

THE NEED FOR A WATER INFORMATION SYSTEM FOR THE REPUBLIC OF MOLDOVA

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Novelty. Insufficient information on water resources is an important issue at both national and global levels. This issue becomes even more important under the conditions of climate change of the last decades. Aim. The aim is to analyze the existing situation in the field and to formulate a scientific argument by means of convincing examples, to argue the need to implement an information system of water cadastre, to arise social interest as a whole towards the problem whose solution determines success. Methods. The authors of the study have used many scientific methods and namely: the systematic analysis of ongoing processes (phenomena); the analysis of statistical data; the methods of trend graphic analysis; the method of analysis and synthesis of natural phenomena and processes. Results. Information of the society is both the purpose and the final result of the present study.

Key words: climatic conditions, information system, water cadastre, water fund.

Actualitatea. Insuficiența informațională privind resursele acvatice reprezintă o problemă actuală nu numai la nivel republican dar are un impact mondial. Acest problem devine și mai actual în condițiile schimbărilor climatice a ultimilor decenii. Scopul. Analiza situației create în domeniul și prin exemple convingătoare de a formula o argumentare științifică a actualității problemei, de a argumenta necesitatea implementării unui sistem informațional al cadastrului apelor, de a trezi „interesul public” al societății în ansamblu față de problema față de care succesul nu poate fi atins. Metode. În cadrul studiului, autorii au aplicat mai multe metode științifice de studiu și anume: analiza sistemică a proceselor (fenomenelor) în desfășurare; analiza datelor statistice; metoda analizei grafice a tendințelor; metoda analizei și sintezei fenomenelor și proceselor în natură. Rezultate. Atât ca scop cât și ca rezultat final al prezentului studiu este informatizarea societății.

Cuvinte cheie: condiții climatice, fondul apelor, cadastrul apelor, sistem informațional.

JEL Classification: D8; L86; Q25; Q26; Q28.

Introduction. The Republic of Moldova is situated in the region where one needs to know about water resources and water fund as a whole from both social and economic points of view.

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The role of water is beyond price in agriculture. The water problem is of both social and economic importance in southern regions of the Republic of Moldova. Indeed, fresh water is a „source of life” in this area.

In the last decades the problem of fresh water has become relevant in central and northern regions of the Republic too. Climate changes that are observed on the Earth in the last decades increase the risk of negative influence caused by high temperatures and irregular atmospheric precipitation.

High temperatures, unbalanced climatic conditions and unstable atmospheric precipitation increase the negative social and economic influence. This results in the need to analyze the existing situation, monitor the water fund and, consequently, to implement an information system of water cadastre.

1. Analysis of the situation in the field

The philosophical content of the sintagmas “water and life”, “water is a source of life”, etc. has been depreciated in Moldova recently and has transformed in cheap, formal expressions and claims that have no profound meaning.

This situation is the result of paying less attention to important social and economic problems in this field.

Problems become great and dangerous when they are unexpected and you are neither ready nor informed.

The topic of the present study is the informatization process in the field of water resources. The Republic of Moldova has no modern information system in this field. It is necessary to state that the Republic of Moldova does not have any water cadastre at all.

There is no concept of information system in the field of water cadastre and it happens when social, economic and ecologic impact of water becomes increasingly important, especially in the last years.

It would be wrong to deny important actions that take place in Moldova regarding the improvement of agricultural lands, fresh water supply, etc. The problem is actually that all these activities would be much more efficient under the conditions of a modern Information System of water cadastre.

1.1 The research subject

The subject of the present study is the water fund of the Republic of Moldova viewed in terms of the Information Cadastre System as a whole [1, p. 98-141]. It is obvious that in case of an information crisis like this one needs to know as much as possible about the water fund: who? what? when? where? and how? These questions are specific to a modern and vital cadastre.

These questions reflect the contents, the concept of “Cadastre – 2014” where the need for detailed understanding of the multifunctional role of water as a natural treasure, including of the Information system of water cadastre, is of the greatest importance [8].

The study field is much more wider and needs detailed knowledge of quantitative, qualitative, legal, social, economical and ecological aspects of the research subject (water cadastre), as well as theoretical peculiarities of the Water Cadastre System at the territory of the Republic of Moldova (principles, categories, etc.).

1.2 Research materials and methods

The problem of the Information Water Cadastre System implementation is considered in terms of social, economical and ecological impact of water under the global climate changes [3].

Therefore, we have used the following information materials: annual and periodic information of the National Bureau of Statistics of the Republic of Moldova and EU countries; annuals of the Agency for Land Relations and Cadastre as well as the Real Estate Register of the state enterprise “Cadastru”; annuals of the Agency “Apele Moldovei”; legal framework of the Republic of Moldova and EU countries related to water cadastre; scientific research of local and foreign authors; other data and scientific studies on the dynamics of the water fund, water quality of Moldovan water bodies, etc. [7].

2. The need for the implementation of water cadastre

The objective necessity of cadastre implementation, in our case it is water cadastre, is firstly manifested through social, economic, ecological, etc. impact on the topic and the subject of studies.

When answering the question “who and what”, first of all, cadastre is going to answer the following questions:

- who is interested in cadastre implementation, who will represent the organizational part and be responsible for its implementation;
- who is water cadastre intended to, who will greatly influence the information content and quality aspect.

Any cadastre as an Information System differs from other information systems in terms of the answer on the following questions: when, where and how. These are the questions that characterize full deployment of processes (phenomena) in both nature and society.

Observing processes and phenomena in time and space, penetrating inside them to answer the question “how do these processes (phenomena) take place”, subsequent computerization of the society – all these have a systemic multifunctional content.

It is evident that these questions arise only if the society (the corresponding field) has acknowledged objectivity of phenomena, processes and need for computerization. This segment is very important in the process of cadastre implementation, including the implementation of water cadastre. It is more rational if a society realizes the objective need for water cadastre implementation before the negative impact reveals (natural cataclysms, floods, droughts, etc.).

The analysis of cadastre development provides us with many examples when intentions to implement a cadastre failed because of the lacking acknowledgement of “objective need” for these processes. We have previously noted that they write and speak little about the role and impact of water in our society, the actions that are taken are occasional and without any complex content. The actual situation is much more complicated.

Importance of the issue.

Any issue can be studied in detail and correctly only if we know the boundaries of the studied subject. The detailed analysis and description of the given subject is too huge to cope with it within this study. At this stage we should state that the subject of both water cadastre and this study is the water fund.

We will try to prove the existence of some processes, phenomena and trends. We will show the need for a profound study within other articles.

2.1 The quantitative aspect of water cadastre.

The dynamics of the water fund surface (the quantitative aspect) is the most visible within this study and allows us to formulate some important conclusions.

The analysis of regional (spatial) changes which takes place within the water fund has a very large content. From a situation in a region (or a water body) to a global situation [8].

We are going to limit the quantitative aspect to two measure units within this study: surface and volume. We are going to consider the subject of cadastre (the water fund) in terms of surface and volume dynamics.

The authors of the study also realize that the surface of the water fund as the subject of this study is a derivative, the final result of many natural phenomena (atmospheric precipitation, drought period, landscape structure, etc.) as well as anthropogenic factors (drained meadows, lake construction – erosion ponds, etc.).

The authors consider that at the initial stage it is important to follow the final outcome compared to the surface of the water fund. It is the outcome that may worry or reassure us, ask us some questions or suggest answers.

Table 1 analyzes the water fund surface over the last 10 years and shows a significant increase. The water fund has been increased by 6.5 thousand ha (from 69.8 thousand ha to 76.3 thousand ha). The annual increase of surface varied depending on some objective (natural) factors, which caused these changes.

Table 1

The Dynamics of the Water Fund Surface in the Republic of Moldova

	The study period (years, on January 1 st)	The water fund surface (thousand ha)			
		The total	Including		Moorlands
			The total of waters	Including Ponds	
1	2	3	4	5	6
1	2004	69.8	62.7	33.5	7.1
2	2005	71.2	64.1	33.5	7.1
3	2006	73.1	65.7	33.7	7.4
4	2007	72.8	65.4	32.6	7.4
5	2008	73.2	65.7	32.8	7.5
6	2009	73.7	66.2	33.4	7.5
7	2010	74.5	66.8	33.6	7.7

8	2011	76.0	67.3	33.3	8.7
9	2012	76.3	67.6	33.6	8.7
10	2013	74.8	66.1	32.2	8.7
11	2014	74.0	65.2	31.7	8.8
12	2015	74.0	65.2	31.7	8.8

Source: The annuals “Land cadastre of the Republic of Moldova”.

Thus, the dynamics of the water fund surface shown in Figure 1 may be appreciated as a permanently growth trend. Further, it is of great interest to assess this trend and determine the factors (motives) that resulted in this trend. We have already stated that the surface of the water fund is influenced by many factors, both natural and anthropogenic ones.

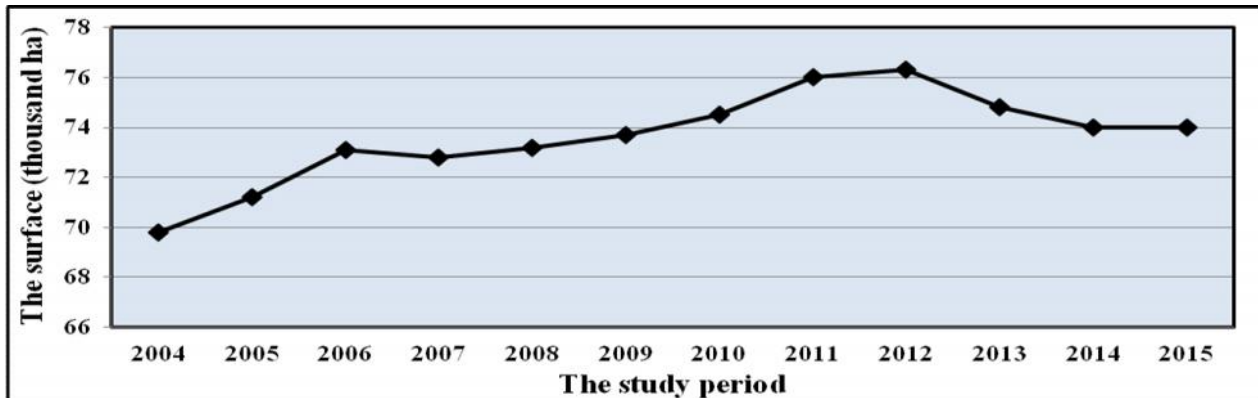


Fig. 1. The Dynamics of the water fund surface in the Republic of Moldova

Source: The Annuals “Land Cadastre of the Republic”.

2.2 The dynamics of atmospheric precipitation

The authors also consider that atmospheric precipitation is one of the most important factors, which influences the water fund surface.

Table 2

The volume of atmospheric precipitation in the Republic of Moldova

The research subject	The study period, years / the average volume of atmospheric precipitation (mm)												
	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
The volume of atmospheric precipitation	470	480	490	500	510	520	535	540	550	560	565	570	580

Source: Diminishing the impact of extreme pedo-climatic factors on crops.

Table 2 provides the dynamic information of atmospheric precipitation in the Republic of Moldova over the last 120 years. The multilateral impact of atmospheric precipitation is described in various scientific works. The problem becomes even worse due to unstable annual atmospheric precipitation and its growth trend in the long-term perspective [6, 7].

The information provided in Table 2 proves the fact that the volume of atmospheric precipitation has been increased by 110 mm over the last 120 years. The analysis of atmospheric precipitation over the last 4 years gives the evidence of the ongoing growth trend.

One needs to mention here that annual volumes of atmospheric precipitation differ a lot. If we assess the average line, which illustrates the dynamics of atmospheric precipitation at 100% (Figure 2), annual extremes, then, will be +55% (1966) – 40% (1980) etc.

This proves that we must be ready for significant deviations (both dangerous floods and drought periods) even under the conditions of atmospheric precipitation medium growth. That is, the situation makes us develop some specific activities necessary to face the consequences of atmospheric precipitation.

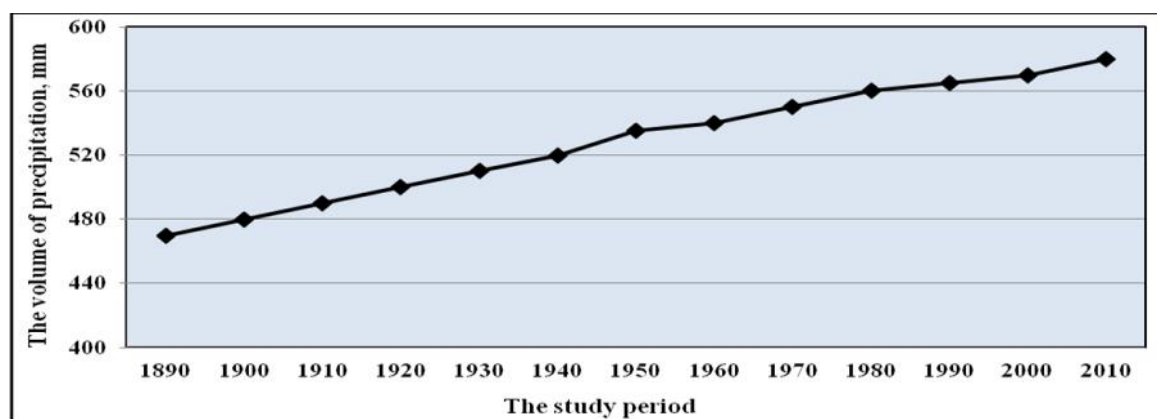


Fig. 2. The dynamics of atmospheric precipitation in the Republic of Moldova

Source: Diminishing the impact of extreme pedo-climatic factors on crops.

What does this volume increase of atmospheric precipitation by 110 mm over the last 110 years mean? The average level of 580 mm in the Republic proves the fact that this figure equals 680 mm or even more in northern regions.

The climate of the Republic of Moldova needs to be reviewed in terms of atmospheric precipitation. The economic activity in agriculture should be re-examined. The agricultural methodology should be re-considered. It is rather difficult to assess Moldova's climate as the arid one under the conditions of atmospheric precipitation permanent growth [6, 7].

It is contradictory, but drought periods in the Republic of Moldova are becoming more dangerous from year to year under the conditions of atmospheric precipitation annual increase. According to Table 2, one can see the dynamics of atmospheric precipitation in the Republic of Moldova over the last 130 years.

2.3 The qualitative aspect of water cadastre

Quality is the second important information aspect within any cadastre. We cannot evidently avoid this aspect in our study too. Moreover, the changes that take place within the water fund affect directly the quality of water.

Figure 3 shows the structure of surface waters at present. According to this figure, the level of clean surface water is very low.

The ratio between the volume of clean and polluted water is 1:16. Sixteen units of polluted water are allotted to one unit of clean water [6, 7].

The climatic situation in many European and non-European countries, related to the last period of time proves that the issue of water and atmospheric precipitation should be monitored at a high level. The state (by means of various programs and policies) plays an important role here.

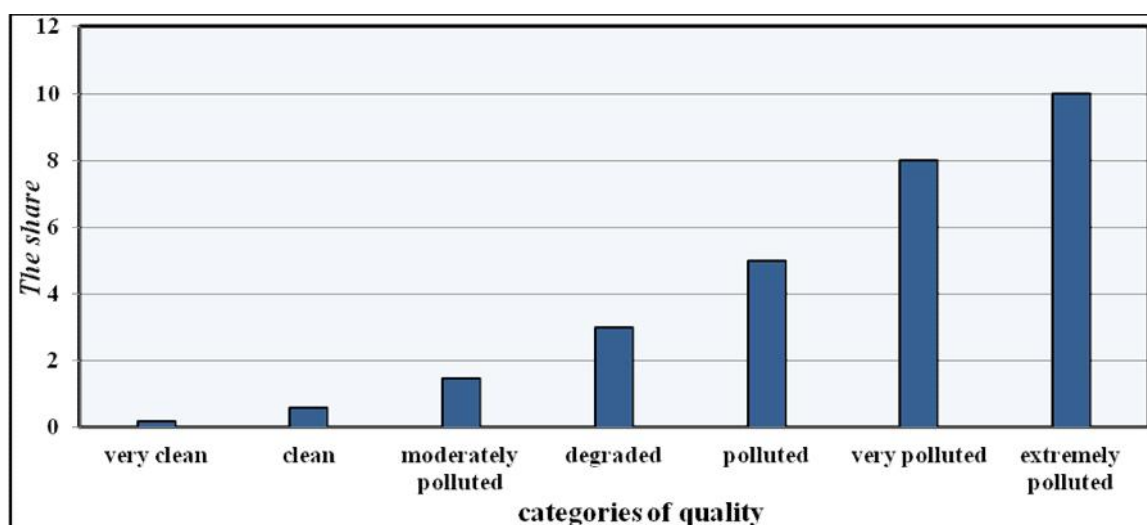


Fig. 3. The quality structure of surface waters

Source: State Water Cadastre of the Republic of Moldova

