



Orange-Senqu River Basin

Orange-Senqu River Commission Secretariat
Governments of Botswana, Lesotho, Namibia and South Africa

UNDP-GEF
Orange-Senqu Strategic Action Programme
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ORASECOM Protocol for Data and Information Exchange and Sharing

Discussion Note

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ORASECOM

Data and Information Sharing Protocol

Discussion Note

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Glossary

DCP	Data Collection Platform	IT	Information Technology
FGEF	French Global Environment Facility	IWRM	Integrated Water Resources Management
FAO	Food and Agriculture Organisation	NAP	National Action Plan
GEF	Global Environment Facility	ORASECOM	Orange-Senqu River Commission
GIS	Geographic Information System	POP	Persistent Organic Pollutants
GTZ	German Agency for Technical Cooperation	RBO	River Basin Organisation
HYCOS	Hydrological Cycle Observing Center	SADC	Southern African Development Community
ICP	International Cooperating Partner	SAP	Strategic Action Programme
ICPDR	International Commission for the Protection of the Danube River	TDA	Transboundary Diagnostic Analysis
ICT	Information and Communication Technology	UNDP	United Nations Development Programme
		WRYM	Water Resources Yield Model
		WRMP	Water Resources Planning Model

Definitions

For the purposes of this document:

Geographical scope

Data and information pertains not only to data and datasets as well as information which is considered to be of transboundary relevance but also to data and datasets as well as information that emanates from within the territory of the ORASECOM Parties.

ORASECOM Parties

Riparian States in the Orange-Senqu River Basin and contracting parties to the ORASECOM Agreement.

Data

Data refers to all datasets comprising raw data, transformed data and data products, including model outputs, graphs, maps, GIS files, figures, illustrations and other summaries of these data in hard copy or electronic format.

Information

Information refers to interpretations and representation of data and conclusions drawn from data analyses, documents and reports and other information products of the ORASECOM, its consultants and ORASECOM Parties.

Metadata

Metadata refers to descriptions of datasets and information which includes a range of tags and descriptors including the origin, nature, location, geographical and temporal extent, methods of collection among other parameters.

Data provider

Institution (with legal persona), data centre, or consultant who supplies the data, information and / or metadata that may hold intellectual property rights to the dataset.

Data custodian

Individual or institution with responsibility for storing and maintaining and controlling access to data holdings in hard copy or electronic format.

Data user

Individual to whom access has been granted to a database or dataset, including his/her immediate collaboration sphere, defined here as the institutions, partners, students and staff with whom the data user collaborates, and with whom access must be granted, in order to fulfil the Data User's intended use of the dataset.

Data and information exchange

Reciprocal transfer of data and information among the ORASECOM Parties.

Data and information sharing

Provision of full access to data and information maintained by ORASECOM to the ORASECOM Parties.

Data restrictions

Data and information exchange and sharing will be conducted while respecting the rights of the data custodian in relation to copyright, intellectual property and any legitimate restriction of a ORASECOM Party.

Intellectual property

Intellectual capital in the form of a scientific and technical data and information, and information of commercial value, including, but not limited to the following: environmental data and information; methods and designs; specifications and formulae; know-how, data, systems, models and processes, financial and marketing information; as well as registered or unregistered intellectual property in the form of patents, trade marks, designs, and copyright in any works, including literary works or computer software programs, relating to a the work of ORASECOM and its Parties.

1. Background

1.1 Rationale

This document describes the context and considerations for and prescribes the ORASECOM Protocol for Data and Information Exchange and Sharing that pertain to the acquisition, submission, management, curation and utilisation of data and information obtained and held by the Orange-Senqu River Commission (ORASECOM).

The Protocol pertains to the present and future data and information holdings of ORASECOM and that of its (concluded, ongoing and future) ICP funded programmes and projects, namely so far projects supported by French GEF, German and UK supported through GTZ; EU supported, and supported through UNDP-GEF. It is emphasised that the data and information considered in this document pertains not only to data and information which is considered to be of transboundary relevance but also to data and datasets that emanates from within the territory of the ORASECOM Parties.

This Protocol does not pertain to the data and information holdings of the ORASECOM Parties and their institutions.

1.2 ORASECOM's role in data and information management

Functional requirements related to ORASECOM's role in data and information management are included in the Revised SADC Protocol on Shared Watercourses and the ORASECOM Agreement. General Principle 6 of Article 3 of the Revised SADC Protocol states *"State Parties shall exchange available information and data regarding the hydrological, hydro geological, water quality, meteorological and environmental condition of shared watercourses."*

Several other provisions of the Revised SADC Protocol refer to sharing of data and information, including *"timely notification... accompanied by available technical data and information."*

The ORASECOM Agreement tasks the ORASECOM Council to advise the parties on *"the standardized form of collecting, processing and disseminating data or information with regards to all aspects of the River System"* (Art 5.2.5). And Art 7.4 obliges the Parties to the Agreement to *"exchange available information and data regarding the hydrological, hydrogeological, water quality, meteorological and environmental condition of the River System"*.

By 2012, ORASECOM wishes to establish a basin-wide plan for the joint management and development of water and related resources in the Orange-Senqu River Basin, focusing primarily on trans-boundary issues.

As a result, the functions of an ORASECOM data management system need to enable ORASECOM to fulfill a data exchange and sharing role between the Parties and further interested parties, as well as to facilitate informed decision making of ORASECOM bodies and the Parties on the joint basin-wide plan.

Derived from this is a need for basic data management functions, to ensure that data are stored securely and catalogued to enable timely retrieval. The other functions of a data management system are related to development of an integrated water resources management plan, for example thematic map production, spatial analysis, and modeling.

Table 1 summarises the functional requirements for an ORASECOM data management system.

Table 1. *Functional requirements for ORASECOM data management.*

Function	Web/internal	Comments
Data repository Store and catalogue data collected Quality assure data	Internal	Important data must be stored to ensure data integrity; ORASECOM data and data from third party data custodians must be clearly identified. Data repository may include <i>inter alia</i> : Hydro-meteorological database (initiated by the GTZ-executed project, to be operational); Water Quality database (initiated by the EU-supported project, to be operational); Hydro-geological database ((initiated under the French GEF-supported project, to be operational).
Search and discovery	Web-based	Stakeholders must be able to discover data that ORASECOM holds; Metadata must adequately describe the datasets and the custodians; Data quality must be transparent.
Data exchange and sharing Direct access to ORASECOM data Request data	Web-based	Revised SADC Protocol as well as the ORASECOM agreement mandates data exchange and sharing; Timely access is required, but not real time access; ORASECOM can also refer stakeholders to the data custodians.
Security and user groups	Internal and web-based	Different user groups must have different permission regarding data access.
Display Time series data in charts Spatial data as maps 3D Visualisation	Web-based	Prepared charts (e.g. discharge, water quality parameters) and thematic maps may be made available (i.e. pdf, Google Maps/Earth).
Spatial analysis	Internal	GIS functions are required internally to conduct analysis for report generation (e.g. water quality stations and protected areas).

2. Data and information categories

2.1 Data ownership

It is essential for ORASECOM to define “ORASECOM data” and “third party data”, since data ownership has important implications for data management, exchange and sharing. Three cases illustrate this point:

- The UNDP-GEF Project funds and implements a survey of persistent organic pollutants (POPs) and heavy metals, with technical support from the Parties. The sampling locations and laboratory results are primary data generated by the ORASECOM Programme and are ORASECOM data.
- The GTZ Project purchases commercial satellite images for an irrigation management project. The data license states that ORASECOM can use the imagery, but cannot distribute the images to other parties. The images are third party data.
- The EU Project acquires water quality data from each of the member States at sites of trans-boundary importance. The data are quality assured, integrated and analysed to create a water quality database and “fitness for use” categories. These data could be considered ORASECOM data or third party data.

Hence, three categories of data ownership / custodianship are proposed:

- Data and information produced by ORASECOM, or by ICP projects associated with ORASECOM;
- Data and information acquired from third parties by ORASECOM, or by ICP projects associated with ORASECOM;
- Data and information acquired by independent activities under the auspices of the ORASECOM Parties or third parties.

Data and information sourced through ORASECOM, or ICP projects associated with ORASECOM

Data and information generated by ICP projects associated with ORASECOM have data ownership and intellectual property rights associated with them which while ceded to ORASECOM, must be made explicit in all contracts and agreements. Secondary obligations, if such as they exist, must be carefully considered by the ORASECOM in its agreements with ICPs. It is also essential that data and information that has been acquired via commercial contracts (i.e. with consultants, as opposed to national institutions), is treated as above, since the source of funding for the acquisition of the data and information is accounted for in this category.

Data and information acquired from third parties by ORASECOM, or by ICP projects associated with ORASECOM

ORASECOM, mainly through its ICP projects acquire data and information for various purposes that emanate from outside the ambit of ORASECOM. This might pertain to historical data held by other data centres, or researchers and institutions. These data may for instance be used for modeling or thematic map production. In these instances, the management pertaining to these data could be subject to existing restrictions. These may include restrictions in terms of commercial and intellectual property issues. It will be necessary that management systems are in place to ensure that adherence to these requirements can be ensured.

Data and information acquired by independent activities under the auspices of the ORASECOM Parties or third parties

Related to the development of an integrated water resources management plan for the basin is the need to collate (and possibly integrate) data and information at a basin wide scale. This therefore requires that metadata in relevant thematic areas is collected a standardized way, from the respective line agencies of the ORASECOM Parties, as well as from third parties (e.g. regional organisations, or national, regional and international research and resource organisations). These data shall not be held (mirrored) at the ORASECOM data repository, a central ORASECOM site shall merely reference the respective data custodians.

2.2 Data and information types and associated management systems

A variety of different kinds of data and information will need to be managed by ORASECOM. The following is proposed:

ORASECOM Water Information System, working title for a GIS Portal, covering:

- Physical, environmental and socio-economic data. External access as per assigned data user rights and the restrictions of the data custodians.

OSIS, Orange-Senqu Information System, working title for an ORASECOM document management system, covering:

- Reports and publications from ICP projects under ORASECOM. This would encompass bibliographic metadata and possibly holdings of all published material from ORASECOM and its ICP projects. Full external access would be enabled.
- Official Documents. A key function of the ORASECOM Secretariat is to maintain a record of all meetings of the all the subsidiary bodies of the organisation. A searchable database of these documents shall be established. Restricted internal access only.

Regards physical, environmental and socio-economic data, the below table provides a brief summary of the type of data and information acquired and generated. The table follows the data categories as per ISO 19115 TopicCatCd, which is the metadata standard for geographic data.

Table 2. Data custodians for selected data categories in ORASECOM member States

ISO Data Category	Botswana	Namibia	Lesotho	South Africa
Farming Irrigation Livestock	Ministry of Agriculture http://www.moa.gov.bw	Min. of Agriculture, Water, and Forestry http://www.mawf.gov.na/	Ministry of Agriculture and Food Security	Dept. Agriculture, Forestry and Fisheries http://www.daff.gov.za/
Boundaries, Base Maps	Dept. of Surveys and Mapping http://www.dsmportal.gov.bw/Portal/ National Spatial Data Infrastructure (NSDI). www.ngis.gov.bw	Min. of Lands and Resettlement, Dir. of Survey and Mapping http://www.op.gov.na	Dept of Lands, Surveys & Physical Planning	Dept. of Rural Development and Land Reform http://www.ruraldevelopment.gov.za
Climatology, Meteorology	Dept. of Meteorological Services www.weather.info.bw	Namibia Meteorological Service http://www.meteona.com/	Lesotho Meteorological Services http://www.lesmet.org.ls/	South African Weather Service http://www.weathersa.co.za/
Environment Protected Areas Biota	Ministry of Environment, Wildlife and Tourism, Department of Environmental Affairs http://www.eis.gov.bw/	Ministry of Environment and Tourism http://www.met.gov.na	Ministry of Tourism, Environment and Culture www.mtec.gov.ls	Dept. of Environmental Affairs and Tourism http://soer.deat.gov.za
Inland Waters Hydrology Water Quality	Dept. of Water Affairs Harry Openheimer Okavango Reasearch Center (HOORC), University of Botswana - Okavango Delta Information System http://odis.orc.ub.bw/odis/	Dept. of Water Affairs NamWater http://www.namwater.com.na/	Water Affairs, Water and Sewage Authority (WASA) Lesotho Electricity Corporation http://www.lec.co.ls/	Dept. Water Affairs http://www.dwa.gov.za/Hydrology/ http://www.dwa.gov.za/iwqs/
Geoscientific Information Hydrogeology	Dept. of Geological Survey, Dept. of Water Affairs	Dept. of Water Affairs	Geological Survey	Dept. Water Affairs http://www.dwa.gov.za/groundwater/

3. Guiding principles

3.1 Data acquisition

ORASECOM shall map data and information gaps in relation to its mandate and in particular work on its IWRM Plan, leading to an ORASECOM research agenda and related data acquisition plan.

Responsibilities of ICP projects related to data acquisition and management are to be laid down in project specific data management plans. The ORASECOM Secretariat shall produce respective guidelines / a template for the data management plan.

3.2 Metadata standard

Data and information exchange will include descriptive metadata complying with an international metadata standard such as ISO 19115, FGDC and Dublin Core.

Data and information shared by ORASECOM, where ORASECOM is the data owner / custodian, will include metadata complying with the ORASECOM Metadata Profile, which describes a subset of ISO 19115:2003. (i.e all ICP projects associated with ORASECOM shall comply with the ORASECOM Metadata Profile).

3.3 Quality assurance

Quality assurance shall be conducted on all data and information exchanged. The ORASECOM Secretariat shall define compulsory QA guidelines for its data providers.

Data quality information shall be included in the metadata, quality information shall follow the ISO19115 standard and include:

- Lineage - information about the events or source data used in constructing the data specified by the scope or lack of knowledge about lineage.
- Completeness – presence and absence of features, their attributes and their relationships.
- Logical consistency – degree of adherence to logical rules of data structure, attribution and relationships (data structure can be conceptual, logical or physical).
- Positional accuracy – accuracy of the position of features.

- Thematic accuracy – accuracy of quantitative attributes and the correctness of non-quantitative attributes and of the classifications of features and their relationships.
- Temporal accuracy – accuracy of the temporal attributes and temporal relationships of features.

Compulsory QA procedures of the respective data provider and the ORASECOM Secretariat shall be defined in ORASECOM data QA guidelines.

However, the responsibility for (poor) data quality rests with the data provider /custodian. The ORASECOM Secretariat cannot be a 'clearing house', i.e. assume responsibility for the quality of data produced its by ICP projects.

3.4 Data and information users

Six types of data and information user are defined, each with different access restrictions:

- Internal data and information users – all bodies of ORASECOM, including Council, ORASECOM Secretariat, Technical Task Teams, and the ORASECOM Secretariat. Internal Users have full access to all data and information held by ORASECOM, while respecting the rights of the data custodian in relation to copyright, intellectual property and any specified restriction.
- Data and information users associated with ICP projects associated with ORASECOM – such as a consultant contracted by an ICP project under ORASECOM. Use of data and information shall be governed by a license issued by ORASECOM and to ensure this, the ORASECOM Secretariat will include appropriate provisions in partnership/cooperation agreements.
- Directly contracted commercial data and information users – such as a consultant contracted by the ORASECOM Secretariat. Their obligations will be specified by terms in the contract of engagement and include respecting the rights of the data custodian in relation to copyright, intellectual property and any specified restriction.
- Independent commercial data and information users – such as a user who intends to use data and information for profit or other commercial gain. Their use of the data and information shall be governed by a license issued by ORASECOM that will include standard terms and specific terms, as required.
- Research, academic or civil society data and information users – have access to data and information held by ORASECOM governed by a license issued by ORASECOM.

- Public data and information users – the general public typically does not require access to data. Data products (i.e. thematic maps) and information (ORASECOM reports) is disseminated to the public through the ORASECOM website.

3.5 Data licenses and restrictions

A standard data license will be applied for each type of data and information user. Data and information exchange and sharing will be conducted while respecting the rights of the data custodian in relation to copyright, intellectual property and any legitimate restriction of an ORASECOM Party.

Access or use restrictions will be defined for each data or information item, which clearly specifies restrictions on the access or use of data and information by user type:

- Legal access restriction – applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data or information or metadata.
- Legal use restriction – applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations or warnings on using the data or information or metadata.
- Security access restriction – handling restrictions imposed on the data and information for national security or similar security concerns.

3.6 Data costs

Exchange and sharing of data and information by ORASECOM, ORASECOM Parties and ICP projects associated with ORASECOM shall be completed without costs, subject to copyright, intellectual property and any legitimate restrictions.

Operational costs for compilation and transfer/exchange of existing data and information may be agreed between the data custodian and the ORASECOM Secretariat in exceptional circumstances. Operational costs will be reimbursed upon timely delivery of data.

Transfers of data and information to research, academic or civil society data users shall be completed free of charge, subject to copyright, intellectual property and any legitimate restrictions.

Transfers of data and information to independent commercial data and information users shall be completed at a cost recovery basis, subject to copyright, intellectual property and any legitimate restrictions.

4. Data and information management

4.1 Institutional structure

ORASECOM, through its Technical Task Team and a related Working Group on Data and Information Management (to be established) as well as the respective officer at the ORASECOM Secretariat (e.g. currently the Senior Water Resources Specialist) shall implement this Protocol for Data and Information Exchange and Sharing.

Terms of Reference for the Working Group shall be drafted by the ORASECOM Secretariat and approved by the Technical Task Team.

4.2 Physical infrastructure

The UNDP-GEF Project will invest in the appropriate necessary hardware and software, as well as the associated IT support for the maintenance of the system during the Project's duration.

Issues of longer- term sustainability shall be tackled in parallel to the development of the applications.

4.3 ORASECOM data portal

The ORASECOM data portal, a dedicated website forming part of the ORASECOM parent website, shall be developed to facilitate the data and information sharing function of ORASECOM. The site shall contain all necessary information about data management processes, cycles and policies and include links to the respective databases that are in place. The site shall also be populated by a range of real-time and period (e.g. annually updated) data products and information.

4.4 OSIS Orange-Senqu Information System

Reports, publications as well as ORASECOM documents will be included in the OSIS document management system.

5. Related documents

The following documents shall be worked out and annexed to later / the final version of this report:

- Terms of Reference of the ORASECOM working Group on Data and Information exchange and Sharing;
- ORASECOM protocol for Data and Information Exchange and Sharing;
- ORASECOM Metadata Profile Guideline;
- ORASECOM Quality Assurance Procedures;
- ORASECOM Data User License.