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WATER, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN NORTH AFRICA

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I. INTRODUCTION

1. The ECA office for North Africa (ECA-NA) has proceeded to assess the progress made in the application of the African Water Vision for 2025, and to advocate for the formulation and implementation of strategies to ensure the long-term sustainability of water and the environment.

2. It is in this context that in 2005, the Office firstly carried out a detailed assessment of national experience regarding the development of water resources, an exercise in which high-level experts participated. The empirical data gathered and analyzed were summarized in a Report speaking about the regional outlook. The said regional report will be published every two years.

3. Afterwards, in collaboration with UN-Water Africa and the Sahara and Sahel Observatory, the Office organized a seminar to discuss the challenge of water and the environment and its impact on development perspectives in North Africa. This seminar was held in Tunis on 21 and 23 February 2006 and joined together some thirty high-level decision-makers, national experts and scientists working in the field of water resource management and remote detection, and at the same time, the representatives of international, intergovernmental and non-governmental organizations.

4. This document summarizes the principal results of the activities carried out by the Office in the area of water and the environment. The main challenges of water, environment and sustainable development will be recalled in Chapter II in terms of potentialities, extraction and management, critical problems posed by needs, competing requirements, as well as environmental threats. Chapter III will present the action plan on « water, the environment and sustainable development » adopted by the experts at Tunis in support of the efforts put forth by the different countries to meet the challenge of judicious water and environmental management.

II. CHALLENGES OF WATER, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

5. The issue of water, in a context of sustainable development, remains a critical factor for development in Africa in general, and in semi-arid countries in particular. The situation in North Africa, the hydrological hazard, population growth, and traditional water practices has led to localized scarcity.

2.1 Mobilization and use of water resources

6. Indicators dealing with the mobilization and use of water presented in the national reports[1] show that North Africa is located in a region of the world with the lowest water potential.

[1] *ECA-NA (2005), National reports on the development of water resources (Algeria, Egypt, Libya, Morocco, Mauritania, Sudan, Tunisia) prepared in the framwork of devising of the regional report.*

7. The renewable potential of the region, estimated at 150 km^3, is dependent by more than 40%, on external water resources. Non-conventional water resources are little developed (treated waste water and desalinated water). The said countries have mobilized almost their entire potential in underground water and only three (*Mauritania, Morocco and Algeria*) still enjoy a degree of margin for the mobilization of surface water.

8. The rate of utilization is at the maximum for four countries (*Tunisia, Libya, Egypt, Sudan*). Irrigation represents approximately 80% and the remainder is shared between drinking water, tourism and industry. A part of water resources could have been used to greater degree for the ecological balance in humid areas, normally supply by waterways with collection by dams, principally intended for agriculture.

2.2 Water management

9. Review of the experience of the different countries shows that the development of water resources is largely based on management of supply, in other words, the mobilization of water via hydraulic structures.

10. This practice is favored for reasons of practicality: indeed, governments agree more easily on budgets for the construction works that are more visible as opposed to "invisible" efforts such as water savings or water uptake control.

11. However, the management of water supply cannot alone durably satisfy the needs of a country:

- Firstly, because the water potential is reaching saturation, as is already the case for Egypt, Libya, and to a lesser extent, Tunisia.
- Secondly, because resources in available water risk depletion if they are not protected, which is the case for Morocco.

12. The sharpening of water crises is therefore attributable not only the speedy increase in demand, but also to the manner of water management. Management of water supply must therefore go hand in hand with management and action strategies regarding demand, to durably satisfy the ever-present needs:

- In Mauritania, efforts for management of demand are necessary given the geographical situation of the river Senegal and because the greater part of the country is located in a dryland area. The principal bottlenecks are the fragility of management structures and the dilution of responsibility of the concerned bodies.
- In Morocco, even though technical solutions enabling solutions to water management problems have been identified and appear to have been easily implemented at the per sector level, inertia constantly thwarts the said implementation. The reasons behind this situation are due to the compartmentalization of the assignments of the authorities in charge of water sub-sectors and the insufficient coordination of the said sub-sectors. So as to give an orientation to water policy better adapted to natural

conditions and the socio-economic effects already coming to the fore, the Moroccan authorities have devised a National Water Plan designed to propose action programs for the long term to ensure sustainability and effective water management.

- In *Algeria*, water resource development indicators leave one to believe that this country has above all, to grant importance to water supply to compensate for belatedness in the mobilization of surface water. However, reality tells us that surface water is unequally distributed among the country's regions, and underground water resources, apart from the small part of territory to the north, are already in a situation of over use. Thus, Algeria needs to initiate measures for management of demand. This has already been done through the adoption of a new water management strategy based on progressive pricing, integrated and participative management by watersheds, education and awareness of water issues.
- For a long time, Tunisia has adopted a demand management strategy given the limited equilibrium between water needs and resources. This strategy consists of the adoption of a pricing system leaving enough initiative for encouraging water savings, ambitious pollution eradication programs, integrated water resource management and large-scale use of wastewater after treatment.

2.3 Environmental threats

13. Environmental water needs refer to the level of the minimum incoming and outgoing flows to be maintained in the water system so as to preserve minimum water quality.

14. Degradation of the environment and pollution of water resources by human beings is taking on greater importance in the different countries. The gravity of the current situation varies depending on the in and outflows, the model of utilization, the population density, the spread of industrialization, the availability of sanitation systems as the social and economic conditions prevailing in the country concerned.

15. The principal threats weighing on the environment, such as those cited in the national reports and identified by the seminar, can be summarized as follows:

- Abusive uptake of surface water cuts down on downstream flow from the watering places (reduced water quantities, modification of the physical conditions of riverbeds), while uptake from water tables impacts the tables themselves, and on resurgence.
- Poorly controlled urbanization may be behind the hurdles caused by waterways which modify the normal paths and cause human loss and material damage.
- The release of industrial and household wastewater either partially or completely untreated, the filtration of pesticides and residue of fertilizers, as well as navigation are often factors affecting the quality of water.
- Poorly adopted agricultural practices and clearing in watersheds all accelerate the speed of water and charge it with solids that increases the intensity of floods and reduced the water storage capacity in dams.

- The many sources of pollution by agriculture owing to the uncontrolled use of chemical fertilizer and phytosanitary product affect the flow of wadis and on underground tables. The effects thereof can be extremely detrimental in the long term.
- The overexploitation of natural resources (non irrigated agriculture in certain regions, the lack of planning for land use, the depletion of nutrients, demographic growth), the loss of marshlands and forest, and the proliferation of illnesses carried by water (irrigated areas).
- The change and variability in the climate: exacerbation of floods and droughts (poverty, displacement of populations). However, cyclical droughts in the region, along with the advance of desertification and the chronic scarcity of water resulting therefrom, weakens even more insufficiently irrigated land, with low yield performance.
- The onslaught in waterways of sedimentation and aquatic plants, the proliferation of aquatic plants is an indicator of the modification in the natural equilibrium of waterways, in some regions entailing a reduction in the intensity of light penetrating into the water and modification in the physical and chemical quality of the water that causes the disappearance of certain fish species and the appearance of new ones.

III. MEETING WATER NEEDS WITHOUT DESTRUCTION OF THE ENVIRONMENT

16. Sustainable development requires an increase in water availability to meet the various socio-economic needs while fighting pollution and wastage.

17. Filling the ever-increasing gap between limited water resources and rising demand – a consequence of development in various economic sectors, therefore constitutes one of the major challenges the water sector has to face.

18. Water policies try to comply with progressive and sustainable socio-economic development. The entail two opposing factors in the water system:

- The supply and cost relative to availability or the increase thereof. Inside, the pressures are their effects weigh heavily on resources and ecosystems.
- Use and demand, the equilibrium of which with regard to supply, limits increase. Inside, a level of coverage of needs can be established, taking due account of conflicts in use and pressure on water resources, risking degradation and a negative impact on sustainability.

19. The mobilization and judicious use of water resources therefore requires integrated management to ensure the sustainability of water and the environment. To do so, the different countries are also led, in addition to traditional information, to use satellite earth observation images serving as a tool of analysis for identification of the potential and evolution of underground water. These are operational applications that can support the strategic decisions for water management. The use thereof is going to become increasingly generalized with the development of information and communication technologies.

20. The Tunis seminar made possible discussion of all these issues, in particular the interactions between the development of water resources, the concurrent needs and degradation of the environment, to place the trends and potential constraints, and to review the techniques for control of demand, the production and enhancement of water use via institutional and organizational aspects.

21. After the three days of discussion, the seminar proposed elements of the Action Plan on «water, environment and sustainable development» structured around the three major themes of the seminar, i.e., water management, environmental management and assessment tools (Cf appendix). They are given in the form of a logframe defining the subject matter, the goals, the actions and the assessment and monitoring tools for water and environmental management. The Action Plan is currently being finalized par the experts who participated in the debates of the Seminar.

IV. CONCLUSION

22. Globally, the issue of water and environment in the region is posed in the following terms: scarcity, climatic factors (aridity, evaporation, drought), growing needs, particularly in agriculture, (socio-economic and environmental consequences), dependency on water sources outside the country (for example, *Egypt, Mauritania and Sudan*), degradation of water quality and sustainable development of water resources (importance of water from a economic, social, cultural and strategic standpoint).

23. It is expected that, once the Action Plan is finalized, it will guide all the stakeholders in their efforts to implement policies and programs leading to the judicious management of water and environment. It will also make it possible to mobilize partners such as the ABD, the Arab Maghreb Union the IDB and the OSS around a crucial program of collaboration for the future of the region.

COMPONENTS OF THE ACTION PLAN FOR WATER, THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN NORTH AFRICA[2]

I. Trans-border issues and actions in the field of water management

Subject	Goal	Logical action
Assessment of water resources		- Set up information systems between regional partners (trans-border aspects and water tables) - Set up information systems on water at the national level - Information / data
		- Establish tools for assessment of water resource potential
		- Establishment and/or updating of water system monographs
		- Develop a network of resource measure and monitoring integrating the concept of quality
		- Promotion of applied research and training. - Set up regional "community practice" research and development networks
Operational management of water resources		Optimization water system management rules
		Protection of water resources
Mobilization, Exploitation and Maintenance		Mobilization and transpiration
		Study models for transfer between basins
		Maintenance of hydraulic installations
Trans-border issues		Trans-border aspect of water resource management
Water management		Optimization of water system management rules
		Water governance and management
		Management of drought and scarcity
		Management of demand and water savings
		Fight against effects of flooding
		Awareness

II. Trans-border issues and actions in the environmental field

Subject	Goal	Logical actions
Urban sanitation	Improvement living environment	*Connect populations to the network *Set up purification stations *Encourage participative management and public/private partnerships _ Capacity Building of populations
Rural sanitation	Idem	*Study and set up appropriate systems *Entrust management, maintenance and technical power to NGOs and/or local authority representatives *Reinforce the capacities of local populations
Treated waste water use in agriculture	Broaden the perimeter to be irrigated	*Develop agricultural land *Develop irrigation infrastructures *Select species adapted to the water treated *Devise a legal nomenclature regarding the species *Study the market to diversify crops
Pollution of water tables	Protection and sustainability of water tables	- Study and establish protection perimeters - Regulate activities conducive to pollution, particularly agriculture
Intrusion of salt water in coastal tables	Hinder the intrusion of salt water	*Study, establish protection zones - Regulate drilling in coastal perimeters in accordance with protection zones *Replenish water tables under threat of intrusion
Industrial releases in wadis, and trans-border space	Protection of water basin and waterways	*Treat pollution in the process concerning the production of low pollution units (Introduction of clean technologies in production process) *Provide industrial units with purification stations *Control releases from laboratories - Study partnerships on trans-border issues
Saving natural lakes and water sources	*Protection of natural environments and biodiversity (RAMSAR agreement)	Study and establish protection zones.
Erosion and silting of dams	Protection and development of water basins.	*Promote reforestation in watersheds *Improve cropping patterns on watershed land *Install small size hydraulic units

[2] *This action plan is now being finalized by the seminar participants. It is given by way of information only.*

III. Current and new assessment tools

Subject	Goal	Logical action
Tools, techniques and new technologies applied to water resources management and monitoring of environmental indicators	Water resource management and environmental protection	Spreading of new technologies: - Organization of seminars and get-togethers - Demonstrations - Training
		- Development of user interfaces more accessible the operational nature of the products of new technologies.
		Training (transfer of know-how): - Development of information system (database) Use of satellite images
		Set up national and regional automatic monitoring networks for water
Institutional tools	Direct implication of users in the decisions regarding integrated resource management	Promotion of the participative approach at all stages of the project
		Strengthen the national regulatory frameworks whose main objective is integrated water resource management
		Harmonization of regulation in sub-regions
		Establish joint mechanisms between partners working in the field of water
		Establish arbitration facilities for managing litigation inside the country at sub-regional level
Economic tools	Pricing of water for better savings and more enhancement How to price sanitation Education for water savings	Drinking water supply: - Pricing adapted to the socio-economic context of the country - Education in school about water savings - Encouragement for use of water saving processes - Water enhancement (wastage and loss of water, better added value crops, more economical sectors with water rights Sanitation: - In pricing, include the collection and purification of waste water - Encourage industrialists to treat waste water - Synchronize sanitation and drinking water supply in rural areas