



Water Management issues in Republic of Moldova: main challengers in Waste Water Treatment and Water Supply

Basin Water Management Authority of Moldova

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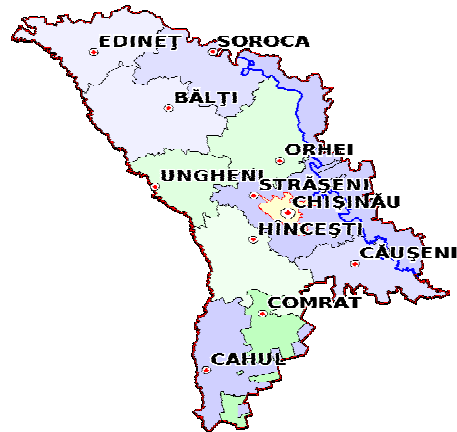
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General Information about Moldova



REPUBLIC of MOLDOVA:

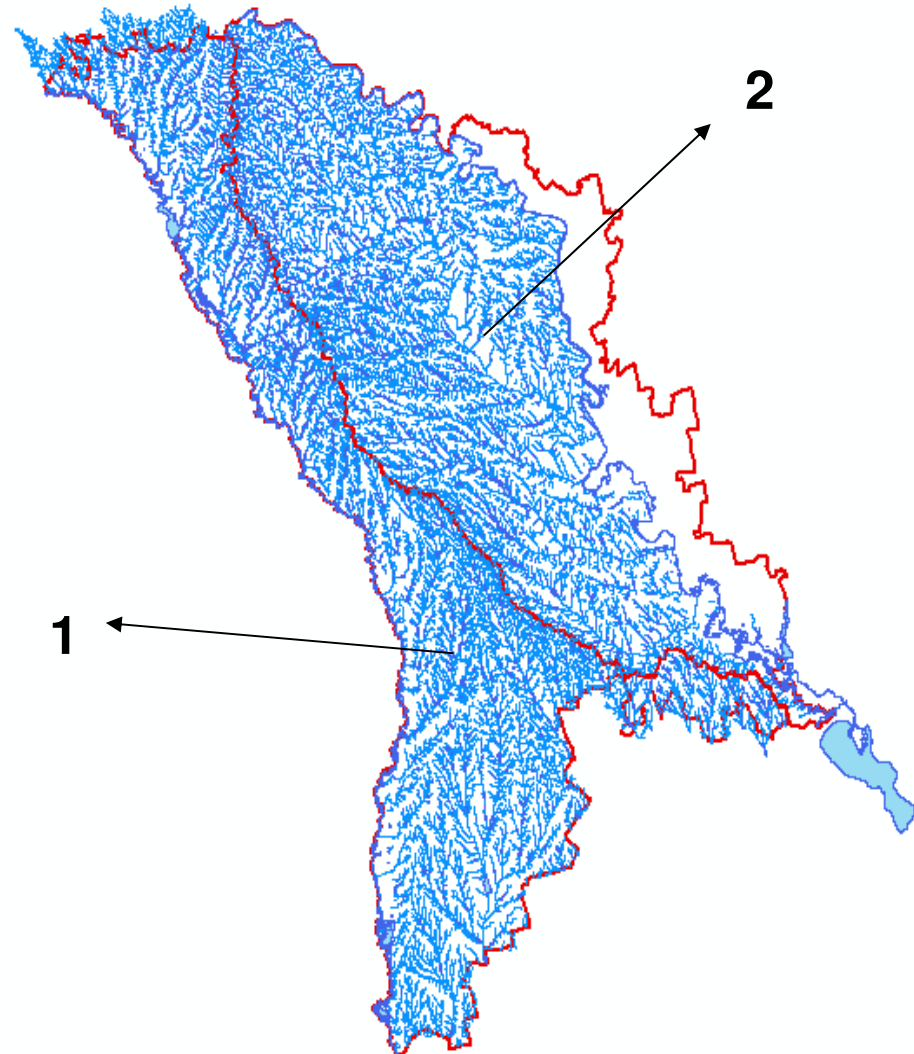
- Situated in the south-east, bordering Romania to the west and Ukraine to the north, east and south.
- The total length of the border is 1389 km, 690 km with Romania that coincides almost entirely on the river Prut.
- The area 33.7 000 km²
- Capital - Chisinau
- Population – 3.6 million inhabitants.
- The landscape is fragmented, represented by a series of relatively low plateaus and plains.
- The climate is temperate continental.
- Is divided into 32 districts, five cities and two regions with special status



Hydrographic basin districts According to new Water Law nr. 272

River basin districts:

1. Danube-Prut-Black Sea
2. Dniester



The hydrographic network (attributes)

River	Length, km	Surface of the bazin, km ²	Annual Average flow, mln. m ³	Average flow, m ³ /s
Nistru *	1352 (657) **	721000 (19070)**	10700	330
Prut *	976 (695) **	27500 (7990) **	2906	92
Dunărea *	2857 (•1) **	817000 (8350)**	203000	6500
Răut	286	7760	313	9,9
Bâc	155	2150	91,3	2,9
Botna	152	1540	33,6	1,1
Ichel	101	814	20,5	0,7
Cubolta	100	947	61,0	1,6
Ialpug *	142 (135) **	3180 (3165)**	91,2	2,9
Cogâlnic *	243 (125) **	3910 (1030)**	59,1	1,9
Căinari	113	835	46,8	1,4
Ciuhur	97	724	21,8	0,7
Cahul *	39	605	9,2	0,3

Water supply and sanitation in Moldova

legal issues

Legal Framework

- The Moldovan Constitution from 29.07.1994;
- Law nr.1347 of 09.10.1997 regarding the industrial and domestic waste;
- Water Law no. 272 of 10.02.1999 regarding drinking water;
- Law 1402 of 24.10.2002 regarding public utility services;
- Law no. 436 of 28.12.2006 regarding local public administration;
- Law No. 10 of 02.03.2009 regarding state supervision of public health;
- **Updated Water Law no. 272 of 23.12. 2011 and 19 acts of the Government regarding the implementation of this law;**
- **Law no.303 of 12/13/2013 of the public service of water supply and sanitation;**
- **Law no. 112 of 07/02/2014 for the ratification of the Association Agreement between the Republic of Moldova, on one hand, and the European Union and the European Atomic Energy Community and its Member States, on the other hand;**
- GD. 934 of 15.08.2007 "On the establishment of automated information system" State Register of natural mineral waters and soft bottled drinks";
- **GD No. 199 dated 03.20.2014 on approving the Strategy for Water Supply and Sanitation (2014-2028).**

Sanitation - new term within the national legal system, defined in the GD No. 199 dated 20.03.2014. *As defined*, specific actions related to sanitation includes wastewater treatment, household waste management and rainwater

Wastewater treatment	The Management of the waste	Rain water management
<p>Wastewater specific legal terminology:</p> <ul style="list-style-type: none"> • Wastewater - by. in Article 2 of Law No.272 of 23.11.11 - is water used in industrial production processes or in households, polluted by various substances discharged through the sewage system into natural receivers (rivers, lakes, Black Sea) or on different terrains, with or without prior treatment. • GD no.950 of 25.11.2013 in Section 6 defines - waste and domestic industrial water, urban wastewater, primary treatment, secondary treatment, appropriate treatment, eutrophication agglomeration; • Sensitive area - the legislation does not define this term, but GD no.950 of 25/11/2013, Chapter VI, sets criteria for the identification of sensitive areas. The criteria and methodology currently not finalized 	<p>The legal framework for the management of these waste is established in the Law nr.1347 of 10/09/1997.</p>	<p>Missing a specific regulation on this position.</p> <p>Some intentions of our legislature is to implement provisions of the Association Agreement with the EU, Annex XI, Chapter 16 Environment.</p>

Current situation

- Today in the country were installed about 836 water supply systems. Operational were about 784 stations or 94 percent.
- Only 1/3 of the localities in the country (total 1682 villages) have access to aqueducts (471 administrative units).
- The volume of water used was 115.1 mil. m³, including 71.6% from surface sources, 22.1% from underground sources and 6.3% from other sources. The volume of water distributed to consumers was 74.3 million. m³, including to the population 53.2 mln. m³.
- On average to each inhabitant are distributed per year up to 14.9 m³ per.
- In the sewerage system is deplorable situation. In 2014 the total aqueducts, 166 were equipped with sewage, which operated sewer systems 121. Of the total, 101 are equipped with wastewater treatment plants, 70 of which are functional.

Moldova's strategy for water supply and sanitation (2014-2028)

The overall objective is to ensure a gradual access to safe water and adequate sanitation for all localities and population, thus contributing to improving the health, dignity, quality of life and economic development of the country.

Specific objectives

- *Decentralization of public services;*
- *Expanding centralized systems and increasing the population's access to these services;*
- *Promoting market economy and attracting private capital.*

ESTIMATION OF IMPACT AND FINANCIAL COSTS AND RELATED NON-FINANCIAL STRATEGY IMPLEMENTATION

The total cost of implementation strategies for all areas of the country, including the smallest villages, is approximately EUR 2.02 billion (EUR 998 million to EUR 1.04 billion for drinking and wastewater management).

These investments are inaccessible to Moldova, in terms of both the mobilization of resources and the absorption capacity in the foreseeable future the implementation of the Strategy, 2028, as well as the cost recovery of operation and maintenance by beneficiaries, mainly the rural population.

The issues of water supply

- Connection to European standards under the Association Agreement within the EU in the field of water and sanitation has delayed due to national political and economic fluctuations;
- Weak promotion of strategies for achieving national information campaigns and awareness raising;
- Government delays in implementing cost recovery mechanisms for managing water resources;
- The lack of transparency regarding environmental information, especially water and sanitation (hard to get information about water quality). Lack of public IT information platform.

Water supply and sewerage networks

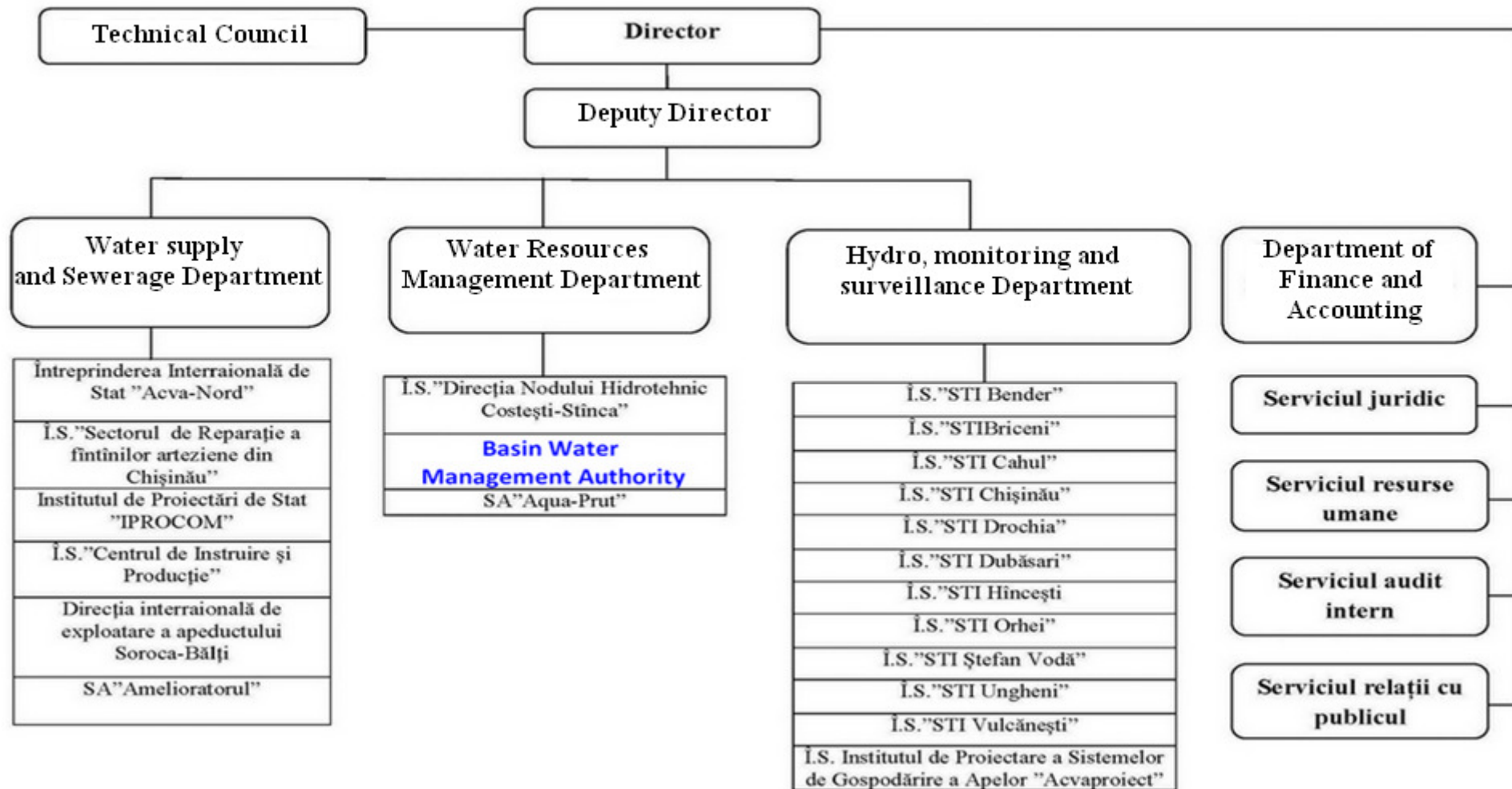
- The majority of the urban water network is exploited for more than 30 years;
- Water Canal S.E. has about 50% of leaks which cause huge losses, unjustified increase of water tariffs. As an example the water tariffs in rural areas are higher than in urban;
- The irrigation network are outdated, is needed their replacement. (Ex. US Compact-Millennium Challenge programme - *was repaired up to 11 large irrigation systems servicing 15,500 hectares*);
- Regionalization Programme-To improve accessibility to drinking water for 5 districts;
- Reduced access of the population to safe water sources (about 44% of the population has no access to safe drinking water, including in rural areas 75.1%).
- Reduced access of population to sewerage systems (about 78.6% of the population is not connected to centralized systems, including 99% in rural areas)

Main Stakeholders

- **The Ministry of Environment** - the key resource responsible for managing the water resources;
- **Ministry of Construction and Regional Development** - responsible for developing, promoting and implementing state policy for regional development, land planning etc.;
- **State Ecological Inspectorate (SEI)** is a regulatory and enforcement institution of environmental protection and carry out state control over rational use and protection of all natural resources;
- **Health Ministry** - one of its main responsibilities lie with the National Center for Public Health (NCPH), regarding the drinking water quality;
- **State Hydrometeorological Service** - part of the Ministry of Environment, responsible for monitoring the state of the environment in the country, monitor service quality and quantity of surface waters in Moldova;
- **State Agency for Geology of the Republic of Moldova (AGeoM)** - part of the Ministry of Environment and is responsible for managing underground water resources, including groundwater. AGeoM manages fountains which supplies drinking water to a part of the rural population;
- **National Agency for Energy Regulation (ANRE)** - the institution responsible for the development of methodology for calculation, approval and implementation of public services tariffs on water supply, sewerage and wastewater treatment etc.

Agency " Waters of Moldova "

Agency " Waters of Moldova " – is the administrative authority responsible for implementing the state policy in the field of water resources management, hydrological, water supply and sanitation, which operates under the umbrella of Ministry of Environment (Government Decision nr. 1056 from 15.09.2008).



Basin Water Management Authority of Moldova

The main Activities:

- The Enterprise is in the subordination of the State Agency "Moldova's Waters" and its entrepreneurial activity is based on the management of public property that was transmitted: 39 lakes, ground water fund.
- **The coordination of water use permits, gather statistical info regarding water limits, manage the DB, "Water Cadastre"** (the statistics for water use), annual report in excel files, no graphical support
- Data exchange (National Bureau of Statistics, Apele Moldovei, Hidrometeorological service etc.)
- The Economic and population needs analysis in water resources, taking action on the rational use of water resources.
- Ensure the collection, processing and data generalization of state statistical reports on the use of water resources.
- International and National Cooperation, drafting project proposals.

Today's main task is:

- The Management of Water Resources using Geographic Informational Systems (GIS) based on the WEBGIS

Ex: WWW.GISMEDIU.GOV.MD

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gismediu.gov.md/en/default/map#lat=210520.532265&lon=288897.936017&zoom=0

Layers

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Legend

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2015-02-10

UTA Găgăuzia

r-ul. Soroca
r-ul. Florești
r-ul. Singerei
r-ul. Fălești
r-ul. Ungheni
r-ul. Orhei
r-ul. Criuleni
r-ul. Anenii Noi
r-ul. Hîncești
r-ul. Ialoveni
r-ul. Căușeni
r-ul. Cimișlia
r-ul. Taraclia

Ministry of Enviroment, National geospatial data fund

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Giscuit IK

Welcome to Ministry of Environment geoportal. Questions regarding access to data please email to
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characteristic layers
of catchment and
discharge points

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Layers IK

Visible layers	☑	📄	🔄	🗑️
Water catchment points	☑	☑	☑	☑
Discharge points	☑	☑	☑	☑
Country border	☑			
Big rivers	☑			
Administrative boundaries of water management bodies	☑	☑	☑	☑
Channels	☑			
Lakes	☑	☑	☑	☑
Rivers	☑			
Districts	☑	☑	☑	☑
Localities	☑	☑	☑	☑
Communes	☑	☑	☑	☑
Roads OSM	☑			
Ortophoto 2007 20cm	☑			
Ortophoto 2007	☑			

Legend ? +

Ministry of Environment, National geospatial data fund, «b>National geospatial data fund, OSM

Scale: 1:10000

Developed by VEC 1.4.2

PROJECT: SLOVAK AID 2014-2016

Project's name: *“Support to development of the programme of measures focussing on the water and sanitation issues in the Prut river basin management planning in Moldova”*

Main objective - Improvement of the water management in Moldova through increasing knowledge on the status of the waste water treatment plants and identification of the sensitive areas and agglomerations for river basin management planning

Methodology for calculation of emission limits for dangerous substances discharged into surface waters

(1)

- The issues of water protection and discharges of the waste waters from both municipalities and industries are set out by Water Act № 272 from 23.12.2011 which establishes for them also the maximum admissible concentrations in surface waters and general limits for discharge limits and monitoring.
- Government Decree № 890 from 12.11.2013 establish the classification system for the surface waters (5 classes): Class I (very good), class II (good), Class III (moderately polluted), Class IV (polluted), class V (highly polluted).
- Another basic requirement with regard to the management of contaminants deals with the fact that the programme of the pollution reductions (also Programme of Measures as part of the River Basin Management Plans) concentrates on maintaining Environmental Quality Standards (EQS) in surface waters.

Methodology for calculation of emission limits for dangerous substances discharged into surface waters

(2)

- The EQS is a decisive factor for calculating emission limit values and their possible authorization. For these reasons the EQS should be defined for all those substances.
- In Moldova the List of the other specific pollutants was not established yet.
- At present, the authorities issuing waste water discharge permits in Moldova is regulated by Government Decrees (GD). In these documents, both maximum allowable concentrations for the surface water classes and also procedure for calculating maximum allowable load for the substances in waste water discharges are defined.
- The procedure described in GD takes into account provisions of the above legal norms valid in Moldova with certain modifications and provides indications on how to proceed in cases of possible critical situations.

Information for calculating of the emission limit values (E.L.V.)

- List of other specific pollutants relevant for the Moldova and their EQSs;
- List of all waste water discharge points of the same substance within the same basin;
- Waste water discharges;
- River flow discharge of the receiving water body at the point of waste water discharge;
- Background values of substances that occur naturally (e.g. metals).;
- Monitoring results (or surveys results).

Calculation of E.L.V.

The following formula is applied as follows:

$$Q = [(EQS - B) (Q_d + Q_r)] / [n (Q_d)]$$

where:

- *EQS - Environmental Quality Standard ($\mu\text{g/l}$);*
- *B - background concentration value ($\mu\text{g/l}$) is inserted into the formula only if known;*
- *Q_d - equals to the average waste water discharge expressed in l/s;*
- *Q_r - equals to the river flow discharge Q_{355d} of the receiving water body in the vicinity of discharge expressed in l/s;*
- *n - a number of waste water discharges of the same substance into the river basin.*

Ex. $[0.039 (600 + 36050)] / [4 (600)] = 0.59 \mu\text{g/l}$ - the maximum permissible concentration of mercury

The formula **does not** take into consideration the following factors

- Degradation of the substance (hydrolysis, photolysis and other);
- Distribution of the substance among water, sediments and biota;
- Progressive increase of the river flow and dilution;
- Self-purification capacity of the water body.

However, if substance is not conservative, it is recommended to use available mathematical models to include the behaviour and fate of the substance in the water body.

Note: In Moldova there is used calculation formula (Government Decree № 950 from 25.11.2013, Annex 5), where dilution factor is used to calculate the maximum allowable load.

Adaptation of the E.L.V. to a real situation

After calculating the theoretical emission limit value, the operator can face three different situations:

1. Industrial plants that do not require a reduction of concentration in the waste water;
2. Industrial plants with waste water discharges with concentrations of which reach the same order of magnitude of the theoretical emission limit value;
3. Industrial plants for which it is impossible to respect the theoretical emission limit value.

The completion of methodology is one of the project main objectives which will be achieved in cooperation with partners from Slovakia, in particular with Peter Rončák (external expert in water resources at Water Research Institute in Bratislava).

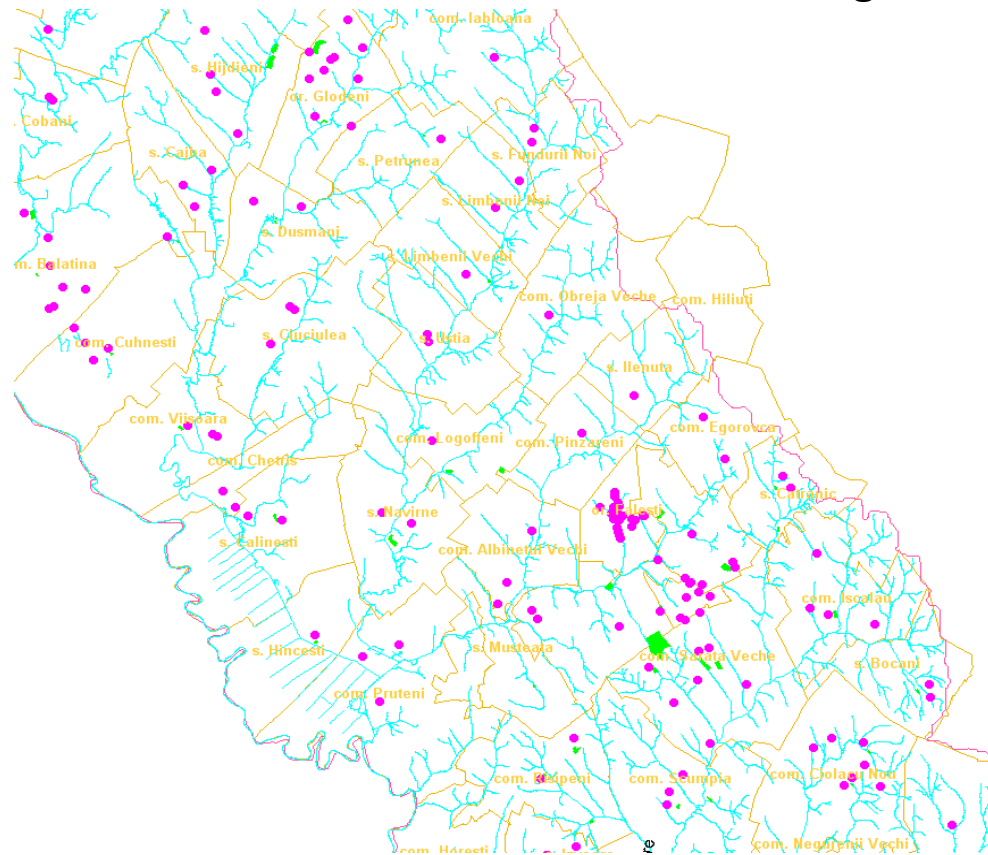
Results of infrastructure assessment

Prut river basin, Moldova

Groundwater catchment points by wells - 853 points

Wastewater treatment plants – 159, of which 24 are functioning

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17 towns use for the centralized water supply network the wells spring (Cărpineni Pogănești, Iurceni etc.)

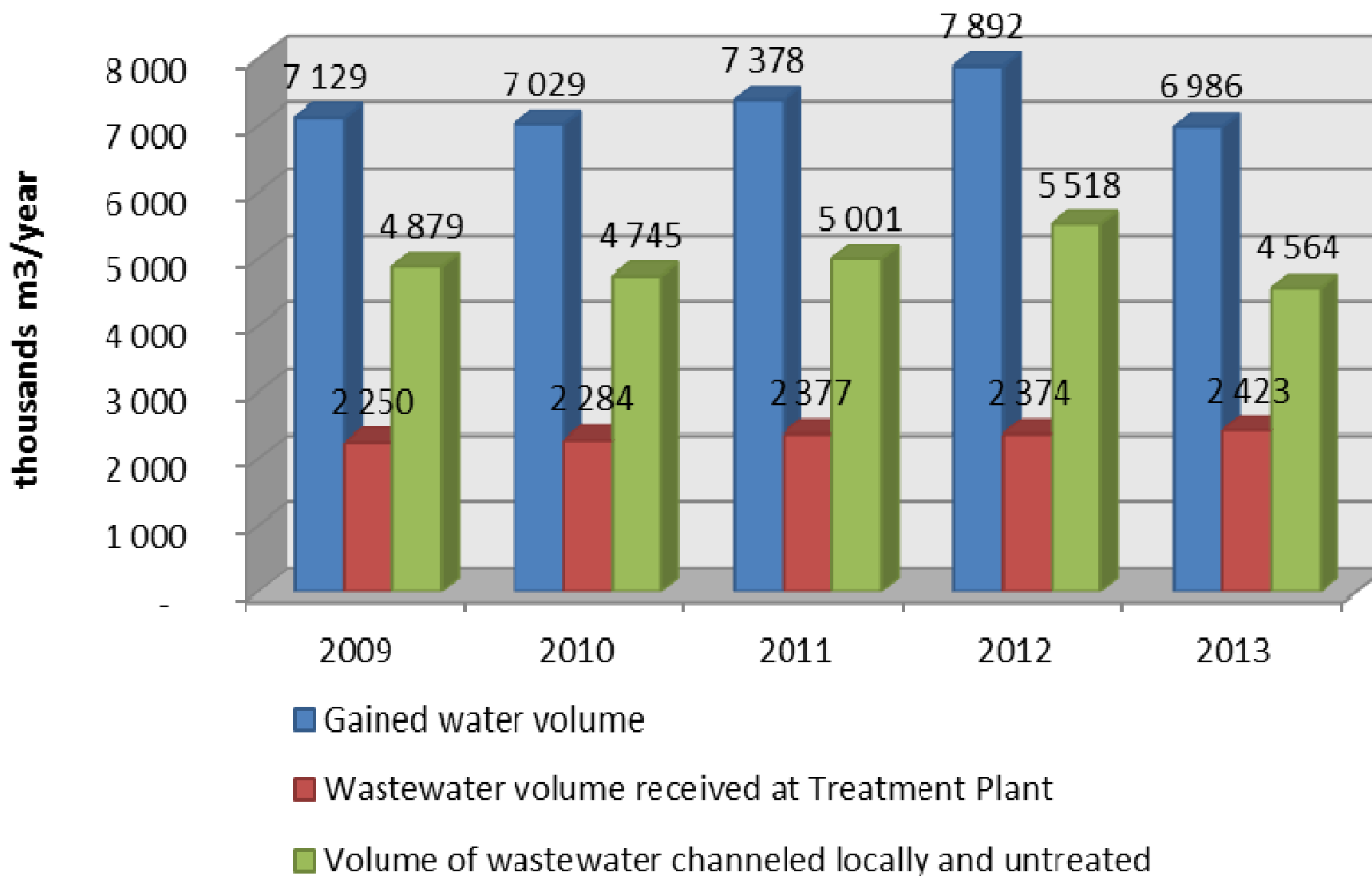
Are operating 36 factories for grapes processing, two sugar factories (Falesti, Glodeni), 7 factories for cans production

Chemical parameters of waste water in PRUT BASIN WATER CANAL 2013

Location (district, city)	Total discharged Thousand m ³ per an/ m ³ /zi	Insufficiently treated Thousand m ³ / m ³ /zi	biological Consumption t/an / mg/dm ³	Substance în suspension, t /an /dm ³	Dry wastet, t/ mg/dm ³	NO ₃ , Kg/an mg/dm ³	CL, t/an mg/dm ³	NO ₂ , Kg/an mg/dm ³	SO ₄ , t/an mg/dm ³	NH ₄ , Kg/an mg/dm ³	Summ	Discharged place
Făleşti	148.0	148.0	3.3	2.6	186.0	3162.8	19.2	62.0	31.5	2558.9	152/6026.3	Sovățul Mic
		404	22.31	17.58	1258	21.4	129.8	0.419	213	17.31		
Nisporeni	128.1	128.1	1.33	2.79	-	1229.8	20.1	67.9	105.4	512.4	188/1957.63	f/d Nîrnova
		350	10.38	21.78		9.6	156.91	0.53	822.8	4.0		
Ungheni	880.9	880.9	84.56	30.30	393.41	-	87.12	-	-	19203.62	155/24908.3	Delia, Prut
	2304.5	2407	95.38	3.44	446.67		98.90			21.80		
Edineț	344.4	344.4	6.7	11.3	223.9	3065.2	348	65.4	-	1821.9	112/4987.3	Valea Edinețului Valea Horjinești, Bogda, Racoveț Prut
	1662.2	940	19.47	32.8	650.8	8.91	1000.1	0.19		5.30		
Cantemir	62.5	62.5	5.44	2.1	43.5	-	-	-	-	-	0/51.04	Tigheci, Prut
	130.0	170.7	87.07	33.62	696.3							
Râșcani	16.6	-	-	-	-	-	-	-	-	-	-	I.a. Costești- Stânca
or. Costești												
or. Glodeni	310.5	-	-	-	-	-	-	-	-	-	-	Glodeanca, Prut
or. Briceni	107.2	-	-	-	-	-	-	-	-	-	-	Lopatnic, Prut
or. Leova	75.0	75.0	0.4	3.15	72.0	90.0	7.8	2.25	-	375.0	162/640.6	Prut
	221	205	5.33	42.0	960.1	1.19	104.00	0.03		4.99		
or. Cahul	748.5	748.5	15.23	12.42	861.30	3944.6	123.73	823.35	79.34	-	249/7386.92	Valea Frumoasa, Valea Cotihana, Prut
	2048	2045.1	20.35	16.6	1151	5.27	165.3	1.10	106.00			
Valoarea admisibila, mg/dm ³			25	35	1500	25.0	300	1.0	400.0	2 (N)		

- 90% of treatment plants do not clean at satisfactory level the water because the biological cleaning is not working properly.
- Nitrogen and Phosphorus cleaning are not working at all. The Treatment Plants are old and not working properly.

Wastewater balance



Treatment plant Nisporeni



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Image © 2015 CNES / Astrium

21 July 2014



July 2007





*Wastewater balance based on
the reports of operators from
Prut basin*

Sources: google.maps

Bing.maps

Ortofoto 2007

Treatment Plant UNGHENI

Modern Treatment Plant in v. Iurceni







**Conditions for the identification
of sensitive areas (*According to EU Directive 91/271/EEC
concerning urban waste-water treatment represents the basis for our
own normative acts*)**

The designation of sensitive areas will be done according to one or more criteria:

- *The water bodies which are found to be eutrophic or in the near future may become eutrophic if protective action is not taken;*
- *surface freshwaters intended to supply drinking water containing more than 50 mg / l nitrates if action is not taken;*
- *The areas where to comply with the other Council Directives advanced treatment is needed.*
- *The list of sensitive and less sensitive areas must be reviewed every four years.*

**The identification will be done using GIS technologies
(www.gismediu.gov.md)**

Conclusions

The Moldovan current system for collection, treatment and disposal of wastewater poses some problems related to the knowledge of their quality or volume of wastewater and the quantities of pollutants discharged into the receivers.

Today there is no methodology for calculating the Emission Limits for Dangerous Substances.

At Local level there are data on wastewater, but they are not collected properly in the absence of appropriate methodologies. The data collected must comply with EU Directives on wastewater

Due to the fact that the treatment plants do not work properly the discharge of the wastewater on the receiver has a cumulative amount of discharged pollutants accumulated in time.

The Water Operators want to charge the users extra for their water losses.

GIS can ensure the usefulness of natural resources far greater than the financial value of work required to develop it.

It is required a huge investment and to acquire performant technologies for water treatment.

Future activities

- Institutional Reorganization of the Basin Water Management Authority of Moldova according to the EU requirements;
- The promotion of the approval procedures of the methodology at national;
- Finalizing the criteria for sensible areas;
- Mapping the sensible areas according to the criteria using GIS technologies;
- Introducing modern, efficient treatment technologies for small villages;
- Implementing Projects for developing regional water supply systems in rural and urban areas;
- The development of quantity and quality water monitoring;
- Development of a DB and online reports of the water users etc.

Ďakujem za pozornosť !
Thanks for your attention !
Mulțumim pentru Atenție !
Спасибі за вашу увагу!

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