OBJECTIVES AND RISKS OF SOP ENVIRONMENT WSS PROJECTS

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Abstract

This paper aims to present some important findings of our recent research dedicated to the development of the water sector in Romania, namely of the Water Supply and Sanitation networks and services, as required by the objectives of the Sectoral Operational Programme Environment. After highlighting the necessity and importance of investments in the WSS infrastructure, we present the objectives of SOP Environment and the current high financing demand for investments in water supply and wastewater systems, under Priority Axis 1. Finally, the economic and financial risks to the SOP Environment regional water supply and sanitation projects are identified and exemplified by a qualitative analysis at a major regional (county) WSS project. There are also some brief conclusions and recommendations, as well as future research outlooks.

Keywords: water supply and sanitation (WSS), SOP Environment, projects, economic risk, financial risk.

Introduction.

Importance of WSS infrastructure and services development in Romania

In Romania, one of the most obvious characteristics of the general state of the environment concerns the striking deficiencies in environmental infrastructure, especially in the urban wastewater treatment and water supply and sanitation in rural areas. We can assert, based on a brief characterization of the water/wastewater sector, that Romania is still underdeveloped in terms of providing the infrastructure and distribution services of water supply and collection and treatment of wastewater.

The main current issues in the Water Supply and Sanitation (WSS) sector are: the relatively low public access to water supply network (only 65% of households and 56.5% of the Romanian population is connected to the public drinking water supply, in 2011); poor quality of drinking water;
a low and unbalanced coverage of (urban or rural) areas in regions with public sewers (the total degree of sanitation coverage was, in 2011, of approximately 43.5% at the national level; the share of residents equivalents connected to public sewers is 78.45% in urban areas, as opposed to rural areas where it is of only 9.23%);

- the network of public sewerage is much less developed than the national public network water distribution, indicating an imbalance and lack of character generally integrated water services as a significant deficiency of this sector. The total number of localities with public sewerage is less than half (37.4% in 2011) of the total number of the localities supplied with drinking water network;
- a worrying aspect is that the sewerage system has developed at a considerably slower pace than the distribution network of drinking water;
- a lack of or insufficiency of wastewater treatment facilities (only 32.2% coverage with wastewater treatment facilities in 2011, so that treated wastewater represented only 35% of the total reversal);
- poor management of the water supply and sanitation systems.

All these issues have a negative impact on the prospects for a sustainable regional socio-economic and human development.
Since Romania has adopted the EU environmental acquis and aims to collect, by 2015, 60% of the wastewater discharged (doubling the capacity of 2004), the investment needs in the water supply and sanitation networks and services are a big challenge for the country, in economic, financial and administrative terms, especially given the global financial crisis. However, reducing the gap on environmental infrastructure, both quantitatively and qualitatively, between the European Union and Romania should result in more efficient public services, taking into account the principles of sustainable development, such as the "polluter pays" principle.

For environmental protection, the issues of surface and groundwater pollution derived mainly from the untreated wastewater discharged into watercourses. The extent of urban development in recent years in the absence or non-functioning of sewage treatment plants (even in Bucharest) led to a situation that over 50% of the quantities of pollutants discharged into the natural receivers come from large urban areas, which means that Romania will meet very high costs to implement Directive 91/271/EEC concerning urban waste water, over 10 billion euros.

Although the situation of localities with a population of less than 2000 population equivalent is not an emergency, of compliance with the obligations assumed by Romania's EU Accession Treaty in Chapter 22 (Environment) the fact that about two thirds of the rural population is not connected to the mains water supply and 80% of these residents do not benefit from sewer systems is, in our opinion, a major alarm signal regarding the prospects for balanced and sustainable development at the regional level in Romania.

Romania's capacity to provide efficient infrastructure and services in the environmental field, both nationally and locally, is also an important factor of economic development. Therefore, the public and/or private investments in water supply and sanitation WSS infrastructure, although extremely costly, are currently essential to ensure a balanced and sustainable development of the regions and districts of the country, a collective effort and an efficient test of Romania's integration in the European Union. However, through their drive, these investments in environmental infrastructure can be a viable and healthy way to revive the economic growth in Romania in the economic and financial crisis, a step to the desired smart and green recovery, recommended in the Europe 2020 strategy.

The importance of investment in environmental infrastructure, in a program of economic recovery is apparent from research devoted to the actual environmental infrastructure and its management, which shows that provision of infrastructure, can influence economic activity both in demand and in supply. The EU countries have undertaken numerous studies to determine whether the infrastructure stimulates economic growth. Evidence suggests that a more extensive infrastructure network is typically associated with higher economic activity. However, identifying and verifying the correlation between environmental infrastructure and green economic development at local, regional or national level is still a conceptual methodological challenge for economic research (Frone Simona, Frone D.F., 2014).

1. SOP Environment and the current financing demand for investments in WSS infrastructure

As shown in our previous work, poor infrastructure is a real similarity between Romania and the country poor in developing Asia and Africa. Romania is underdeveloped in terms of infrastructure providing water supply services (distribution and potable water treatment) and, especially, in terms of sanitation services (collection and treatment) of wastewater.

The main reason is in the past underfunding of the water sector in Romania (Rojanschi V., Lust A., 2006), although the water supply and

sanitation (WSS) services generate substantial benefits for human health, the environment and economy as a whole (Frone Simona, Frone D.F., 2011).

In order to provide sustainable services WSS, the investment is necessary be carried out proper in both the upstream and the downstream; upstream investments in water management are critical to ensure sufficient resources constantly drinking water supplies from quality with the limiting the negative impact on other alternative uses of water. Investments to be carried downstream water supply activities are required for the collection of wastewater, sludges, safe treatment and disposal of wastewater in order to ensure adequate control of the environmental impact of these discharges of wastewater and maintaining the quality of natural water resources.

Hence water sector is an essential environmental sector which needs demanding investments in Romania: the overall objective of Sectoral Operational Program Environment (SOP Environment) is to protect and improve the environment and living standards in Romania, focusing in particular on meeting the environmental acquis. The aim is to reduce the environment infrastructure gap that exists between the European Union and Romania both in terms of quantity and quality. This should result in more effective and efficient services, while taking fully into account sustainable development and the polluter pays principle.

The first specific objective of the SOP Environment is the improvement of quality and access to water and wastewater infrastructure, by providing water supply and wastewater services in line with EU practices and policies, in most urban areas by 2015 and by setting efficient regionalised water and wastewater management structures.

Indeed, in Romania, as stated in the financial statement of the Sectoral Operational Programme Environment (SOP Environment, 2007), the total estimated required investment for the water sector in 2007-2013 are of about 12 billion Euro, out of which about €5.4 billion foreseen from the EU funds:

- €4.8 billion estimated in the period 2007-2013 for waste water collection and treatment investment. This investment is urged since up to 70% of the waste water are untreated or insufficiently treated and flow directly into natural receivers; less than 55% of Romania's population is connected both to water and sewage services; all territory of Romania declared sensitive area; advanced treatment (more expensive) will be required for agglomerations larger than 10,000 p.e. (population equivalent)
- €3.8 bn estimated in the period 2007-2013 for investment in drinking water provision, since only 65% of the population of Romania benefit from mains drinking water supply and indoor plumbing [SOP Environment, 2007].

That is, a total estimated investment requirement of €8.6 bn for the period 2007-2013, meaning an average annual investment of €1.72 bn , i.e. about ***2.32 bn $ / year*** (average exchange rate employed 1 Euro € = 1,35 USD $).

Also, by considering another rough previous estimation, the total investment needs for rehabilitation of public water and sewer as calculated in the sustainable development strategy of public water supply and sanitation in Romania (RWA, 2003) is:

- water supply and sanitation in urban areas: 6.3 billion Euro
- water supply and sanitation in rural areas: 6.2 billion Euro.

The total is 12.5 billion, representing an annual average of 625 million Euro/year, i.e. minimum ***850 million $/year*** (but here a 20 years long-term is considered).

In line with the assessment of the environmental needs in Romania, the first most demanding field representing Priority Axis 1 ***"Extension and modernization of water and wastewater systems"*** .The proposed total financial allocation for Priority Axis 1 is of about 3.2 billion Euro, taking into consideration also the risk of noncompliance with EU acquis which would lead to higher price to be paid in the medium term by Romanian authorities.

Currently, in implementing SOP Environment, Romania was quite successful in the signing and approval of major environmental infrastructure projects (43 major water projects approved for Priority Axis 1 (SOP Managing Authority, 2013). The signed projects are worth 5 billion euros, and in terms of the 2007-2013 calendar, the programme fitted the schedule agreed with the European Union more than forecasted, in terms of signing contracts.

However, the second phase of implementation and absorption, which are the responsibility of local authorities, is still poor. Water and sewerage networks projects present also a high financial risk of disengagement of EU funds, due to too low levels of implementation: the average rate of implementation of the 42 regional major WSS projects was of only 15 % in August 2012 (Frone Simona, 2013).

Still, as we shall further analyse, the Priority Axis 1 "Extension and modernization of water and wastewater systems" faces some problems, shortcomings and challenges for a higher absorption of EU structural and cohesion funds available for the effective development of the water/wastewaterinfrastructure, since the co-financing and implementation capacity of the Regional Operators has proved to be too limited.

2. **Economic and financial risks to the SOP Environment regional water supply and sanitation projects**

In order to outline and analyse the most important and specific detailed analysis on economic and financial risks associated with specific investment projects in water supply and sanitation infrastructure WSS.

The classification, analysis and assessment of risks related to WSS projects is not an easy task, although it is an issue that should always be well thought out and planned. The actual outcome of future specific risk is not predictable with certainty but different probabilistic outcomes are usually known, either from mathematical calculation or similar experiences.

Economic and financial risks of the WSS activity can be divided into two categories:

1) financial risks (investment related), which is the set of risks associated with investment in new infrastructure of water and wastewater: expansion of a distribution network, the creation and development of new sources of drinking water, or the construction of a new water wastewater treatment.
2) economic risks (of exploitation), which is the set of risks associated with the operation and maintenance of the water supply and sewage-sanitation service.

Next we may be able to perform more detailed analysis of these risks, with some own comments and particularities highlighted for the case of the water supply and sewerage sanitation (WSS) projects financed by the Priority Axis 1 of SOP Environment in Romania.

The most significant financial risks of infrastructure and WSS utilities projects are:

- the c**redit risk (capital - intensive profile):** a typical WSS project involves large investments in early years, with a large negative cash flow, which eventually turns into a positive but modest cash flow. Precisely because of this risk, major environmental infrastructure projects for water supply and sanitation in Romania benefit in SOP Environment from European grant funding (Cohesion Fund), since they are virtually non-bankable due to the huge investment needs, to be achieved in a relatively short time (under terms negotiated in the accession treaty);

- the **risk of reduced profitability:** because the late obtaining of positive cash flow and resistance to tariff increases, financial rates of return of the water / wastewater are among the lowest (5-10%, as compared to 17-25% in the energy sector and 25 -30 % in the telecommunications sector) (UNEP , 2006).

- the **risk of disengagement** (cessation) of European funding: in financing the SOP Environment WSS projects, this risk translates into specific risks of financial corrections or disengagement. Thus, any misuse of

EU funds will lead to financial corrections. These may consist of delayed disbursements, reduction in future payments or recovery of funds allocated.

- the **currency risk** : in the European SCF funding, such as the SOP Environment WSS projects, this risk is avoided by the fact that funds are either grants or co - financing contribution of budgets of the national and local government, which are in national currency;

- the **sub- sovereign risk**: in Romania there have issued problems in the financial capacity of municipalities and county councils, to contract and guarantee loans. According to the Ministry of Finance, a number of four county capital cities and eight county councils have exceeded the 2013 level of 30 % debt ratio which allows contracting or guaranteeing new repayable loans.

Economic risks of the WSS projects are determined by the uncertainty of economic development, namely of the market for this sector. The most important of these risks are:

- the **commercial risks**: risks related to the consumer demand, the microeconomic behavior of consumers (i.e. their reaction to increasing water consumption tariffs) , current and projected demographic changes in the operating model of water consumption, illegal connections , unbilled water and bad debts;

- the **risk of competition**: The demand for WSS infrastructure and services in Romania is reduced because of the risk of competition determined by quasi - free access of rural population to water from common wells and own boreholes;

- the **risk of inflation**: According to a recent report by the IMF in Romania, inflation is expected to decline further in the second half of 2013, down to 3.3 % at the end of the year (in the central bank 's target range) and will continue to decline in 2014 to 3%, and 2015, to 2.9%. Thus inflation risk is relatively low (moderate risk score in the risk matrix of the WSS projects);

- the **contractual risk** is inherent in the long-term contracts, since over long periods, the operating environment is likely to change due to changes in national policy, water quality standards, the availability of fresh water resources , etc. ;

- the **legal and regulatory risk**: typical risks which are taken into consideration here refer to the existing legal and regulatory framework for the provision of water and wastewater, the incoherence of national and regional legal method of resolving disputes, such as those related to the enforceability of legal provisions.

The fact that water is one of the local natural monopolies requires the important role regulatory authority for WSS services to ensure compliance with performance standards and for protection of consumer

interests. However, the regulatory framework for water and wastewater services may be insufficient, inadequate and unstable, being perceived as a significant risk to potential investors in this market.

There is significant uncertainty about future cash flows of the WSS operators as essential cost elements (determined, for instance, by the requirements of wastewater treatment), and income (e.g. tariffs) cannot be predicted accurately. This risk, together with low levels of implementation of contracts, are key reasons for low investment and relatively limited use of public-private partnerships in the water sector in many emerging market economies and developing countries (Platon V et al, 2014).

The table below (Table 1) summarizes the main economic and financial risks of water supply and sanitation projects and services:

Table 1: Specific financial and economic risks and impacts in the WSS sector

Crt.nr.	Risk category	Impacts
Financial risks		***Affect financing of investment projects in the sector of WSS***
1.	Credit risk	Major WSS projects are capital-intensive AAC and non-bankable (difficulty in attracting commercial loans)
2.	Risk of low profitabilty	Projects are less profitable and unattractive to investors (difficulty in attracting funds on the financial market)
3.	Risk of European funding disengagement	Ceasing funding for continuation or completion of the investment
4.	Currency risk	Devaluation of the investment debt service
5.	Sub-sovereign risk	Incapacity of local governments and municipalities to grant or borrow
6.	Macroeconomic risk	Macroeconomic instability will affect the price of capital raised from the financial market
Economic risks		***Affect the value of project costs and revenues in the WSS sector***
1.	Commercial demand risk	Payment default and lower revenue than forecast of the feasibility study
2.	Risk of competition	Incomes below projections in the feasibility study (reduced demand due to competition)
3.	Risk of inflation	Overcoming the cost of project implementation
4.	Contractual risk	Losses or additional costs by changing operating environment, under fixed contractual terms
5.	Legal (regulatory) risk	Investment or additional cost required by regulation amending the legislative framework
6.	Other risks	Increased investment and operating costs

Source: Own selection and comments

In order to better highlight the most important risks of the SOP Environment WSS Projects to be implemented in Romania, we shall take an example of such a major county project.The follow up provides a simulation of qualitative assessment of the economic and financial risks for the specific regional WSS project **Extension and rehabilitation of the water supply and sewerage systems in the Dambovita county,** by the method of risk scoring matrix.

Thus, for this case study, taking into account economic and financial risks associated with regional WSS projects in Romania, absorbing European Cohesion funding, as have been identified and analysed above, we perform a qualitative assessment of these risks, in the actual stage of the project. In the qualitative risk assessment we rely on information from the feasibility study and the investment implementation reports for SOP Environment Axis 1, completed with our own analysis on current developments in the WS (water supply) and WW(wastewater) tariffs and works, within the chosen regional project case study (ROC Dambovita - Targoviste Water Company).

First we analyse qualitatively the main economic risks of this major WSS project to identify the most important economic risk. This risk will be next explained and analysed in detail.

Risks are assessed in terms of their probability of occurrence and their impact, issues that can be assessed on a scale of 1-5, where 1 represents a very low impact and 5 is a very high impact. In addition, the probability of risk may be measured on a scale from A - a very high (80-100%) probability to E - the very low probability (10-20%), so as to order the main risks identified according to these criteria (Table 2).

Table 2: Qualitative assessment of the economic risks for a European funded regional WSS project

Risk	Impact (1-5)	Probability (A-E)	Scoring of risk
Risk of demand (non-payment)	4	B	High
Risk of competition	3	C	Moderate
Risk of inflation	3	D	Moderate
Contractual risk	2	C	Moderate
Legal and regulatory risk	2	E	Low
Other risks	2	D	Low

Source: Own analyses and assessments

Finally, we develop a risks matrix, showing better these risks in terms of their risk score:

Risk Score = Probability x Impact

An ordinal risk score matrix form is obtained considering the probability and impact levels in their qualitative expression, previously considered (in table 2). In this matrix (Table 3) for more relevance, the low

impact colour is green; yellow represents moderate values of risk score and red colour code, the higher levels of risk score.

Table 3: Economic risk score matrix for a European funded regional WSS project

RISK SCORE		Risk impact				
		1	2	3	4	5
Probability	A					
	B				High	
	C		Moderate	Moderate		
	D		Low	Moderate		
	E		Low			

Source: Own analyses and assessments

As resulting from our qualitative risk analysis, based on the matrix of scores, the most important economic risk of the studied WSS project is the commercial risk of falling demand hence a risk of non-payment of bills for water supply and sewer sanitation services, because of their high tariffs and low affordability of the population, especially in rural areas.

The feasibility study (ISPA TA, 2010) admitted that rates will exceed the limit of affordability of the poorest 10% of households from 2011 until 2018, but problems were not expected for income deciles 2 and 3, with higher affordability limits.

However, taking into account recent developments in the tariffs for WSS services (WS and WW) at ROC Dambovita, we found that there is a high probability of non-payment and demand reduction (probability of category B), which would have a great impact on the cash-flow of beneficiary and thus on the ability to implement the investment project.

Since the beginning of 2013, ROC Dambovita has adopted relatively high tariffs for both WSS services, tariffs that exceeded the levels projected in the feasibility study (Platon V et al., 2013). Current tariff for water supply and sewerage sanitation services at the Dambovita ROC (Targoviste Water Company) is 3.39 RON / m^3 of WS and 3.49 EUR / m^3 of WW, for both households and businesses as decided by (IDA "Water Dambovita", 2013).

In Figure 1 we showed that, since 2013, the level total charge for WSS services has exceeded the level projected in the feasibility study, a policy that presents a high risk of non-payment from water and sewerage consumers in the region ascribed to the ROC Dambovita.

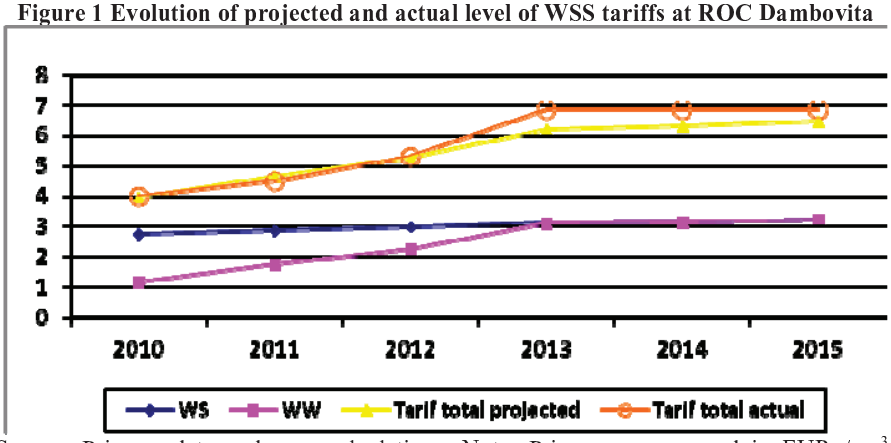
We consider that ROC Dambovita tends to abuse its natural monopoly position by dramatically increasing tariffs for water supply and sewerage sanitation services, in an attempt to recover as quickly as possible the investment costs of the project or, even worse, in order to cover some current unjustified expenses or losses.

A separate analysis on affordability for urban and rural areas show that the problems of consumers capacity to pay for WSS concern mainly rural areas. Thus special solutions should be found to reduce the problem of affordability of low-income households, in rural areas, which will cover about one third of the population served in 2013 if the present boundaries of the area served remain the same (ISPA TA, 2010).

This excessive charge overlapped with effects of economic crisis has already created discontent and frustration among local consumers (Exclusiv DB, 2013), effectively leading to tariff resilience and non-payment of services, or waiving connection, among the vulnerable population of the project area.

Given the fact that affordability problems are more common among rural households, the ROC should consider social tariff only in rural areas. This would maximize the desired effect on poor households' affordability while limiting the negative effects of implementing these measures on ROC's revenues and project cash-flow, since the water consumption in rural areas is anyway low.

Figure 1 Evolution of projected and actual level of WSS tariffs at ROC Dambovita



Source: Primary data and own calculations. Note: Prices are expressed in EUR / m^3, exclude VAT and are valid for all localities in the area of water and sewer systems operated by the Water Company ROC Dambovita, starting with 01/01/2013. Legal basis: Hot.Nr.69 / 01/18/2013 Intercommunity Development Association "Water Dambovita" Notice Nr.4573683 / 20.12.2012 issued by ANRSC.

Another positive side effect of such measures is that they would give households in rural areas that are currently not connected to the system (or are connected illegally), an incentive to connect to water and sewage WSS system. A higher rate could reduce the willingness of connection or could encourage illegal connections.

Next, we shall briefly review and assess the financial risks of the WSS major project of ROC Dambovita. As we have analyzed more in detail above, investment related financial risks represent the set of risks associated with investment in new infrastructure of water supply and sanitation.

Table 4: Qualitative assessment of the financial risks for a European funded regional WSS project

Risk	Impact (1-5)	Probability (A-E)	Scoring of risk
Credit risk	3	D	Moderate
Risk of low profitability	3	C	Moderate
Risk of European funding disengagement	4	B	High
Currency risk	2	D	Low
Sub-sovereign risk	2	C	Moderate
Macroeconomic risk	1	C	Low

Source: Own analyses and assessments

Table 5: Financial risk score matrix for a European funded regional WSS project

RISK		Risk impact				
		1	2	3	4	5
Probability	A					
	B				High	
	C	Low	Moderate	Moderate		
	D		Low	Moderate		
	E					

Source: Own analyses and assessments

Unfortunately, the major project of **Extension and rehabilitation of the water supply and sewerage systems in the Dambovita County** is among those listed as projects and contracts with risk of failure at September 30, 2013 (www.posmediu.ro/proiecte).Thus, as analysed in a previous extended research (Frone Simona, 2013), the implementation of investment for the project was only 10% at 29.09.2012, under the project deadline of 31 December 2013.

In addition, some of the project contracts for works have been suspended or terminated (such as the contract for Extension and rehabilitation of the water supply and sewerage systems Gaesti, which was terminated at 0.5% physical progress as well as the Extension and rehabilitation of the water supply and sewerage systems Titu) due to serious deviations in the public tendering and procurement.

Therefore, in the qualitative assessment of financial risks for this major WSS project, the probability of exceeding the term of contractual implementation is considered high (category B) and hence the risk of

disengagement of European funding (including also financial corrections here) is reasonably high (red code in the matrix of risk scores).

In this risk scoring matrix (Table 5) for more relevance, again the low impact colour is green; yellow represents moderate values of risk score and red colour code, the higher levels of risk score.

4. Conclusions and recommendations

As we must outline in our conclusions and recommendations, although the process of regionalization of operations and systems in the Romanian water supply and sanitation sector has had, among its objectives, the creation of an appropriate institutional framework for the development and implementation of large infrastructure investment projects, in some cases sufficient strengthening of financial and strategic management capacity was not achieved, to enable the effective management of financial and economic risks of the projects.

In the SOP Environment, the absorption of European funds (a current total rate of absorption of 35.47%, reported at 31.08.2014) is affected, in our opinion, by low administrative and managerial capacity, particularly at local authorities. Hence, a great risk of losing EU funds due to the very low implementation is represented by regional projects of water and sewerage networks. Some of them have values of over 100 million euros each, but their level of implementation may be still below 20%.

These projects are run by local authorities, through specialized companies owned by them. Regional WSS projects are major investment projects, using European money through the Sectorial Operational Programme Environment, managed by the Ministry of Environment, as well as State budget funds and money from local budgets. The European Commission applies for Romania financial corrections of 10% of the SOP Environment program, due to problems or deviations in public procurement contracts signed before October 2011.

As based on the risk-analysis here and on subsequent research, one conclusion is that there are still important difficulties and lacks in the institutional, operational and managerial fields of the Romanian water (WSS) sector, that mostly increase the economic and financial risks to regional water supply and sanitation projects.

In order to outline these risk factors and according to a recent analysis the weak implementation of regional WSS projects (Cenacchi Valeria, 2013) we refer to:

- Difficulties and lacks of the beneficiaries (ROCs): inadequate expertise and experience; lack of proactive attitude for launching and managing tenders, implementing contracts, monitoring and validation of consultants;

- Difficulties and lacks of the I.D.A.(Intercommunity Development Association): poor endorsement and stabilisation of strategic decisions on the investments plans and on the update of master plans, lack of reactivity for adjusting the tariff strategies when required, following the actual water demand ; weak governance in managing the ROCs.

The Management Authority of SOP Environment has made lately (last year) a number of changes needed to improve absorption. The Ministry of European Funds has acknowledged that beneficiaries of the projects implemented under the SOP Environment will be able to faster request the EU funding for works performed, provided that submitted should be not less than 150,000 euros. The measure was adopted to eliminate administrative bottlenecks in providing the necessary resources to implement projects and to create all the prerequisites for the execution of works to be completed within the period specified in the contracts (MEF, 2013).

There are still many economic and financial management aspects to be improved in the development of water supply and sanitation sector in Romania, to eventually conform to the heavy requirements of the Water Framework Directive (2000/60/EC) and our future research will resume analysis of these issues in light of the Romanian EU Partnership Agreement for the 2014-2020 programming period.

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