issues highlighted under the technical strategic growth and transformation areas of focus. Competence, on the other hand, goes one step further and describes the demonstrated capacity of the Centre to perform the work that is to be done. The required capacities and competences will emanate from within the Centre itself and from its member States and collaborating partners.

As outlined in chapter three, the management support functions and services in the Centre have been rationalized into three strategic growth and transformation areas of focus that include (i) Human Resource Management and Administration; (ii) Financial Resource Management and Procurement; and (iii) Corporate Governance. Like in the case of the technical strategic growth and transformation areas of focus, this chapter goes further to elaborate on each management support function strategic growth and transformation area of focus in terms of its rationale and justification; the challenges facing the management area; and the strategic focus to be followed in order to address the identified challenges and contribute to the achievement of the overall Centre purpose.

5.2 Human Resource Management and Administration

5.2.1 Rationale and Justification

People are the most important resource for any organization. Policies and practices for managing human resources of a regional organization such as RCMRD differ in many aspects from those of many national public and private sector institutions. Staff in a regional organization have unique occupational needs and characteristics which have important implications for management. They have high expectations for job fulfilment in carrying out their regional roles and responsibilities. It is, therefore, very important for the Centre management to ensure that the Centre attracts, develops, retains and effectively utilizes human resources with specific skills, attitudes and motivations that can allow the Centre's regional mandate to be attained effectively and efficiently.

The most important tasks in human resource management in any organization can be grouped into planning, staffing, development, compensation and evaluation. Effective human resource management in the Centre shall, therefore, be seen as an interactive process that begins with

the inputs of the Centre objectives, available Centre operating resources and critical analysis of the current state of the human resources. The focus for the human resource development and management initiative shall be to strengthen the capacity of the Centre to develop, institutionalize and sustain functional and effective human resource development and management policies and plans on training and career development that are geared towards improvement of the individual person, the group and the overall Centre efficiency and effectiveness.

The Human Resource and Administration Division of the Administration and Finance Department is expected to provide overall human resource management and administrative services to support the technical departments of the Centre. The Division is charged with responsibility of proper management of human resources of the Centre which includes hiring, developing skills and ensuring proper utilization as well as retention of human resources. In addition, the Division is responsible for providing a conducive work environment for all other Departments. More specifically, the Division is responsible for developing and implementing human resource policies and procedures; developing the Centre's human resource plan; implementing recruitment and selection policy and strategy; coordinating training and development of staff; managing the performance of staff; career development; staff motivation and retention; staff compensation; HIV/AIDS counselling; and provision of staff welfare and administration services. The Division, therefore, plays an important role in supporting the Centre's core functions by ensuring the availability of competent and highly skilled core human resources who are well motivated and facilitated with a conducive work environment to perform at the highest level.

The provision of administration and physical resource development and management services in the Centre is also very crucial to delivery of services to the member States and partners. The Centre administrative functions are supposed to interface with all other core departments and divisions of the Centre in the provision of essential services such as administration, transport, security, maintenance, construction of facilities, telephone, estate management among others. In view of this, and considering the need to contribute to the improvement of the overall Centre's efficiency and effectiveness, the human resource and administration Division shall focus on the analysis and prioritization of the Centre human resource and administration requirement and development and institutionalization of functional and effective human resource and administration systems and processes.

5.2.2 Challenges

The challenges experienced in the area of human resource management and administration include the following:

(i) *Attracting and retaining highly skilled human resources:* The Centre aims at maintaining a lean efficient and skilled work force that balances with its financial capabilities. While this approach might serve the Centre's immediate needs, to attract and retain highly skilled human resources that form the core staff would require a substantial investment in terms of compensation benefits. In the absence of resources for this, the Centre will continue

to face a challenge to get the skilled individuals necessary for a Centre of Excellence in Geo-information.

(ii) Coping with inadequate staffing levels: Due to insufficient funding, the Centre has not been able to attain the optimum manpower requirement even though their services are required. This has resulted in overstretching and overburdening of the current staff with additional tasks and responsibilities. The staff shortage is felt throughout the Centre and in all the functional areas. The Centre will, therefore, need to review its organizational and management structure and the optimal staff requirement.

(iii) Developing and implementing skills development and utilization strategy: By not having a clear skills and competency development strategy to guide the hiring, placement and utilization of personnel commensurate of the performance needs of the Centre has resulted in the inability to implement critical project activities. It is, therefore, vital to have a comprehensive job analysis and a strategy for matching and developing competences in line with the job's skill demands.

(iv) Establishing objective performance evaluation mechanism: The Centre has developed and implemented a Performance Management System to guide and support the recognition and reward as a way of motivating of good staff performance. However the system will require continuous improvement to make it more current, effective and relevant to changing needs and demands of the Centre.

(v) Developing and implementing appropriate human resource policies: While commendable work has been undertaken to review and implement staff rules and regulations that are an embodiment of human resource policy, work still remains to develop human resource policies related to staff acquisition, career development, motivation, reward and retention in order for the Centre to remain competitive in the labour market. There is, therefore, a need to develop a medium to long term human resource plan that lays down the human resource requirements in terms of the forecasted numbers, the quality and type of skills required as well as the cost implications.

(vi) Coping with the increasing maintenance costs: The nature of the activities of the Centre requires the availability of reliable transport, equipment and work facilities. The provision and maintenance or replacement cost of the capital acquisitions require substantial resources that would otherwise be put to productive returns in terms of implementation of core programmes and projects of the Centre.

(vii) Developing and managing physical resources: The generation and dissemination of geo-information technologies, products and services relies, among other factors, on the availability of adequate and appropriate physical infrastructure that include land, offices, staff residential houses, laboratories, workshops, stores/warehouses, vehicles and equipment. Availability of adequate physical infrastructure is a challenge to the Centre given the expanding nature of its mandate against increasing demands from the member States. The Centre will, therefore, need to analyze and prioritize its physical infrastructure requirement with a view to

developing appropriate physical resources development and management systems, processes and services.

5.2.3 Strategic Focus

The Human Resource Management and Administration strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Strengthening human resource management and administration systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States”**. In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following three intervention strategies:

- (i)** Strengthening of the human resource planning and management systems, processes and services.
- (ii)** Strengthening of the human resource development and motivation systems, processes and services.
- (iii)** Improvement of the Centre administration systems, processes and services.

5.3 Financial Resource Management and Procurement

5.3.1 Rationale and Justification

Financial resource acquisition and management has become a subject of increased concern because of budgetary constraints; increased competition for financing; challenges to increase efficiency in both public and private sector; the need for increased performance of public-sector organizations; taxpayers’ demand for transparency and accountability; need for better governance systems; and evolution from a control system of inputs to a control system of products and results. Because of this, financial resource acquisition and management in the Centre shall be seen as a set of processes and procedures designed to put financial resources to the delivery of services to the member States and partners.

The Centre programmes and projects are mainly funded by contributions from the member States. The Centre has also attracted considerable funding from development partners to support some of its activities. These funds have been accessed through proposals and negotiations with development partners. However, in order to attract more funding from development partners and other grant making foundations and corporations, the Centre will need to strengthen the capacity of its staff in competitive project proposal development, improve on negotiation skills for funding, establish beneficial donor relations and build donor confidence in its financial management and project implementation.

Expeditious and effective procurement of goods and services coupled with their effective utilization is very important in carrying out the operations of any institution. In order to ensure this, institutions are required to establish effective and efficient procurement and supplies units with qualified procurement staff. The operations of these units are guided by clear procedures

for procuring goods and services and disposal of unserviceable, obsolete or surplus stores and equipment in order to maximize efficiency, promote competition, integrity, fairness, accountability and transparency.

The Finance and Procurement Division is charged with the overall management of the financial affairs of the Centre. The Division maintains financial and accounting controls; generates external and internal financial reports; coordinates budget preparation and exercises budgetary control; forecasts and manages cash flows; manages debtors and creditors; invests surplus funds; and provides sound financial advice to Centre management. In addition to this, the Division is expected to ensure timely procurement and supply of goods and services at the right quantity, quality and at competitive prices in accordance with the existing procurement and disposal procedures. In line with these functions and considering the need to contribute to the improvement of the overall Centre efficiency and effectiveness, the Finance and Procurement Division will focus on the analysis and prioritization of the Centre financial resource and procurement requirement and development/strengthening and institutionalization of functional and effective financial resource and procurement management systems.

5.3.2 Challenges

The challenges experienced in the area of financial resource management and procurement include the following:

(i) Coping with inadequate and unpredictable financial resources: While a good number of member States have demonstrated their commitment to the Centre through timely remittances, there are still high levels of non-remittance of contributions from some of the member States. These non-remittances have led, in some cases, to postponement or cancellation of planned activities.

(ii) Attracting and retaining adequate accounts and procurement staff: Currently, the Centre is operating below the optimum accounts and procurement staff level in terms of numbers, skills and specialization mix required to ensure effective and timely delivery of financial management and procurement services.

(iii) Strengthening strategic links with development partners: A substantial proportion of the Centre funding comes from development partners. However, in cases of delayed disbursement, the Centre is unable to deliver its programmes and projects within the planned timeframes. This state of affairs occurs due to weak strategic links with development partners that are required to ensure timely disbursement of funds.

(iv) Maximizing on available resources: The Centre's financial rules and regulations do not provide for investment of funds in instruments other than fixed deposits. This lack of flexible investment framework to facilitate investing of surplus funds denies the Centre better returns that may exist in the market. In addition to this, the efforts to control costs have been hindered by generally weak cost reduction awareness and practices among the Centre staff.

(v) Strengthening the Centre financial sustainability: The medium and long term survival of the Centre stands threatened by low financial sustainability. In addition to this, the level of income generation is too low to enable the Centre to self-support in the medium term. This further constrains the capacity of the Centre to undertake large projects or costly service delivery to the member States. Further to this, the Centre experiences delays in timely production of financial reports that are required to ensure effective financial management control due to lack of integrated information management system.

(vi) Setting up risk management and pricing mechanisms: The lack of risk management and internal financial controls makes it difficult to proactively mitigate incidents that may threaten the Centre's capacity to meet its financial management obligation. Further to this, the absence of a robust pricing and monitoring mechanisms has caused the Centre to realize low margins on completed projects and trainings. These margins are not sufficiently large to support future undertakings.

(vii) Strengthening the Centre procurement and supplies: The lack of an automated procurement and supplies management system has continued to deny the Centre the benefits of an integrated platform to track utilization of items, their procurement, receipt, requisition and issue.

(viii) Dealing with procurement process complexity and delays: The section is faced with the challenge of dealing with the increasing complexity of the procurement process caused by the sophisticated nature of modern scientific equipment and the associated high cost. The section also occasionally experience delays in procurement of goods and services due to failure by end users to submit right specifications and requirements on time thus delaying procurement process.

5.3.3 Strategic Focus

The Financial Resource Management and Procurement strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Strengthening financial resource management and procurement systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States”**. In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following three intervention strategies:

- (i)** Strengthening of the Centre financial resource budgeting, accounting and management systems, processes and services.
- (ii)** Strengthening the Centre financial resource acquisition, risk management and sustainability systems and processes.
- (iii)** Improvement of the Centre procurement and supplies systems, processes and services.

5.4 Corporate Governance

5.4.1 Rationale and Justification

In today's globalized business world, organizations need to access global pools of capital; attract and retain the best human capital; form beneficial partnerships and strategic alliances; and live in harmony with the community in a sustainable environment. To achieve this, organizations need to develop their capacities and capabilities to mobilize and utilize all kinds of resources required to meet the objectives set as part of their planning process. However, revelations of deterioration in quality and transparency have called for adoption of internationally accepted 'Best Practices' which gave rise to 'Corporate Governance'. Corporate Governance is the processes and related organizational structures by which organizations are directed, managed and held to account. It influences how the objectives of the organization are set and achieved, how risk is monitored and assessed and how performance is optimized. It is a system of structuring, operating and controlling an organization with a view to achieve long-term strategic goals to satisfy stakeholders and employees while complying with the legal and regulatory requirements apart from meeting environmental needs.

The Centre has made good progress in the establishment and operationalization of most of the required corporate governance systems, processes and services during the previous strategic plan. In order to continually improve on its efficiency and effectiveness while building on its credibility, the Centre shall concentrate on strengthening these systems, processes and services aimed at embracing the concept of good corporate governance. Adoption of good corporate governance will enable the management to pursue objectives that are in the interest of the Centre and its member States besides facilitating effective monitoring and efficient utilization of resources entrusted to it. In this regard, the Centre will need to continue strengthening of the corporate governance systems of management designed to contribute towards the Centre's accountability; effectiveness and efficiency; integrity and transparency; and open leadership in line with the requirements of modern corporate culture.

5.4.2 Challenges

The challenges encountered in the area of corporate governance include the following:

(i) Improving corporate communication: Some of the member States as well as clients and partners may not be fully aware of the Centre's mandate and its products and services. The Centre's sustainability and effective contribution to the member States' needs depends, to a large extent, on the corporate image projected with stakeholders. In order to address this challenge, the Centre has developed a communication strategy. In this regards, appropriate supportive mechanisms need to be put in place to ensure that the strategy is operationalized so as to strengthen the packaging of communication and marketing information in order to ensure that the information needs of all stakeholders are met, market opportunities for the Centre products and services are identified and promoted and the Centre's image is enhanced.

(ii) Improving resource mobilization: The inconsistent funding level from the member States and the unpredictable donor support require the Centre to explore complementary sources of funding. This would require the Centre to develop and implement appropriate resource mobilization strategies. In order to address this challenge, the Centre has developed a

resource mobilization strategy. In this regards, appropriate supportive mechanisms need to be put in place to ensure that the strategy is operationalized so as to enable the Centre to mobilize additional funding in a competitive and resource constrained environment in order to enhance its financial sustainability.

(iii) *Strengthening partnerships and strategic alliances:* The generation and application of geo-information for sustainable development planning requires the establishment and operationalization of effective and efficient partnerships and strategic alliances among the wide range of actors involved in the planning and management of land, natural resources and environment. In this regard, the Centre will need to develop and operationalize a partnership strategy so as to strengthen the existing partnerships and facilitate the development of new strategic alliances.

(iv) *Establishing corporate legal services:* The Centre is a legal entity and, therefore, under an obligation to comply and act within the laws of the host state as well as those of the member States. As a result of this, there is need for corporate legal services to ensure statutory and legal compliance as well as prepare and verify contracts, leases and other in-house contractual documents. This has, in the past, either been sourced from the national Government authorities or from private legal firms. The challenge with this arrangement is that the legal fraternity have to understand clearly the nature of the Centre's issues and its regional and international status to effectively deal with such legal matters. Another aspect of the Centre's operations with legal implication is the issue of Intellectual Property Rights, which has not yet been articulated. Although this does not appear to be an issue at the moment, the Centre needs to have in place a mechanism on how to deal with it when issues of Patents and Intellectual Property Rights arise in the future as the Centre develops technologies and prototypes in geo-information and information communication technology.

(v) *Strengthening planning, monitoring and evaluation systems:* A well-organized and functional planning, monitoring and evaluation (PM&E) system is expected to contribute significantly to the decision-making process at different levels of the Centre. For the PM&E to be an effective tool for decision-making, information obtained will need to be relevant, timely and accurate. The absence of a formal monitoring and evaluation mechanism has meant that tracking of achievements and accountability of results has not been optimal. Alternative arrangements employed have not fully addressed the matching of result achievement with resources needed for programme implementation.

(vi) *Strengthening the internal financial and assets audit systems:* The main role of this function is to monitor and evaluate the technical and operational systems to identify any foreseeable risks, deviations from laid down procedures, rules and regulations, and apply the right tools to make corrective measures. In order to continuously improve on its efficiency and effectiveness in the utilization of resources, the Centre will need to continue with the strengthening and improvement of the internal controls in line with modern corporate governance principles.

5.4.3 Strategic Focus

The Centre Corporate Governance strategic growth and transformation area of focus shall be expected to contribute to the attainment of the overall Centre purpose through the attainment of its purpose of **“Strengthening the Centre corporate governance systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States”**. In order to deliver this purpose and contribute significantly to the attainment of the five Centre level strategic results, the strategic growth and transformation area shall focus on the following three intervention strategies:

- (i) Implementation of the corporate communication and resource mobilization strategies.
- (ii) Establishment and operationalization of effective and efficient corporate partnerships, strategic alliances and legal services.
- (iii) Establishment and operationalization of effective and efficient Centre internal audit, planning, monitoring and evaluation systems.

6.0 STRATEGIC PLAN IMPLEMENTATION ARRANGEMENTS

6.1 Implementation Approach

This new Strategic Plan, covering the period 2015-2018, has been developed within the context of a fast-changing and dynamic socioeconomic environment characterized by factors such as declining resource availability; a wide range of government-led public sector reforms in the member States aimed at improving efficiency and effectiveness in the management of the public service; and increased stakeholders and clients awareness of the need for sustainable development. In order to re-invent and position itself strategically, the Centre has identified five strategic results that are necessary and sufficient to deliver its purpose and hence the mission. In order to achieve this, there is need to create and operationalize a mechanism for establishing flexible alliances and innovation platforms that allow the Centre to establish and operationalize effective partnerships and collaborations with other organizations within and outside the member States including regional and international organizations, research institutions, universities and the private sector to solve priority sustainable development problems in a specified period. The formation of such partnerships and collaborations will be seen as one of the strategies for ensuring availability of additional resources for carrying out joint programmes and projects as well as ensuring availability of a critical mass of professionals with the right disciplinary mix to provide multidisciplinary solutions for priority sustainable development problems experienced in the member States.

The implementation of the Strategic Plan will further incorporate joint planning and participation by all key stakeholders within and outside the member States so as to ensure that multiple views, needs and concerns in resolving priority issues at different levels are taken into account and negotiated. The Strategic Plan strategic growth and transformation areas of focus shall be addressed through nationally and regionally coordinated programmes and projects. Cross regional and organizational synthesis, networking and sharing of lessons learned shall be used to improve the outcome and impact of the programmes and projects. Under-pinning the Strategic Plan and its implementation are also several crosscutting issues. These invariably affect and influence the implementation and direction of geo-information technology application in the member States, and have been recognized nationally, regionally and globally. In view of this, the Centre has made a commitment to address these crosscutting issues during implementation of this Strategic Plan. This commitment draws on and aligns the Centre Strategic Plan with the strategic plans of other relevant regional and global organizations.

The implementation of the new Strategic Plan over the period 2015-2018 will require a projected total investment of USD 15,815,000. The Centre expects to raise the projected budgetary requirement through member States contributions and internally generated revenues which is projected to be USD 16,938,000 over the four-year strategic plan period. It is, therefore, expected that the member States will continue to meet their financial obligations to the Centre to enable it carry out all the planned activities. Annexes 2 and 3 shows summaries of the Centre budgetary projection and Centre projected income for the period 2015-2018 respectively.

6.1.1 Promotion of Pro-Poor Sustainable Development

Not all sustainable development initiatives benefit the poor and often lead to negative impact on the vulnerable groups. Technologies that have economies of scale can focus on the wealthy and when too little attention is paid to the division of labour and resources, yield or profit enhancing developments can adversely affect the welfare of women and other disadvantaged groups. In this regards, the Centre shall endeavour to ensure that the geo-information technologies and innovations it promotes are pro-poor or at least scale-neutral, and that they strengthen the resilience of individuals and households to withstand adverse events. Important measures include employment generation and micro-finance that can reduce vulnerability while contributing to sustainable land, natural resources and environment management, improved livelihoods and wealth creation.

Sustainable land, natural resources and environment management-related legislation and regulation should ensure that sustainable development and growth promotion does not come with unacceptable increased risk and vulnerability. The promotion of technological change should promote diversification of livelihood strategies in ways that spread risk among different enterprises. Sustainable land, natural resources and environment management interventions involve trade-offs between yields and vulnerability but, for the poor, care must be taken not to sacrifice too much on sustainability at the expense of increasing production and productivity. Lessons learnt should be communicated to policy makers for incorporation in poverty reduction strategy papers and other poverty-reducing initiatives.

6.2 Implications on the Centre Management Systems

The implementation of the new Strategic Plan is expected to have major implications on many facets of the Centre's management systems as well as institutional capacity, culture and structure. During the Strategic Plan period, therefore, the Centre will strive to nurture an institutional culture that puts a premium on performance, service delivery and capacity for effective teamwork and collaborative partnerships that should be reflected at all levels of the Centre's operations. This culture shall be strengthened by appropriate incentives and a participatory system of monitoring and evaluation that provides constant feedback to the management and staff on progress towards achievement of mutually agreed objectives. The aim of such a system will be to promote accountability as a personal achievement rather than an escape from sanctions.

This new approach shall require the Centre management to recognize the need to build a corporate culture through strengthening of performance management and development of a comprehensive human resource management and development strategy. The approach shall also be expected to put emphasis on analysis of the tasks that the Centre needs to carry out as a basis for determining its human resource requirements. The staff will then need to be motivated through skill enhancement programmes, multi-tasking, rewarding of good performance in order to increase their participation in broad areas of decision-making and hence their individual stake in the achievement of the Centre's Mission. At the policy level, broader partnerships will require the development of appropriate policies for safeguarding

Intellectual Property Rights and ensuring equitable sharing of benefits accruing from successful development and application of technologies, products and services. The current staff establishment and gaps is shown in Annex 4.

6.2.1 Organizational and Management Structure

The commitment to increased emphasis on achievement and impact coupled with the understanding and acceptance that the Centre should take responsibility for marketing its technologies, products and services to the point of adoption and application, requires a review of the Centre's organizational and management structure. In transiting from the strategic planning process to the implementation level, efforts should be made to create a more horizontal institutional management structure that facilitates effective distribution of responsibilities and improvement of channels of internal and external collaboration, consultation and communication. In this respect, the Centre shall need to redefine and strengthen the functions of the different offices such as those of the Department Directors, Divisions and Sections Heads with a view to making them more efficient and effective in the delivery of services and reduce on overlaps and duplication of efforts. The details of the current Centre organizational and management structure as approved by the Governing Council are presented in Annex 5.

The current Centre organization and management structure recognizes two technical departments, one technical support department and two institutional management divisions. The institutional structure is weak in the area of corporate governance and will, therefore, need to continue strengthening it in line with the modern corporate culture along the lines initiated during the previous strategic plan. However, considering that Centre is a lean institution, it may not have the resources to establish fully fledged corporate governance sections but rather may consider establishing offices to deal with specific corporate governance aspects.

6.3 Operational Plan

This Strategic Plan has outlined clear strategic results and strategic growth and transformation areas of focus that can only be realized through sound implementation plans. To operationalize the Strategic Plan, therefore, the Centre shall develop a detailed Operational Plan (OP) covering the period 2015-2018. In order to ensure proper alignment and harmonization with the Strategic Plan, the Operational Plan shall be developed using a nesting approach for better outcome mapping and impact orientation. In this regard, therefore, the preparation of the Operational Plan shall take over the planning process from the intervention strategies level and go on to identify the necessary and sufficient outputs required to deliver each intervention strategy. This information shall then be summarized into implementation plans and financing plans for each of the strategic growth and transformation area of focus. The Centre level Result Framework that shall form the basis for developing key performance indicators in the strategic growth and transformation areas of focus implementation plans is shown in Annex 1.1.

6.3.1 Annual Work Plans

The Operational Plan shall be operationalized through rolling Annual Work Plans (AWP) in which the necessary and sufficient activities and their respective milestones required to deliver each yearly target shall be specified. The AWP's will be linked to the annual Performance Contract (PC) targets. The adoption of the rolling AWP's shall be expected to facilitate review and adjustment of planned activities in the context of emerging priorities and funding opportunities. The AWP's shall be expected to provide full details on the outputs and their respective activities, milestones, operational budgets and collaborating institutions and organizations.

The analysis of the previous annual work plans indicates that there was good adherence to the strategic plan and the operational plan in the preparation of the annual work plans. However, the annual work plan format was found to be difficult to follow and, therefore, there is a need to revise the format to make it more user friendly. A good work plan format should be able to identify activities easily and trace them back to their respective outputs and intervention strategies. This should be done by using appropriate and linked numbering system. In using a good annual work plan format, only brief narratives are required as all the justifications will have been done in the Strategic Plan and Operational Plan.

6.4 Performance Contracting

One of the most significant reforms being undertaken by the member State governments and organizations is the introduction and implementation of a system of performance contracting. An essential feature in performance contracting is the development of a devolved operation style which emphasizes management by outcomes rather than by processes. As an African regional organization, the Centre shall continue to strengthen performance contracting initiated during the previous strategic plan as a way of organizing and defining its results, responsibilities and tasks to ensure their systematic and purposeful accomplishment. Consequently, the broad intervention strategies described in this Strategic Plan will be broken down into specific outputs and activities which will then form the basis for negotiated and agreed upon annual performance targets with the Governing Council and cascaded down to all the Centre management units but reduced in scale and scope at each level. Each year's targets will build upon the previous year's accomplishments and lead systematically to the realization of the Centre's mission.

6.5 Monitoring and Evaluation

During the implementation of the different activities, a continuous participatory and rigorous self-monitoring and evaluation will be encouraged. To monitor and evaluate progress during the implementation, the Centre and the collaborating institutions and organizations shall also undertake internal and external reviews over the Strategic Plan period and the results of the reviews widely circulated to the member States, collaborating institutions and organizations, and other stakeholders.

In order to institutionalize the monitoring and evaluation process, the Centre shall develop and operationalize a suitable monitoring and evaluation system capable of tracking the

implementation of the planned activities. The monitoring and evaluation system shall include the use of result frameworks, work plans, site/field visits, semi annual and annual reports, mid-term internal and external evaluations, conferences and end-of-term external evaluations. The abridged version of the semi annual reports shall form annual reports which will in turn feed into the mid-term internal and external evaluations. The mid-term evaluation results will, in turn, assist in the external evaluation whose results will form a major input in the preparation of the subsequent strategic plans.

Outputs of all Centre activities undertaken will be consolidated into annual reports and shared among member States, collaborating institutions and organizations, and other stakeholders. The results obtained will also be presented in conferences, symposia and published as journal articles for wider information and knowledge sharing. In addition, all data captured will be appropriately stored for ease of retrieval and will form the basis for subsequent impact evaluation of projects.

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Annex 1: Centre level result framework

Intervention Logic	Objectively Verifiable Indicators by 2018	Means of Verification	Assumptions
<p>Overall Goal To promote sustainable development in member States and beyond.</p>	<p>1.1 Percentage contribution to the overall improvement in sustainable development planning for economic growth.</p>	<p>1.1 Regional and National economic and impact assessment reports. 1.2 Environment and natural resources assessment reports.</p>	<p>1.1 Member State Governments policies will continue to be favourable to sustainable management of environment, natural resources and infrastructure</p>
<p>Purpose Generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States.</p>	<p>1.1 15% improvement in the capacity and capability of the member States in the generation, application and dissemination of geo-information and allied ICT technologies, products and services. 1.2 10% improvement in the generation and provision of demand-driven geo-information and allied ICT technologies, products and services. 1.3 10% improvement in the Centre capacity, marketing and resource mobilization. 1.4 10% improvement in the management of partnerships, provision of advisory</p>	<p>1.1 Member States Government reports 1.2 Centre and collaborating institutional reports 1.3 External evaluation and impact assessment reports</p>	<p>1.1 Enabling policy environment for sustainable environment and natural and resources planning and management will prevail. 1.2 Political stability will continue to prevail in the member States</p>

	<p>services and policy advocacy.</p> <p>1.5 10% improvement in the availability and application of geo-information technologies, products and services.</p>		
Centre Level Strategic Results			
<p>1.0 Capacity and capability of the member States in the generation and application of geo-information and allied ICT technologies, products and services for sustainable development planning strengthened.</p>	<p>1.1 250 corporate, end user and academic training courses developed and offered to member States and private sector.</p> <p>1.2 2754 personnel trained from member States and private sector</p> <p>1.3 1,800 member States and private sector equipment repaired, calibrated and serviced.</p> <p>1.4 800 member States and private sector institutional capacity enhancement initiatives undertaken.</p>	<p>1.1 Member States Government reports.</p> <p>1.2 Centre and collaborating institutional reports.</p> <p>1.3 External evaluation and impact assessment reports.</p>	<p>1.1 Environment and natural resources will continue to be a major driver of sustainable national economic development of member States</p> <p>1.2 Member State Governments will continue to support sustainable natural resources and environment planning and management</p>
<p>2.0 Demand-driven geo-information and allied ICT technologies, products and services for sustainable development planning generated and provided.</p>	<p>2.1 50 projects developed and implemented.</p> <p>2.2 58 technologies, ICT solutions and software developed/adapted and provided.</p> <p>2.3 121,000 data and related products archived, retrieved and disseminated.</p> <p>2.4 17 research and development assignment conducted and documented.</p> <p>2.5 8 disaster early warning tools and</p>	- Do -	- Do -

	<p>systems developed and established.</p> <p>2.6 139 guidelines, procedure manuals and training materials produced and provided</p>		
<p>3.0 Institutional capacity, marketing and resource mobilization for geo-information generation, application and dissemination improved.</p>	<p>3.1 Strengthened and continuously implemented human resource management and administration systems, processes and services as outlined in the Operational Plan.</p> <p>3.2 Strengthened and continuously implemented financial resource management and procurement systems, processes and services as outlined in the Operational Plan.</p> <p>3.3 Improved and continuously maintained Centre infrastructure and facilities as outlined in the Operational Plan.</p> <p>3.4 Strengthened and continuously implemented Centre corporate governance systems, processes and services as outlined in the Operational Plan.</p> <p>3.5 10 financial resources mobilized strategies developed and regularly implemented.</p> <p>3.5 40% increase in financial resources mobilized to improve Centre sustainability.</p>	- Do -	- Do -
<p>4.0 Effective and efficient institutional partnerships and</p>	<p>4.1 18 existing partnerships and strategic alliances maintained and effectively</p>	- Do -	- Do -

<p>strategic alliances, advisory services and policy advocacy established and operationalized.</p>	<p>managed. 4.2 20 new partnerships and strategic alliances established and maintained. 4.3 57 advisory services on policies, standards, guidelines and geo-information training provided to member States and private sector.</p>		
<p>5.0 Availability and application of geo-information technologies, products and services for sustainable development planning in the member States and beyond improved.</p>	<p>5.1 10 stakeholder categories and their communication needs identified. 5.2 10 developed, produced and utilized communication products for different stakeholder categories. 5.3 20% increase in the demand for the Centre information, products and services</p>	<p>- Do -</p>	<p>- Do -</p>
<p>Technical strategic growth and transformation areas of focus and their respective intervention strategies – (Each of the strategic growth and transformation area of focus shall be expected to contribute to the attainment of the five Centre level strategic results)</p>		<p>Expected Intermediate Outcome</p>	
<p>1.0 1.1 1.2 1.3 1.4 1.5</p>	<p>Remote Sensing, Geographic Information System and Mapping Improvement on remote sensing services and environmental management. Strengthening the photogrammetric data processing and application. Strengthening the application of geographic information system and geospatial database management. Improvement on the development and application of digital mapping and cartography. Improvement on the development and application of early warning and disaster management systems.</p>	<p>Strengthened generation, application and dissemination of remote sensing, geographic information system and mapping technologies, products and services in the member States for improved sustainable development planning.</p>	
<p>2.0 2.1</p>	<p>Land Surveys and Management Improvement on the generation, dissemination and application of geodetic and</p>	<p>Strengthened generation, application and dissemination of land surveys and</p>	

<p>hydrographical survey products and services.</p> <p>2.2 Strengthening the generation, dissemination and application of cadastral and engineering survey products and services.</p> <p>2.3 Development and operationalization of efficient and effective land information management systems.</p> <p>2.4 Improvement on servicing, repair and calibration of surveying instruments and other scientific equipment.</p>	<p>management technologies, products and services in the member States for improved sustainable development planning.</p>
<p>3.0 Technical Support Functions and Services</p> <p>3.1 Improvement on the provision of tailor-made geo-information training.</p> <p>3.2 Improvement in geospatial data acquisition, archiving and dissemination.</p> <p>3.3 Strengthening of the information technical support systems, processes and services.</p> <p>3.4 Strengthening of information technology, business training, and development and implementation of IT solutions.</p> <p>3.5 Development and operationalization of an effective project management and coordination system.</p> <p>3.6 Development and implementation of quality assurance system.</p> <p>3.7 Development and strengthening of business development and marketing strategies.</p>	<p>Strengthened Centre technical support functions and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States for improved sustainable development planning.</p>
<p>Management functions and services strategic growth and transformation areas of focus and their respective intervention strategies – (Each of the strategic growth and transformation area of focus shall be expected to contribute to the attainment of the five Centre level strategic results)</p>	<p>Expected Intermediate Outcome</p>
<p>1.0 Human Resource Management and Administration</p> <p>1.1 Strengthening of the human resource planning and management systems, processes and services.</p> <p>1.2 Strengthening of the human resource development and motivation systems, processes and services.</p> <p>1.3 Improvement of the Centre administration systems, processes and services.</p>	<p>Strengthened human resource management and administration systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States.</p>

<p>2.0 Financial Resource Management and Procurement</p> <p>2.1 Strengthening of the Centre financial resource budgeting, accounting and management systems, processes and services.</p> <p>2.2 Strengthening the Centre financial resource acquisition, risk management and sustainability systems and processes.</p> <p>2.3 Improvement of the Centre procurement and supplies systems, processes and services.</p>	<p>Strengthened financial resource management and procurement systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States.</p>
<p>3.0 Corporate Governance</p> <p>3.1 Implementation of the corporate communication and resource mobilization strategies.</p> <p>3.2 Establishment and operationalization of effective and efficient corporate partnerships, strategic alliances and legal services.</p> <p>3.3 Establishment and operationalization of effective and efficient Centre internal audit, planning, monitoring and evaluation systems.</p>	<p>Strengthened Centre corporate governance systems, processes and services to enhance the generation, application and dissemination of geo-information and allied ICT technologies, products and services in the member States.</p>

Annex 2: Summary of the Centre budgetary projection for the period 2015-2018 (USD, 000)

Technical and management strategic growth and transformation areas of focus	2015	2016	2017	2018	Four year total
1.0 Centre personnel					
1.1 Personnel emolument	1,200	1,350	1,450	1,600	5,600
2.0 Technical strategic growth and transformation areas of focus					
2.1 Remote sensing, geographic information system and mapping	900	1,080	1,290	1,550	4,820
2.2 Land surveys and management	400	420	450	500	1,770
2.3 Institutional technical support functions	726	686	674	658	2,744
3.0 Centre management functions and services strategic growth and transformation areas of focus					
3.1 Financial resource management and procurement	38	9	29	9	85
3.2 Human resource management and administration	212	100	85	110	507
3.3 Centre corporate governance	95	53	50	91	289
Grand Total Budgetary Requirement	3,571	3,698	4,028	4,518	15,815

Annex 3: Summary of the Centre projected income for the period 2015-2018 (USD, 000)

Centre projected income per financial year	2015	2016	2017	2018	Four year total
1.0 Member States contribution	1,276	1,276	1,276	1,276	5,104
2.0 Internally generated	2,800	3,000	3,200	3,500	12,500
Total projected income per financial year	4,076	4,276	4,476	4,776	17,604

Annex 4: Centre staff establishment

Category	Approved posts	Filled posts	Vacant posts
1.0 Management	4	2	2
1.1 Director General	1	1	0
1.2 Deputy Director General	1	0	1
1.3 Executive Asst to DG	1	1	0
1.4 Personal Asst to DDG	1	0	1
2.0 Remote Sensing, GIS and Mapping Department	21	7	14
2.1 Director	1	1	0
2.2 Technical Personnel	20	6	14
3.0 Land Surveys and Management Department	10	5	5
3.1 Director	1	1	0
3.2 Technical Personnel	9	4	5
4.0 Finance and Administration Department	24	16	8
4.1 Director	1	0	1
4.2 Finance Officer	1	1	0
4.3 Human Resource and Administration Officer	1	1	0
4.4 Finance, Procurement, Human Resource and Administration Personnel	21	14	7
5.0 Audit, Common Services and ITTC			
5.1 Internal Audit Section	3	1	2
5.2 Common Services Department	9	7	2
5.3 Information Technology Training Centre	4	2	2
Total Centre Staff Establishment	75	40	35

Annex 5: Centre organizational and management structure

