Webinar 03

Educational module on WIS
Module pédagogique sur les SIE
Módulo pedagógico sobre SIA

P2P
Peer-to-Peer
for Basin Organisations

European Commission

INBO
international network of Basin Organizations

09/10/2026

Importance and main principles of shared data management

P2P
Peer-to-Peer
for Basin Organisations

04

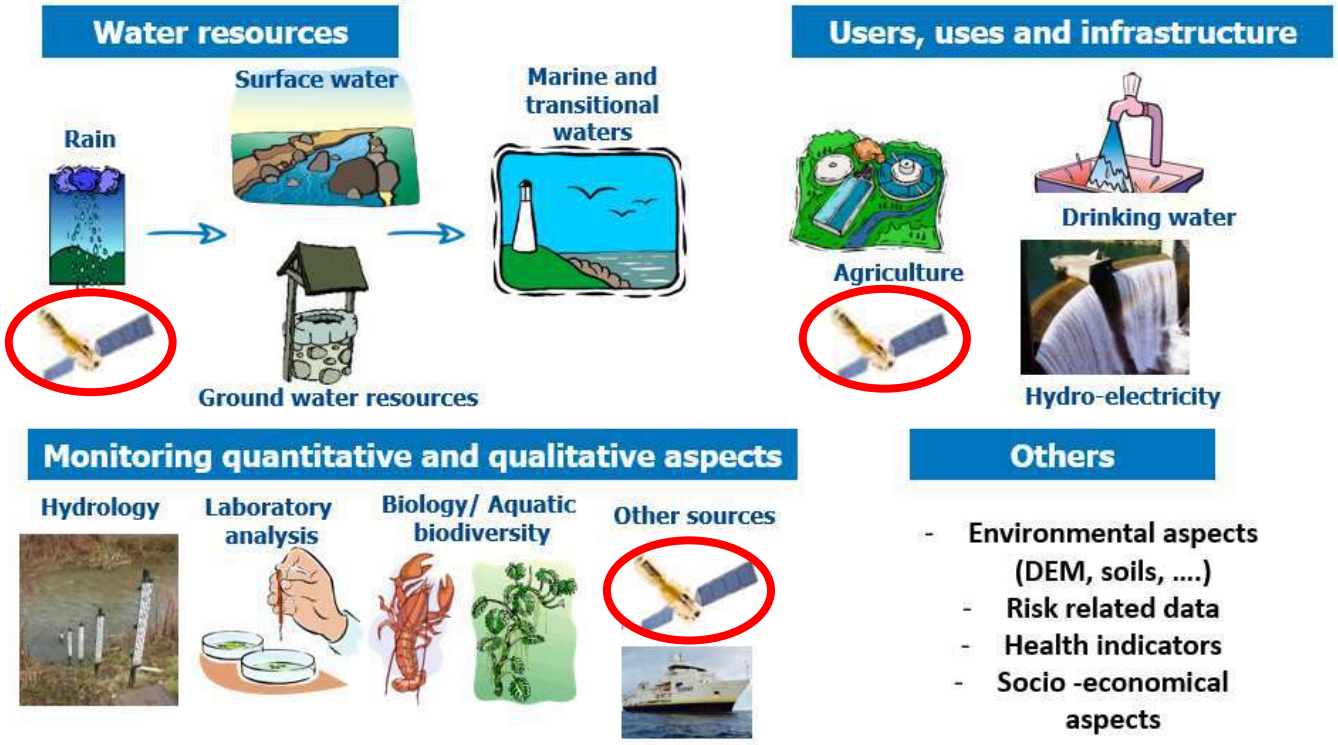
Water resource management requires data on many topics for many uses

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Data and information particularly needed for

- Sectorial water management
- Integrated Water sector planning
- Climate change adaptation
- Risk management
- Reporting
- Specific decision taking
- Other water sector activities

Many data topics
Many data producers



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Various types of data

Spatial data



- Coordinates (latitude/longitude)
- Hydrographic networks
- Watersheds
- Land use / land cover
- Infrastructure (dams, stations, etc.)
- Groundwater maps
- etc.

Alphanumeric data



- Administrative records (permits, licences, etc.)
- Descriptive sheets for equipment and infrastructure
- Characteristics of structures (type, capacity, owner, etc.)
- Calculated indicators (e.g. efficiency, performance)
- etc.

Types of data

Temporal data



- Rainfall time series
- River flow time series
- Water levels (rivers, lakes, groundwater)
- Groundwater level time series
- Water temperature time series
- Daily water consumption
- Time series of water quality parameters
- etc.

Qualitative / documentary data

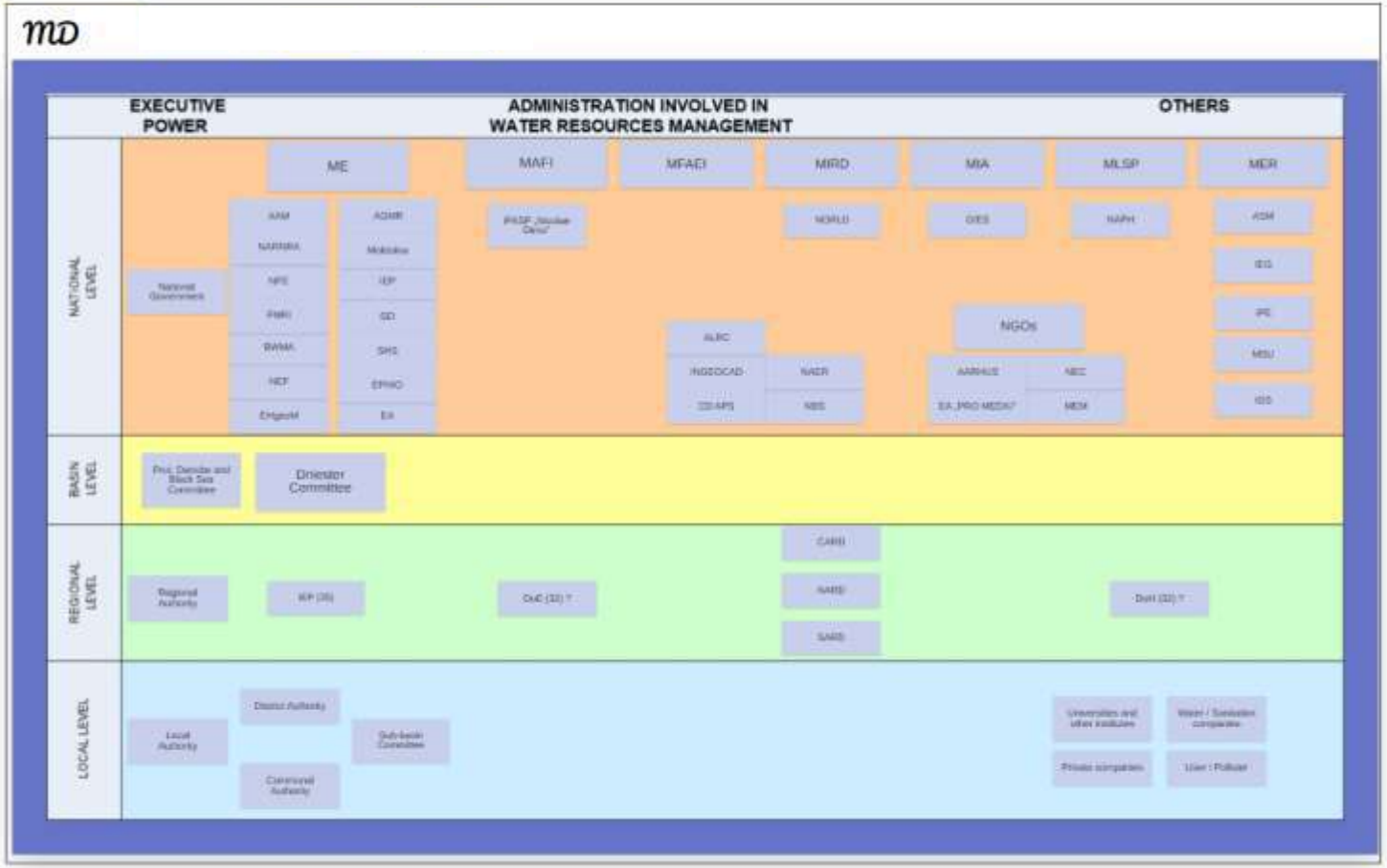


- Reports
- Studies
- Regulations and legal texts
- Technical documentation
- Field observations (notes, photos, etc.)
- Surveillance videos
- etc.

Each type of data provides essential and complementary information for informed water resource management.

Many actors / Example in Moldova

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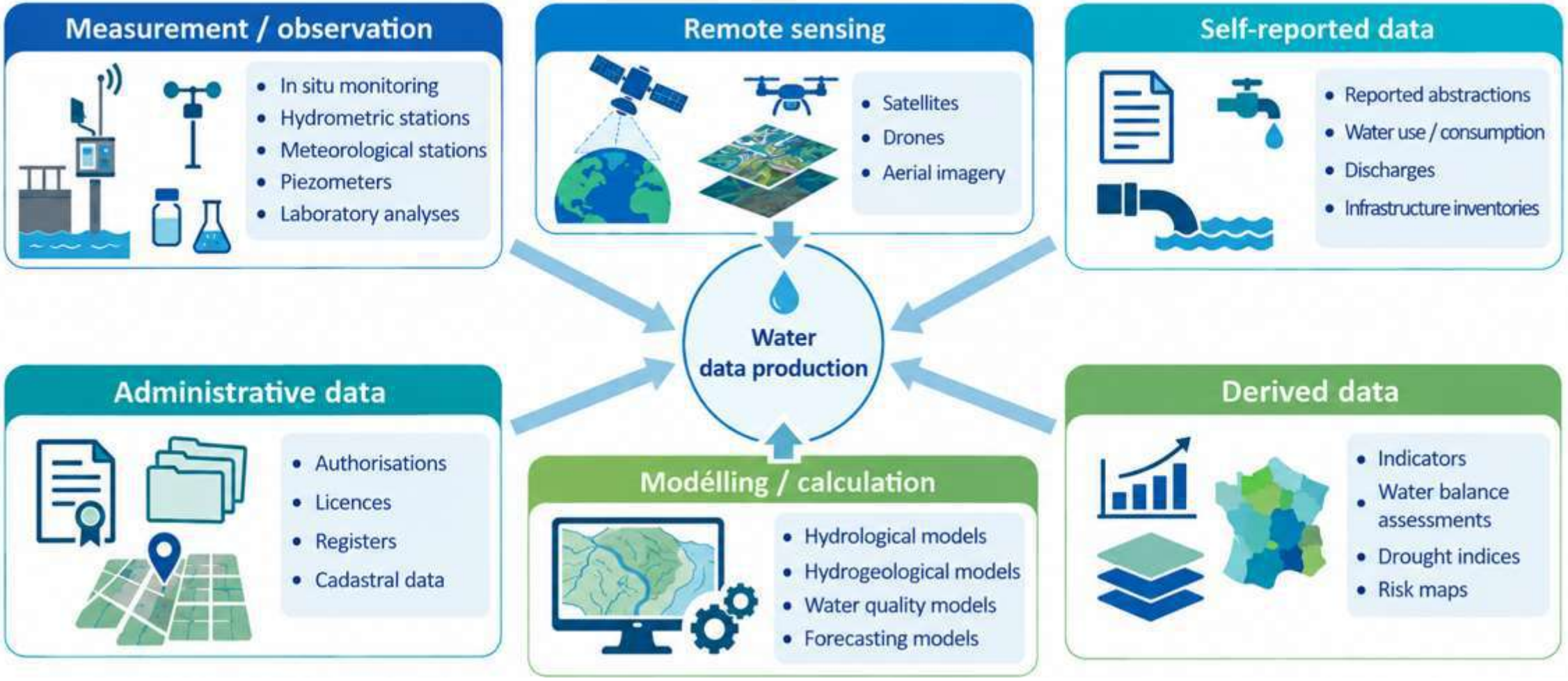
Country code	Orga. name (EN)	Orga Name (RO)	Orga. Acronym	Orga Web portal
MD	Academy of Sciences of Moldova	Academia de Ştiinţe a Moldovei	ASM	http://www.asm.md
MD	Agency Apele Moldovei - ME	Agenţia „Apele Moldovei"- MM	AAM	http://www.apelemoldovei.gov.md
MD	Agency for Land Relations and Cadastre	Agenţia Relaţii Funciare şi Cadastru	ALRC	http://www.arfc.gov.md
MD	Agency of Geology & Mineral Resources	Agenţia pentru Geologie şi Resurse Minerale	AGMR	http://www.agrm.gov.md
MD	Cadastre Department - Agency for Public Services	Agenţia Servicii Publice, Departamentul Cadastru	CD APS	https://asp.gov.md
MD	Central Agency for Regional Development	Agenţia de Dezvoltare Regională Centru	CRDA	http://www.adrcentru.md
MD	Environmental Agency	Agenţia de Mediu	AM	https://am.gov.md/
MD	Environmental Information Centre - MADRM	Центр экологической информации - MADRM	CIM	
MD	Experts Association „PRO MEDIU"	Asociaţia Experţilor de Mediu „PRO MEDIU"	EA „PRO MEDIU"	https://www.pro-mediu.md/
MD	FAO Moldova	FAO Moldova	FAO Moldova	https://www.fao.org/countryprofiles/index?iso3=MDA
MD	Forestry Agency	Агентство «Молдсилва»	MOLDSILVA	https://www.moldsilva.gov.md/index.php?l=ro
MD	Forestry Management and Research Institute	Institutului de Cercetări şi Amenajări Silvice	FMRI	https://icas.com.md/
MD	General Inspectorate for Emergency Situations	Inspectoratul General pentru Situaţii de Urgenţă	GIES	http://www.dse.md
MD	GIZ Moldova	GIZ Moldova	GIZ Moldova	https://www.giz.de/en/worldwide/67751.html
MD	Hydrogeological Expedition "EhGeoM"-	Государственное предприятие Молдавская гидрогеологическая Экспедиция	EhGeoM	http://www.ehgeom.gov.md

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Various processes of data production

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Integration of IA in the monitoring processes

Case of real time monitoring with cameras and AI analysis















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Complementarity of satellite observation and in situ data for water resource management

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OiEau International Office for Water

Satellite Observation
- Global vue
- Wide coverage
- Mainly free



Calibration/validation

Spatial scale

In Situ Measurements
- High precision
- Accurate and local 'ground truth'
- Costly



Time scale/ Frequency

Data governance

Open data principles



- Findable
- Accessible
- Interoperable
- Reusable

Visualization

Modelling

Decision support systems

Digital twins

....



Water resource management

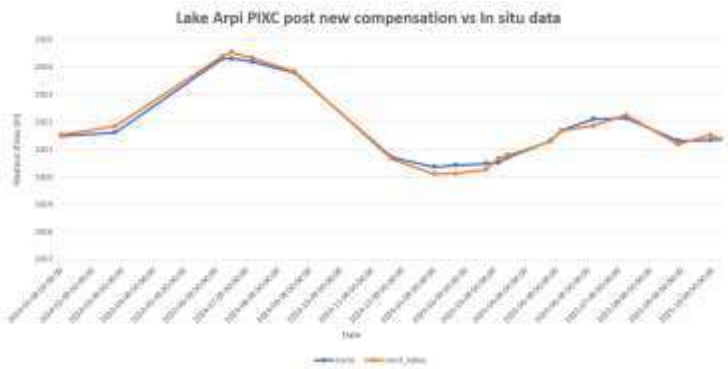
Example of application in hydrology by combining SWOT data with in situ data (case of Armenia)

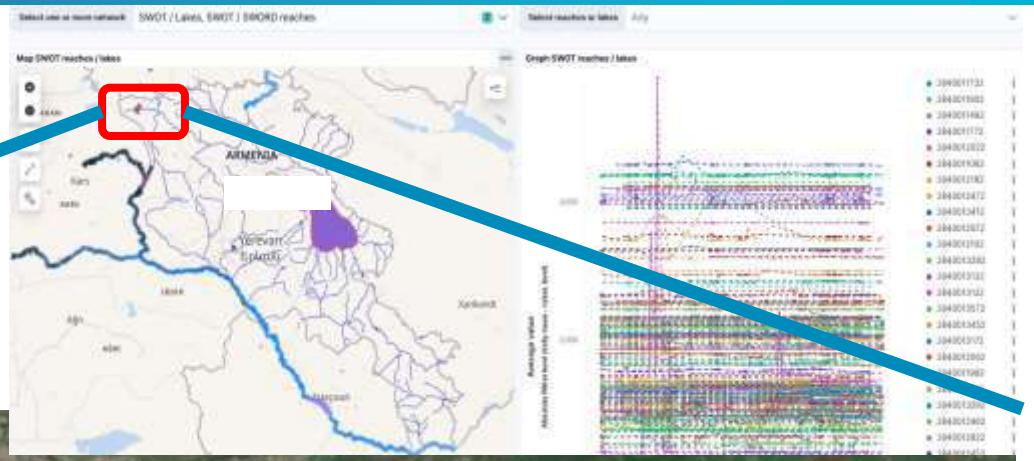
SWOT

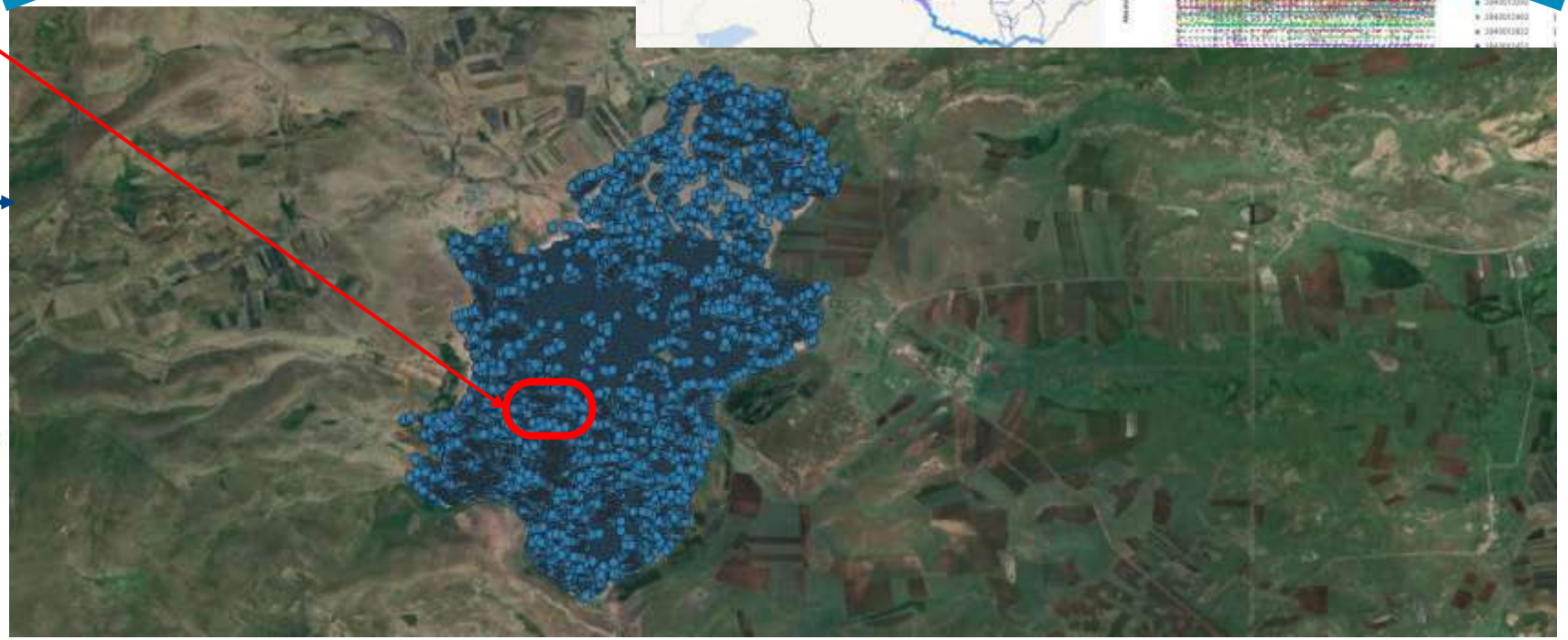


hydroweb.next

National data management platform







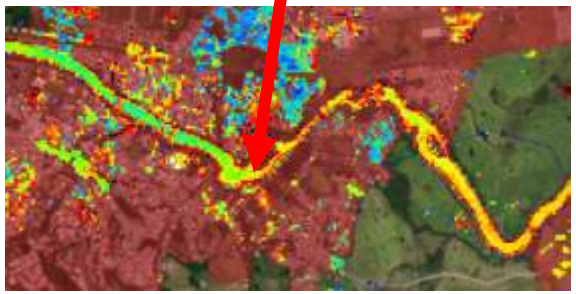
Exploiting satellite images to monitor surface water quality

Sentinel 2

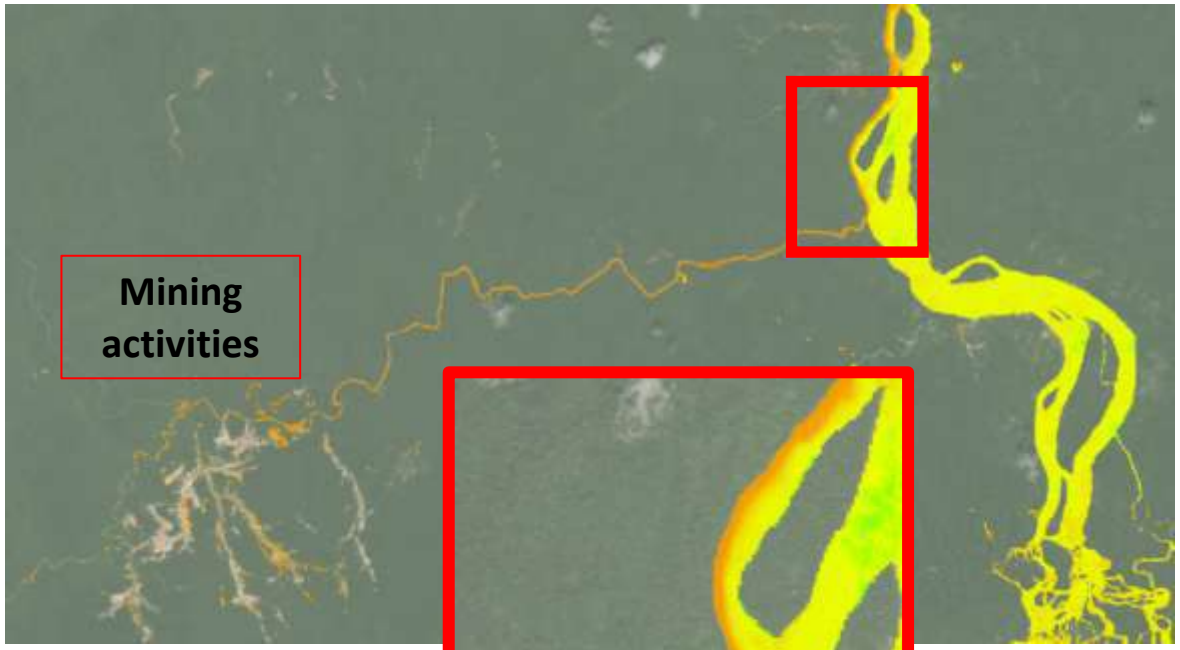


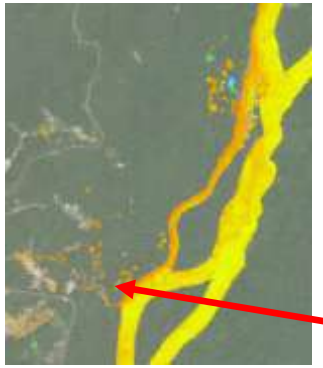
CNES/IRD data processing

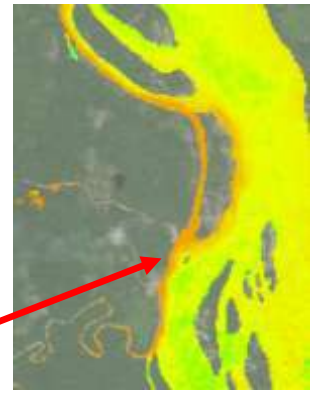
4 parameters:
- **Chlorophyll a**
- **Suspended matters**
- **Dissolved organic matter**
- **Turbidity**



Though automatic detection of pollution emission points



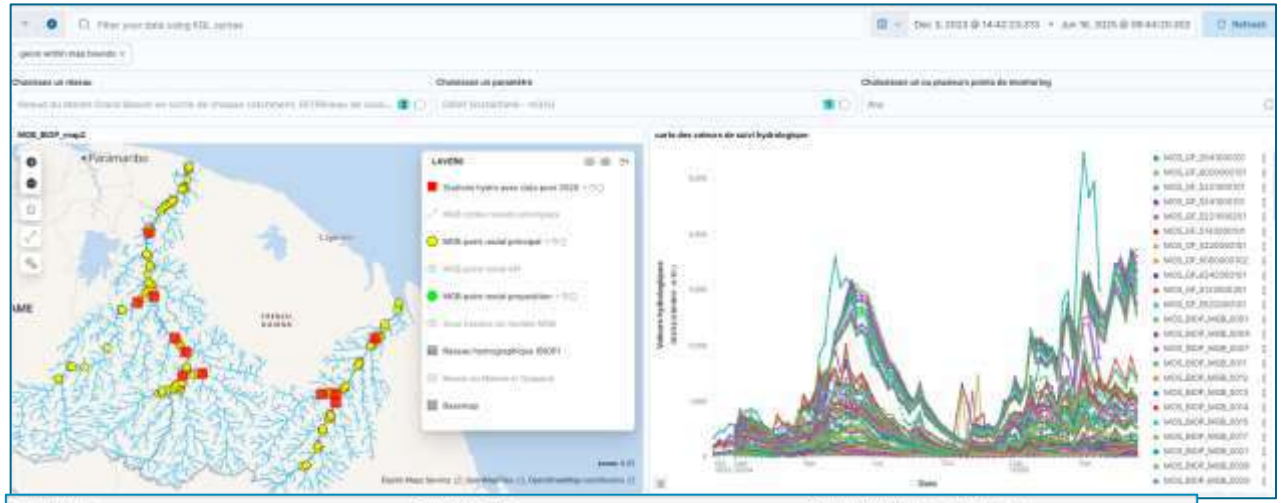


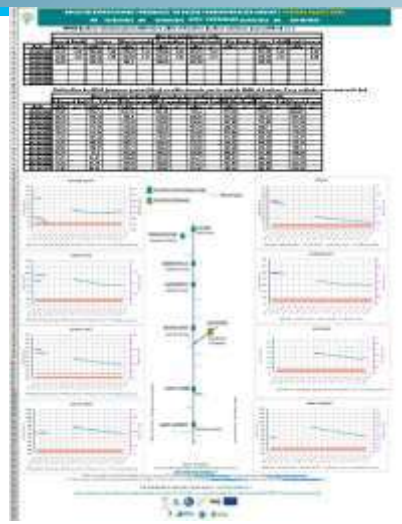


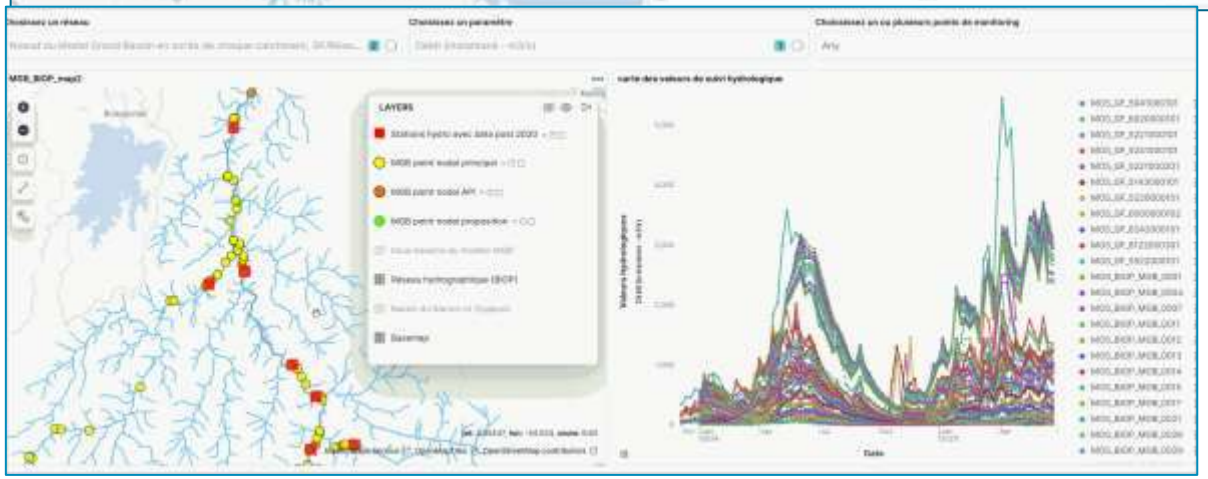
AI for automatic detection of pollution points

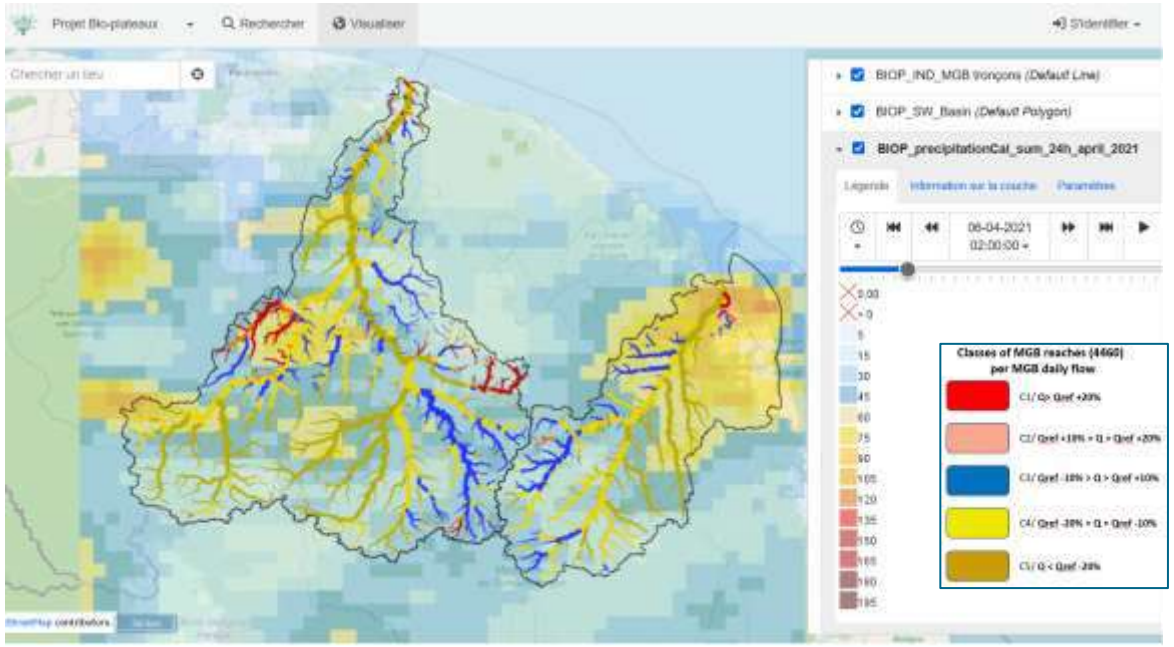
Interactive dashboard for comparing MGB model flow rates and in-situ measurements

daily automatic bulletins or interactive maps of high and low bandwidth sectors



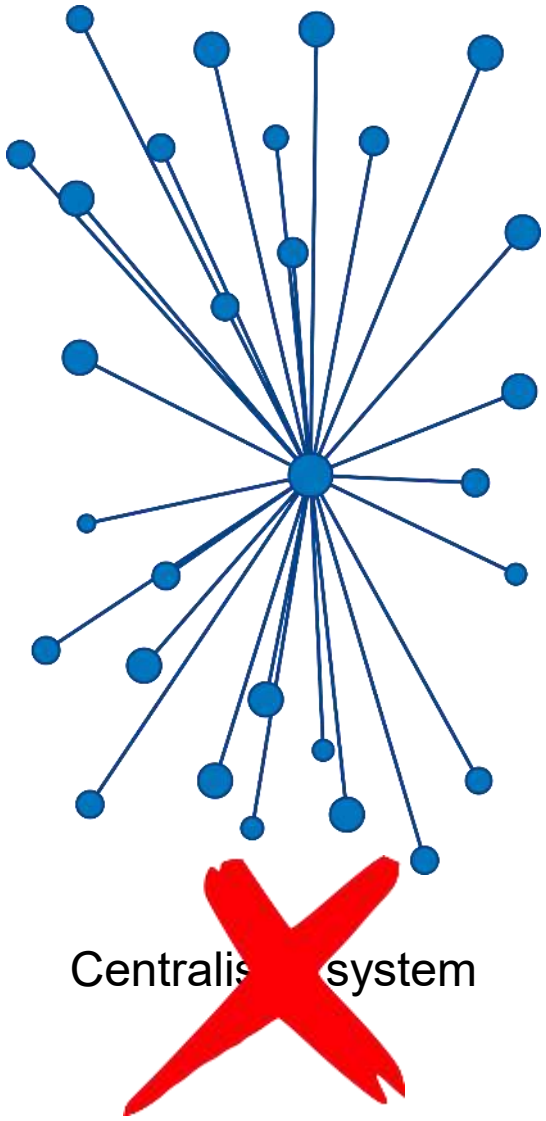




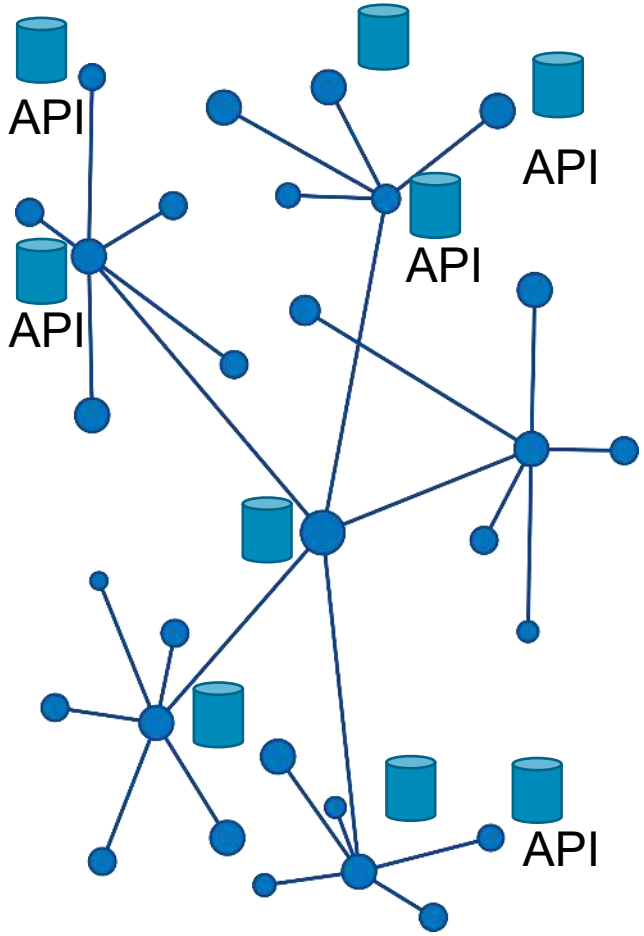


P2P

About the global architecture

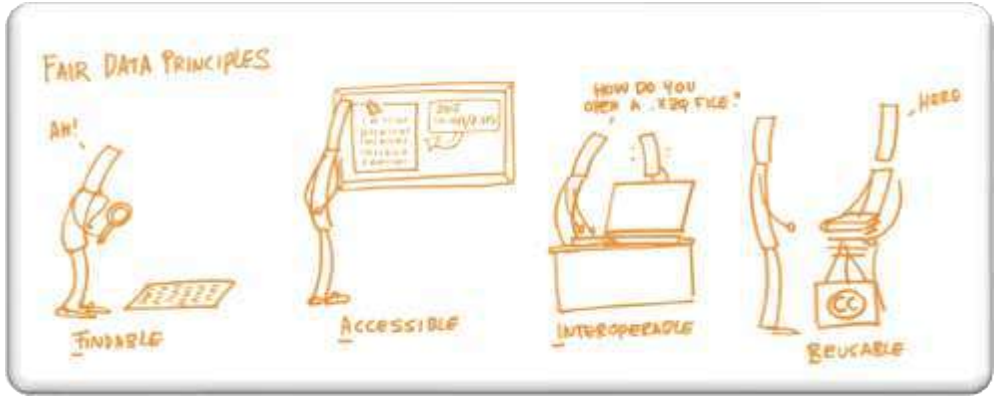


Centralis system



Decentralised system

Applying the FAIR principle



F A I R

Findable | Accessible | Interoperable | Reusable

The data is retrievable by humans and machines through the services and protocols with authentication and authorization where necessary

Data should be structured for use in various contexts and systems, enabling integration and data exchange

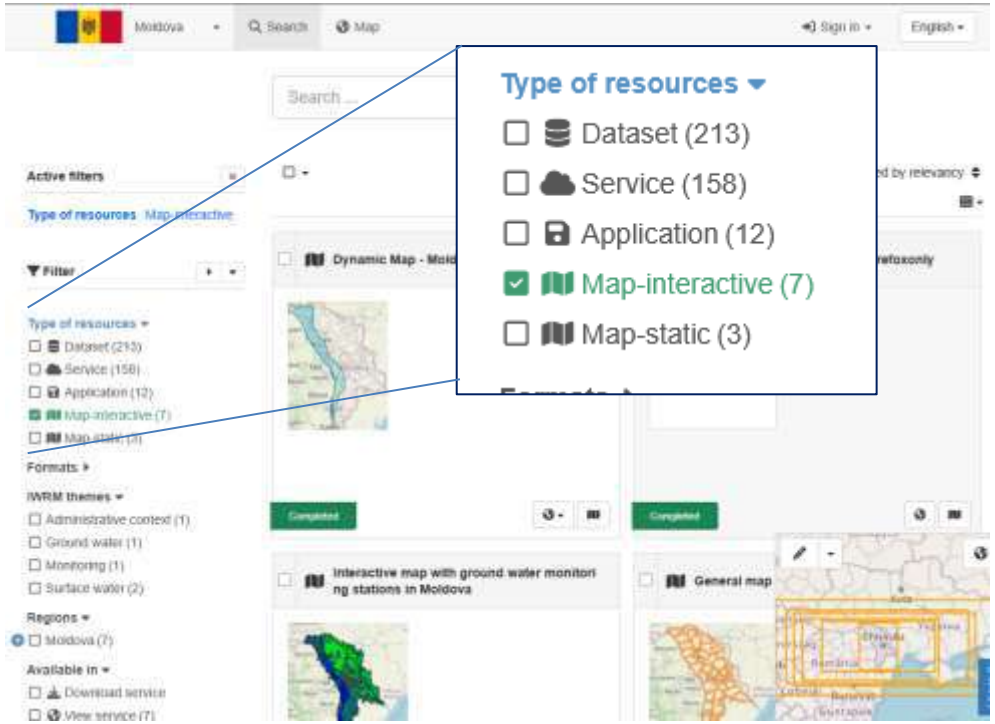
The associated metadata provides an accurate information, and **the data comes with detailed provenance information.**

The catalogue of metadata: an efficient tool to find what exists

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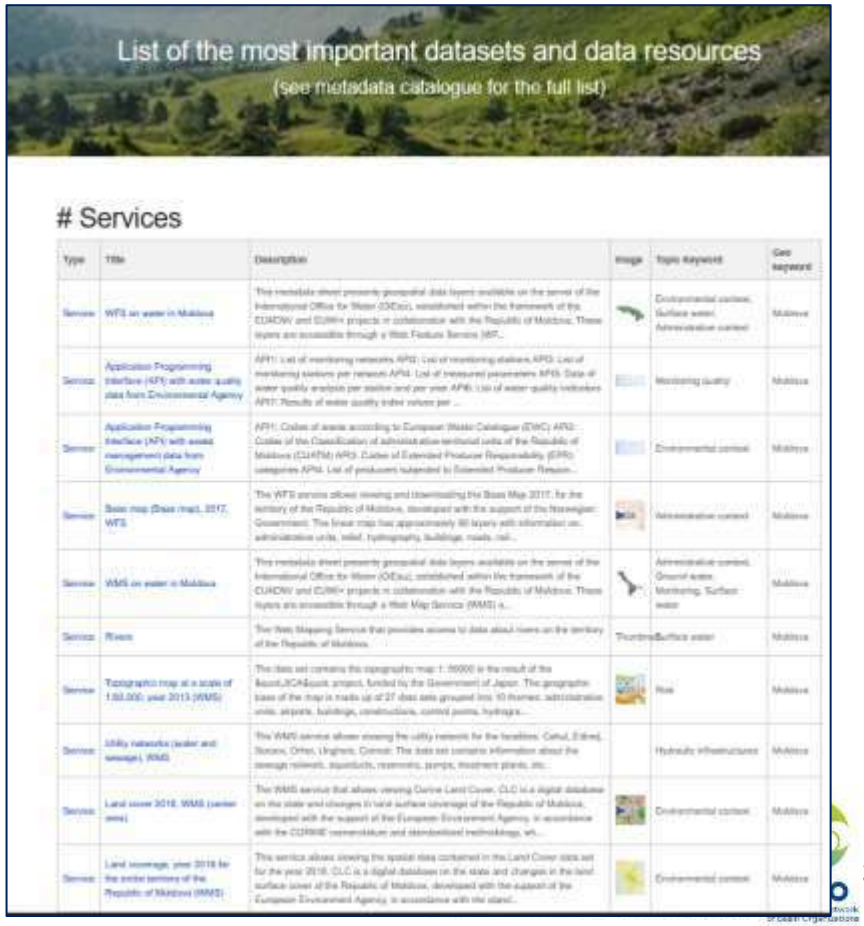
F A I R

Findable | Accessible | Interoperable | Reusable



https://www.aquacoope.org/cat_eecca/**moldova**/eng/catalog.search#/search (*)

https://www.oieau-wiss2.org/MD/en/data-and-information/list-of-datasets-and-data-resources.html



Catalogue of data sources / Metadata

The value of data source description (metadata)

- Building user trust: Data without metadata is unusable because its level of accuracy, freshness, and methodological limitations remain unknown.
- Streamlining institutional collaboration: Facilitating information exchange between ministries, agencies, and public bodies through a universal descriptive language.
- Securing rights and responsibilities: Clearly defining intellectual property rules, terms of use, and redistribution conditions.
- Preserving institutional memory: Protecting technical knowledge against staff turnover and storage media obsolescence.

Global challenges of data source characterisation / Metadata

Findability

En enabling decision-makers, scientists, and partners to find and locate data in national and international catalogs.

Interoperability

Facilitating seamless integration between heterogeneous platforms and thematic information systems through shared reference frameworks.

Gouvernance

Formally identifying the authors, validity date, production methodology, and legal conditions of use.

Sustainability

Preserving information assets, capitalizing on invested resources, and avoiding costly duplication of studies.

ISO 19115 is an international standard for geographic metadata. It defines how to describe spatial data and related services. It provides information about the data origin, quality, extent, and spatial reference system. ISO 19115 includes both mandatory and optional metadata elements.

DATA SOURCE IDENTIFICATION FORM

TITLE OF THE DATA SOURCE
(ex: Data Sheet of … , map of … Database of …, Report on ….)

ABSTRACT: *(Global content, Author and objective: Database/website/map on … created by ….to do …)*

GEO KEYWORD ADMIN: Not determined
GEO KEYWORD MAIN BASIN: Not determined
TOPIC KEYWORD IWRM: Not determined
TOPIC KEYWORD INSPIRE: Not determined

INFORMATION ON DISSEMINATION

WEB ADDRESS OR URL WHERE THE DOCUMENT CAN BE CONSULTED AND/OR DOWNLOADED
http://

LEVEL OF ACCESS (ONE OF THE FOLLOWING: "FREE ACCESS WITH COPYRIGHT", "RESTRICTED TO PARTNERS", "AVAILABLE UNDER PAYMENT OF FEES"): Not determined

CATEGORY, FORMAT AND SCALE OF THE DATA SOURCE

CATEGORY: Not determined ("DATASET", "GIS LAYER", "MAP", "DOCUMENT", INFORMATION SYSTEM)
FORMAT: Not determined *(EX: PAPER, PDF; JPEG; SHP…)*
SCALE: 1: *(EX: 1/100.000)*

CONTACT PERSON TO GET MORE INFORMATION ON THIS DATA SOURCE

NAME | ORGANIZATION
EMAIL | POSITION

FORM OF METADATA COMPLETED BY

NAME | ORGANIZATION
EMAIL | POSITION
Date

Fiche d'identification de source de données

Titre de la source de données *(ex: Fiche de données sur … , Carte de …, Base de données …, Rapport sur ….)*

Résumé: *(Contexte global, Auteur et objectif: Base de données/site internet/carte sur … créé par ….pour faire …)*

MOTS CLE RÉGION: Non déterminé
MOTS CLE SOUS-UGP: Non déterminé
MOTS CLE GIRE THEME 1: Non déterminé
MOTS CLE GIRE THEME 2: Non déterminé

INFORMATION SUR LA DIFFUSION

ADRESSE WEB OU URL OU LE DOCUMENT PEUT ÊTRE CONSULTÉ ET / OU TÉLÉCHARGÉ (le cas échéant)
http://

NIVEAU D'ACCÈS CHOISIR UN DES SUIVANTS: Non déterminé

CATÉGORIE, FORMAT ET ÉCHELLE DE LA SOURCE DE DONNÉES

CATÉGORIE: Non déterminé ("Jeu de données", "couche SIG", "Carte", "Document", "Système d'information")
FORMAT: Non déterminé *(EX: Papier, PDF; JPEG; SHP…)*
ÉCHELLE: 1: *(le cas échéant(carte, couche), Ex: 1:100'000)*

PERSONNE DE CONTACT POUR OBTENIR PLUS D'INFORMATIONS SUR CETTE SOURCE DE DONNÉES

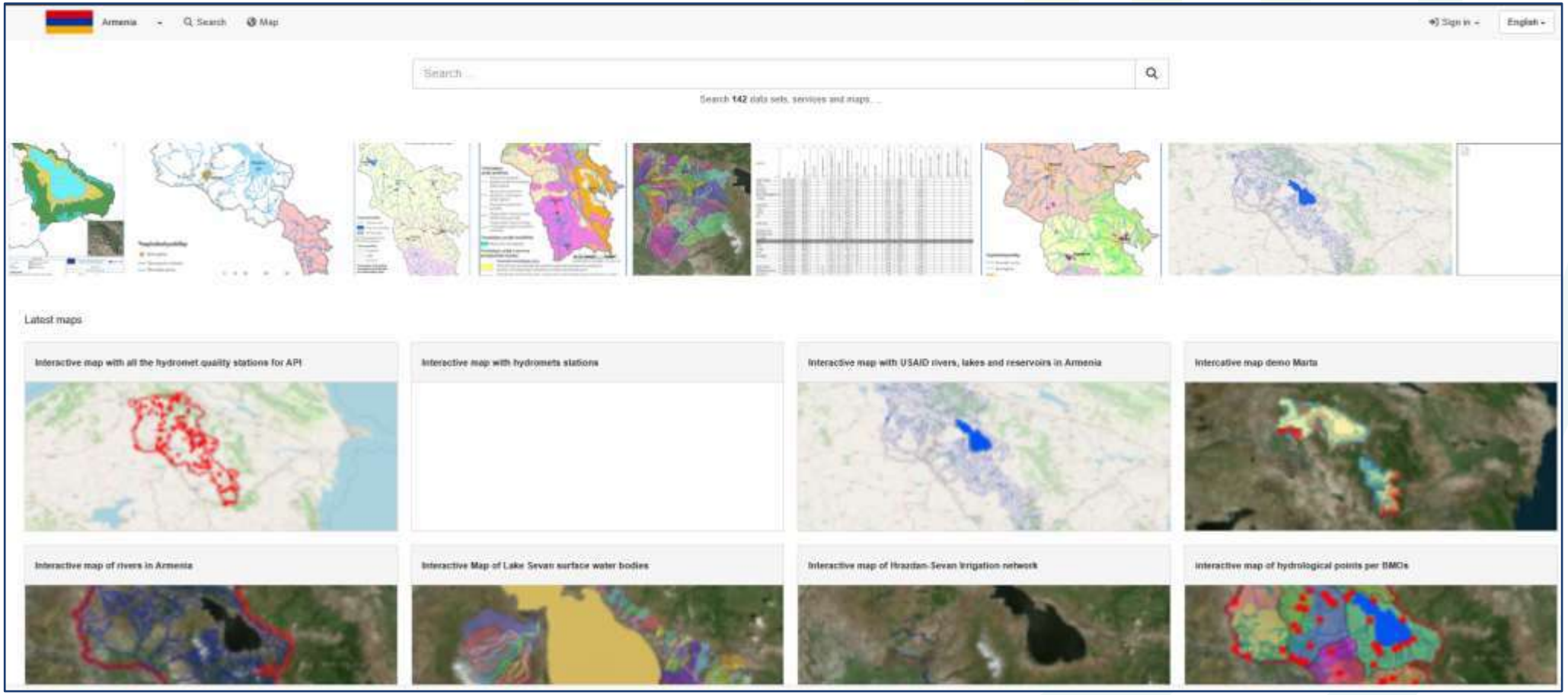
NOM | ORGANISATION
EMAIL | POSITION

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NOM | ORGANISATION
EMAIL | POSITION
Date (jj/mm/aaaa)

*The proposed PDF presents only a few important fields defined in **ISO 19115** standard.*

Example of online catalogue of data sources



Use case: filling in the PDF form

Concrete application on the basins boundary layer in Shapefile format (.shp)

The analyzed dataset

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The Shapefile layer (.shp)

Inseparable set of vector files describing the country's major river basins:

- bassins_senegal.shp (Polygon Geometry)
- bassins_senegal.dbf (Attribute Data Table)
- bassins_senegal.shx (Geometric Index)
- bassins_senegal.prj (UTM 28N / WGS 84 Projection File)

Publication objective

Document the layer for its integration within the National Information System :

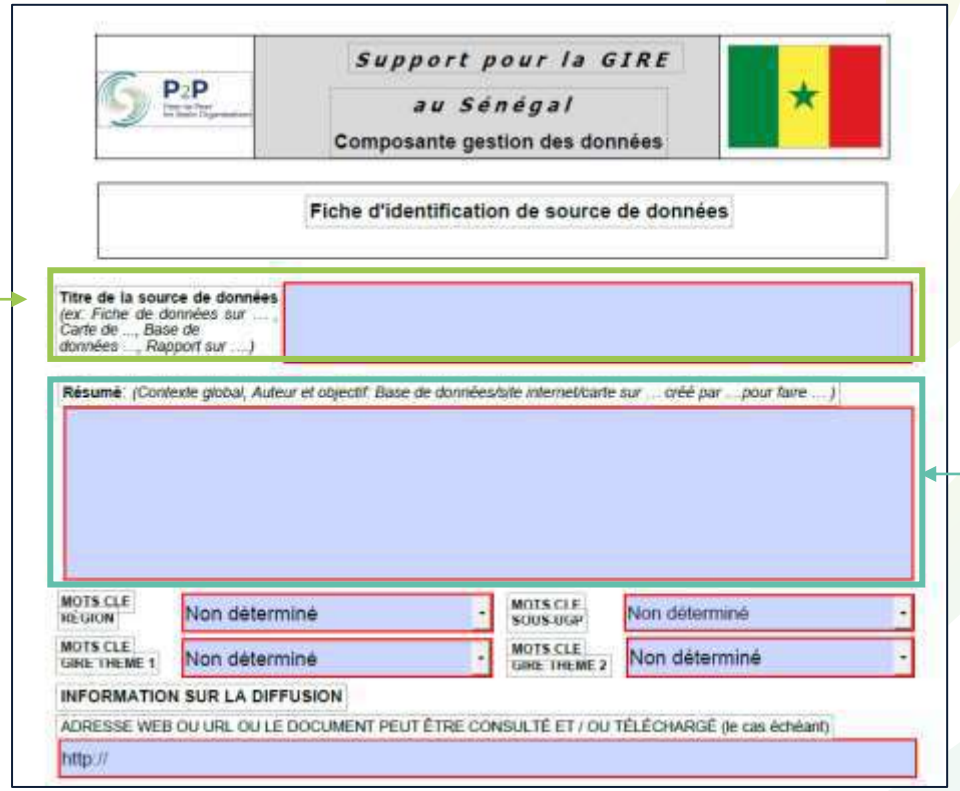
- Scope : Senegal River, Gambia, Casamance Basins
- Users : DGPRE, Water Agencies, Researchers
- Purpose : Integrated Water Resources Management (IWRM)

Senegal River Basins

Sample form completion

Title

- Data format : must mandatory start with "**GIS Layer of**..."
- Precise theme : here "...basins boundary delineation"
- Geographic scope: « ...**in Senegal** »



Abstract & Attributes

- Content description : Vector layer of the major watersheds in Senegal (Senegal River, Gambia, etc.).
- Production methodology : Delineation derived from the hydrological processing of a 30m SRTM DEM, adjusted to the reference hydrographic networks.
- Attribute field definitions : CODE_BAS (identifier), NOM_BAS (official name), SUPERF_KM2 (calculated area), etc.
- Any other useful information (...produced as part of Project XX, ...year of creation, quality control, ...validation level, etc.)

Senegal River Basins

Sample form completion

Geographic Keyword

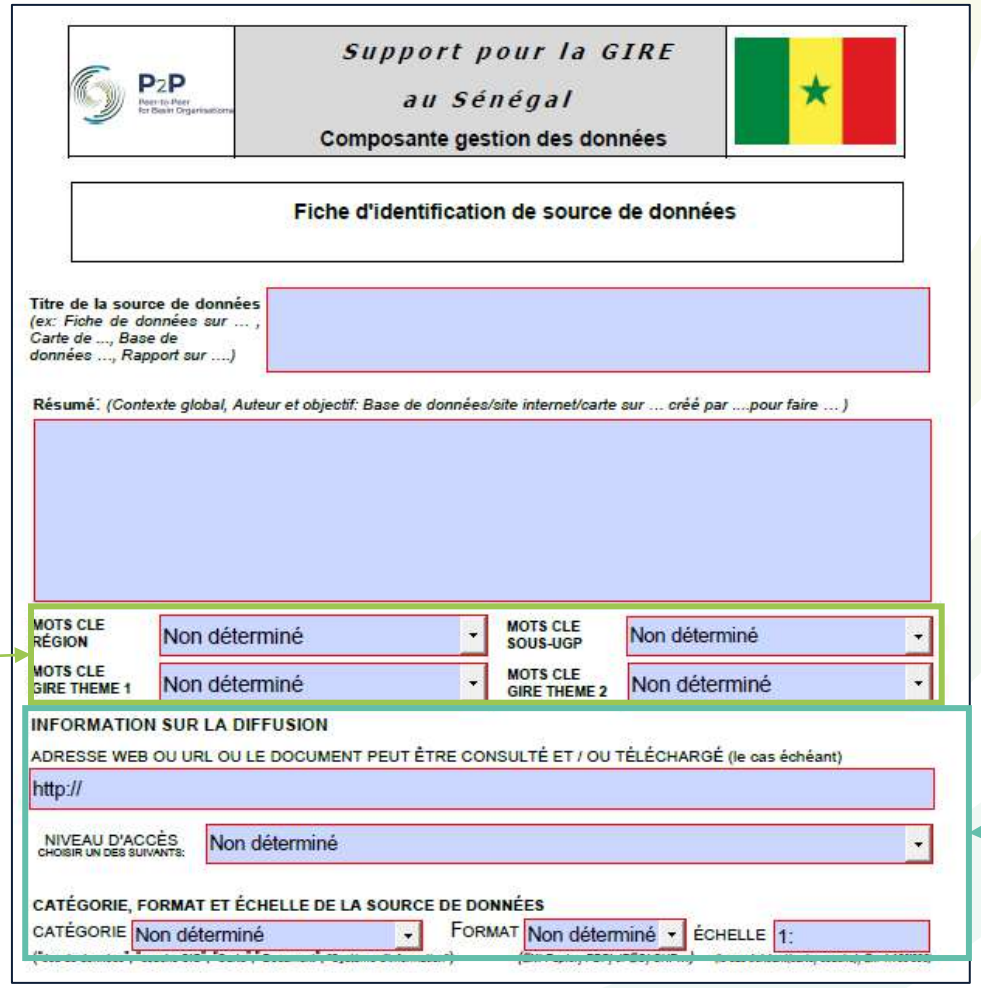
Select a single keyword from the lists according to the exact scale:

- Échelle nationale (ensemble du pays) :
  - « Senegal »
- Échelle d'un seul bassin hydrographique :
  - « Senegal River Basin »

Thematic Keywords

Two standardized themes must be specified:

- Thème IWRM (GIRE) :
  - « River basin hydrography & Watershed management »
- Thème INSPIRE :
  - « Hydrography »



Support pour la GIRE au Sénégal

Composante gestion des données

Fiche d'identification de source de données

Titre de la source de données (ex: Fiche de données sur … , Carte de …, Base de données …, Rapport sur ….)

Résumé: (Contexte global, Auteur et objectif: Base de données/site internet/carte sur … créé par ….pour faire …)

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MOTS CLE GIRE THEME 1: Non déterminé

MOTS CLE GIRE THEME 2: Non déterminé

INFORMATION SUR LA DIFFUSION

ADRESSE WEB OU URL OU LE DOCUMENT PEUT ÊTRE CONSULTÉ ET / OU TÉLÉCHARGÉ (le cas échéant)

http://

NIVEAU D'ACCÈS CHOISIR UN DES SUIVANTS: Non déterminé

CATÉGORIE, FORMAT ET ÉCHELLE DE LA SOURCE DE DONNÉES

CATÉGORIE: Non déterminé FORMAT: Non déterminé ÉCHELLE: 1:

Format, projection and access

Record section	Instruction & rule	Sample value (Senegal case)
Category	Select from the drop-down menu	« GIS layer »
Format & Projection	Specify the extension and CRS	ESRI Shapefile (.shp) / EPSG:32628
Level of access	Intellectual property regime	« copyright »
Web address / URL	Official link (no Drive/Dropbox)	http://www.dgpre.gouv.sn/wfs

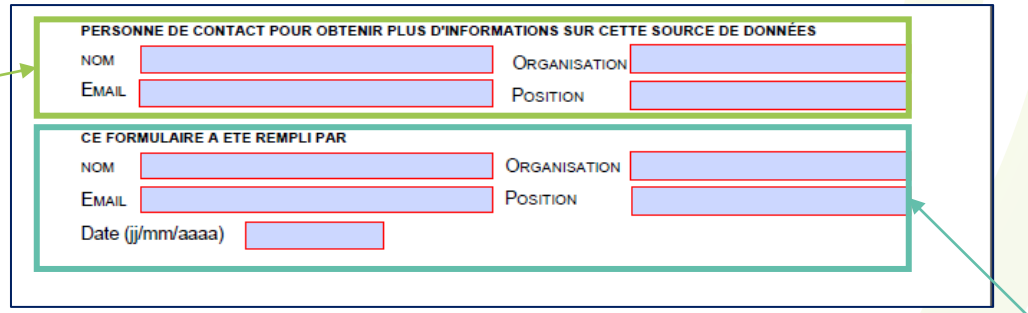
Senegal River Basins

Sample form completion

Data contact

(Producer / responsible party)

To be contacted for information regarding the dataset itself. Producing organization or official manager that guarantees and validates the hydrographic data.



PERSONNE DE CONTACT POUR OBTENIR PLUS D'INFORMATIONS SUR CETTE SOURCE DE DONNÉES

NOM | ORGANISATION

EMAIL | POSITION

CE FORMULAIRE A ETE REMPLI PAR

NOM | ORGANISATION

EMAIL | POSITION

Date (jj/mm/aaaa)

Metadata Completed By (Author)

To be contacted for questions regarding the completion of this metadata sheet. Consultant, GIS expert, or technician who carried out the data entry and documentation work.

Example of fictional person :

› Name: Moussa NDOYE

› Organisation : Water Resources Management Directorate (DGPRE)

› Email : moussa.ndoye@adresse-fictive-dgpre.sn

› Position: Head of mapping & data unit

Case study

Water quality monitoring network by sampling

Context: You are a team of experts from the Dnipro Basin Authority in charge of physico-chemical monitoring of rivers in Ukraine ☺

Data cycle: Your field agents collect water samples from 45 monitoring stations located across the basin. These samples are sent to a partner analytical laboratory, which returns the test results (pH, nitrates, turbidity, heavy metals). Data controlled in laboratory per ISO 17025 requirements.

Processing & validation: You integrate these measurements into your local Access database. Automated and manual quality control checks are performed by your hydrologists to eliminate outliers and validate the data.

Dissemination: The validated data is available to the public and researchers via a dedicated Web REST API, accompanied by an interactive dynamic map of the monitoring points.

It is your turn to describe a local Access database