



ALGERIA

COST OF DEGRADATION OF THE SEYBOUSE BASIN WATER RESOURCES

POLICY NOTEⁱ

Since the 2000s, Algeria has embarked on a policy of balanced mobilization and diversification of its water resources in a context of rapid population growth that has contributed significantly to the water needs of the country. Meanwhile, industrial development and urbanization has led to an ecological imbalance currently improving as a result of the implementation environmental sustainability inducing policy.

The evaluation of the cost of degradation of water resources in the Seybouse catchment area is part of the regional study on the cost of degradation of water resources at catchment level, supported by the SWIM-SM project. The main objective is to help decision makers at national and local level to identify and prioritize concrete actions to improve the management of the basin through potential funding projects related to environmental benefits as well as limiting externalities.

Table 1: Seybouse degradation cost, 2012- in millions of DA

Categories	Seybouse			
	Cost of Degradation In millions of DA	%	Infimum Millions of DA	Supremum Millions of DA
	20.755	73%	14.298	25.582
Waste	2.208	8%	1.741	2.621
Air (Annaba)	2.081	7%	1.947	2.634
Biodiversity	72	0%	57	86
Natural disasters – Global Environment	3.281	12%	2.645	3.917
Total	28.397	100%	20.689	34.840
% GDP Seybouse	4,2%		3,1%	5,2%
% GDP Algeria	0,2%			

The costs of environmental degradation of Seybouse run up to 28.4 billion DA in 2012 with a variation from 20.7 to 34.8 billion DA equivalent on average to 4.2% of GDP in the region of the Seybouse Basin and as well as to 0.2% of Algeria’s current national GDP (2012). The costs attributable to human health were of DA 7.9 billion in 2012 or 27.7% of the cost of degradation of the Seybouse basin with 6 billion dinars for waterborne diseases; 1.9 billion dinars concerned respiratory diseases in the Annaba region (Table 1 and Graph1).

Broken down by category, degradation of water resources is the largest in the Seybouse, by relative values, namely 73.1% of the overall cost for 2012. Natural disasters and the global environment including floods and forest fires having occurred in the region of the Seybouse Basin in 2012 come second, at 11.6%. The waste comes in third position with 7.8% followed by air in Annaba, at 7.3% and finally biodiversity comes last, at 0.3%.

Regarding the Water (20.8 billion dinars in 2012), the “Water Quantity” subcategory accounts for the majority of cost items relevant to the Seybouse Basin (11.0 billion DA) followed by water-borne diseases (6.0 billion DA) and finally the quality of water (3.7 billion dinars). This category impacts upon the global environment (carbon dioxide sequestration) although the costs could not be calculated.

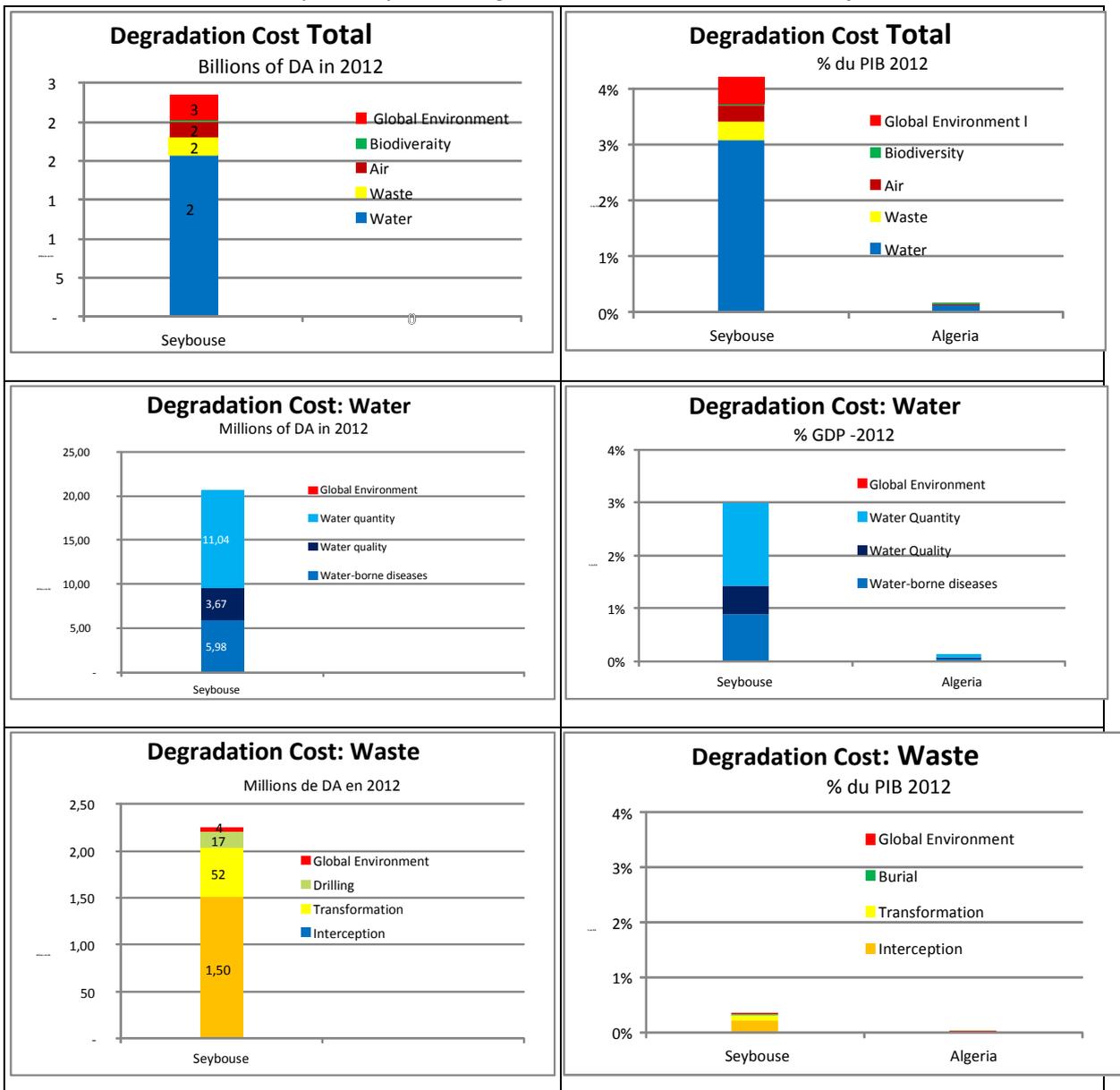


Regarding the “Waste” category (2.2 billion dinars in 2012), the “Collection” sub-category represents the majority of the costs relevant to the Seybouse Basin (1.5 billion dinars), followed by “Waste Processing” (526 million DA), burial (174 million dinars) and finally the “Global Environment” (44 million dinars).

Regarding the “Air” category (2.1 billion dinars in 2012), the damage is mainly related to health (1.9 billion dinars) whereas there is damage resulting in the deterioration of agricultural productivity (125 million dinars) infrastructure and façades (84 million dinars), while the impact on the flora and fauna (eg. acid rain) has not been calculated. Moreover, the cost associated with lead in air has not been assessed, due to lack of reliable data.

The detailed analysis of the “Natural Disaster” and “Global Environment” categories (3.3 billion dinars in 2012) indicates that the damage is most particularly due to floods, forest fires and carbon emissions due to waste and forests fires.

Graph 1: Seybouse degradation cost, 2012- in billions of DA



Source : The Authors.



Based on these findings, four scenarios of interventions were considered, of which only three eventually materialized. The only categories evaluated have been that of limitation of losses in irrigation, water and sanitation in rural areas and that of landfill management systems. Interventions related to land to reduce erosion and siltation of dams were not considered due to lack of studies that would have allowed the establishment of causality between land and siltation, in view of carrying out an economic assessment.

The most efficient scenarios were selected and are shown on Graph 1. Only one scenario was considered, relevant to the effectiveness of large-scale irrigation: Improved yields of vegetable and tree crops with productivity gains expected. The efficiency and effectiveness of large-scale irrigation is by no means challenged, all the more since it could have a positive return on investment within only 4 years. Regarding water and sewerage in rural areas, three scenarios are profitable: (i) drinking water supply exists whilst there is no connection to the sewer system; (ii) there is neither drinking water supply nor any connection to the sewer system; and (iii) the first two scenarios are considered collectively. As far as waste is concerned, there have been three scenarios considered: (i) ensuring a transfer station, a segregation station of a 15% recycling and 15% composting capacity in each of the Wilayas, also featuring the burial of residual volume in a landfill; (ii) ensuring a transfer station, a segregation station of a 10% recycling and 10% composting 10% capacity, in each of the Wilayas, also featuring the burial of residual volume in a landfill; and (iii) endowing each of the Wilayas with a transfer station and an improved landfill, allowing for the construction of cells to produce electricity. The everything-dumped-in-the-landfill alternative coupled with the generation of electricity through the generation in cells is by itself profitable. The same may not be said about the alternatives relying on segregation and recycling, since such solutions are too expensive. Thus, to overcome this shortcoming, a multi-criteria analysis could be considered for decision making where C/A analysis would be weighed as much as job creation, the reduction of poverty, etc.. (See Appendix VI for calculations details).

In the light of recommendations formulated in this study, there have been proposed four chapters of intervention towards an integrated and sustainable management of the Seybouse water resources:

a) **The prioritization of those interventions aiming at reducing the technical and financial losses of drinking water supply and irrigation services, further also likely to improve water management.** Investment and institutional measures should be oriented mainly towards three types of intervention: the rehabilitation of drinking water, sewerage and irrigation based on a cost-estimated action plan focusing on the containment of technical and financial losses; structural changes in water management (incentives, governance, pricing by taking into account the requirements of financial sustainability, conservation, and user awareness) and the choice of technology for greater efficiency in economic, financial and environmental terms and a continuous improvement of management indicators and performance for drinking water supply, sanitation and irrigation.

b) **Focusing on efficient investment for the control of domestic pollution in rural, peri-urban and industrial pollution in the Seybouse basin.** It is primarily recommended that: The State invests in the enhancement of drinking water and / or sewerage infrastructure in rural areas, using appropriate technologies; the Ministry of Environment finalize the study on industrial pollution Basin Seybouse; investments for technical landfills include the generation of additional income in the form of electricity and the processing and closing of dumps in the Seybouse Basin; last but not least, all those institutions involved in water resources and the environment should be able to ensure that polluting industries apply the regulation introducing an obligation for effluent pretreatment before discharge into wastewater systems.



c) **An information network allowing for decentralized observation, follow-up, monitoring of environments and the Seybouse Basin natural resources.** This network should be re-oriented by linking the water institutions and the environment – most particularly ANRH, ABH-Constantine-Seybouse Mellègue, the direction of the Wilayas water resources and the directions of the environment of the Wilayas of the Seybouse basin.

d) **A horizontal action dimension for integrated water management in the Seybouse catchment areas is highly recommended.** A renewed effort is required to support resource planning at the Seybouse basin, taking into account the economic, environmental and social issues, as well as an improvement of the knowledge base, together with improved information systems and good analysis tools. This task and means could be entrusted to the ABH with a clear understanding that planning should not be limited to the purpose of matching supply and demand for water *stricto sensu*; rather, such planning is to also cover such other aspects such as the environment, industry, agriculture, etc.. A "horizontal" system must be set up, stemming from a holistic and integrated thinking on water management in the Seybouse Catchment area.

It is strongly recommended that actions taken are supported by a permanent group within the ABH, which should, in the first place: strengthen the balance of water resources and uses thereof in the Basin Seybouse basin in collaboration with local institutions, users and operators; enhance PDARE to the purpose of taking into account the investment plans, the cost of degradation of water resources of the Seybouse Basin and restoration thereof - including by way of the planned implementation of STEP, in view of also encouraging the reuse of treated wastewater; develop, by way of transfer of tools and know-how, an expertise in assessing the costs of degradation / restoration and an advisory capacity in the ways and means of integrating these aspects into sectoral strategies and development programs and launch information and awareness campaigns among the population and schools by ABH-Constantine-Seybouse Mellègue, in view of communicating to water users the deterioration of the Seybouse water resources and the impact thereof on the population.

ⁱ This Note was prepared by Sherif Arif and Fadi Doumani and is based on the report entitled: Algeria, Cost Degradation of the Seybouse Basin Water Resources prepared in the framework of SWIM-SM EU.