THE DILEMMA OF DEAD SEA BASIN - A REASSESSMENT OF SOLUTIONS FROM AN IWRM-PERSPECTIVE

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The management of transboundary surface- and groundwater systems is one of the major challenges in the water sector. In addition to the high complexity of managing interacting water bodies within a basin, conflicting interests between nation states hinder swift and successful solutions. An international water body at risk that has received a lot of attention lately is the Dead Sea, embedded in a closed basin shared by six countries. Although not freshwater in itself, its falling water level indicates the severe water crisis of the basin. Since the 1970s the water level of the Dead Sea has been continuously falling with severe impact on the environment and economy of the bordering countries. Major resettlements during the 50s and 60s, leading to a rapid population growth in the Dead Sea Basin, caused surface water diversions and overpumping of groundwater beyond save yields. The driving factors were a vast expansion of irrigated agriculture and municipal water demands.

Today, available water resources and thus water supply within the basin fall short of total demands, resulting in growing problems of scarcity. While demands for agriculture are expected to remain constant or slightly decrease, more and more water is needed for the growing domestic and industrial sectors. In response to the deficitary situation, it has been suggested to further develop dams retaining uncontrolled winter floods, to improve efficiency across all sectors in order to reduce losses in water use, to increase the reuse of wastewater, and to transfer water from other basins.

One can question whether conservation strategies free water urgently needed for the rehabilitation of rivers and the recovery of Dead Sea water level or not. Especially in basins of closed nature, the optimization of water uses is likely to lead to further losses to the environment, as gained water capacity is likely to be used for further expansion and consequently immediately committed to close the gap between supply and demand. In this case, reduced return flows will have further negative consequences for the state of the Dead Sea.

Environmental impacts are already noticeable and might aggravate. Due to a reduced hydrostatic resistance with decreasing water levels, freshwater aquifers surrounding the Dead Sea are lost. Closely related to this is the formation of numerous sinkholes around the shores and the uncovering of highly saline soils. Furthermore, an increasing salinity in the remaining water body reduces evaporation rates from the lake surface and might have an impact on the microclimate of the Rift, consequently affecting agricultural crop water requirements.

To combat the Dead Sea's decline, a project to link it to the Red Sea by means of a canal is being promoted by Jordan, Israel and the Palestinian Authority. An infrastructural project of the planned dimension might indeed stabilise the falling water level of the Dead Sea. However, the Red Sea - Dead Sea Canal (RSDSC) project outline does not sufficiently consider the mitigation of the actual causes of the declining water table. Therefore this paper applies the concept of Integrated Water Resources Management (IWRM). This ensures that basin wide problems, such as the overexploitation of ground- and surface water are taken into account.

Methods from both the social sciences and natural science are applied by the interdisciplinary team of authors. The hydrological assessment of accessible data on the Dead Sea basin, together with the thorough analysis of the riparians' international relations and their political economy are considered as crucial. In order to reach the overall aim of a substantial contribution towards an IWRM-management response to the Dead Sea's decay, two approaches are followed: The discussion of existing propositions and a complementary case-oriented comparative analysis. The latter aims at identifying the reasons that lead to a successful management of closed basins with terminal lakes.

The solutions that have been discussed so far can be classified into three categories: Infrastructural, institutional and demand management strategies. Infrastructural approaches aim at connecting the basin to an external water resource in order to directly recharge the Dead Sea. The aforementioned RSDSC, the Mediterranean – Dead Sea Canal (MSDSC) routes and the proposed water carrier between Turkey and the Jordan basin, also known as the 'Peace Canal', belong to this category.

The indirect mechanism of institutional measures aims at increasing the prominence of the Dead Sea through the registration with an international body. In this way additional pressure is exerted on governments to achieve an ecologically sound rehabilitation and conservation. INGO activists favour, *inter alia,* a listing of the Dead Sea with World Heritage or labelling it as Peace Park.

Far less prominent in the discussions about the Dead Sea are demand management approaches. They investigate and highlight saving potentials and reallocation of water mainly in the agricultural sector. In addition, a thoughtful substitution of water diverted upstream such as the amount taken by the Israeli National Water Carrier could fall under this category.

All solutions appear to be flawed, as they are one-dimensional responses to the multi-faceted causes of the Dead Sea disaster, or they have not yet been sufficiently elaborated upon. Canal projects do not recover the basin's original hydrological cycle with groundwater recharge and natural runoff from the river system into the Dead Sea. The demand management approaches are likely to recognise groundwater by reducing extraction to safe yields, but constitute a long process whose impact might be insufficient in the short run. Any institutional solution alone is simply too weak and can only be part of a comprehensive strategy. However an improvement of the Dead Sea's international status increases its economic value and might thus foster decision-maker's willingness to adjust their policies beyond infrastructural projects.

To sum up, a balanced combination of the various approaches is needed in order to solve the water crisis of the Dead Sea Basin - for which the basis is laid in this paper.

The solutions in demand management require the involvement of local stakeholders as this plays a crucial role for their success. The comparative investigation's results indicate that a strong bottom-up support is very important for bringing a lake's deterioration to a halt. In order to ensure local participation and support in the case of the Dead Sea, several indirect and direct measures at different levels reaching from the local to the international level can be taken.

As a direct measure, awareness rising plays an important role, be it only to balance the efforts made by the proponents of infrastructural approaches in this field of measures. For instance a study produced by Friends of the Earth Middle East (FoEME) shows that a large share of the population actually approves the RSDSC supply project without being aware of alternative solutions or risks. Furthermore strengthening existing NGOs or Water User Associations (WUA) is a tool in empowering bottom-up involvement. Mediation might help to resolve conflicts between opposing streams and networks with subsequent harmonisation of interests towards a common position are tools that increase impact.

As in the case of the direct measures it can be stated that indirect measures are manifold. They reach from designing exit programmes so that agriculturalists have a chance to generate income outside from irrigated agriculture to using soft power and diplomacy to make nation states recognise the grass roots level. Finally taking up the suggestion of NGOs that come from the region to register the Dead Sea with international protection regimes could be supported from outside.

The most promising combination is the one out of soft power and diplomacy, combined with enabling the NGOs to register the Dead Sea with a protection regime. In addition it is necessary to help potential local allies in every country to collaborate with each other and across national boundaries. Last but not least it is very crucial to provide choices by means of exit programmes so that local stakeholders that otherwise would have no choice then continuing with e.g. unsustainable groundwater exploitation for irrigation, do have actually a choice to get involved in demand management and water conservation that benefits the Dead Sea and its tributaries.

Agents of change of involving people could be international organisations, development agencies and nation states, as well as INGOs.

Keywords: *Dead Sea Basin, Red Sea – Dead Sea Canal, Integrated Water Resources Management (IWRM)*

References:

AL-WESHAH, R.A., 2000. The water balance of the Dead Sea: an integrated approach. *Hydrological Processes*, Hydrol. Process. 14, 145±154 (2000).

ASMAR, B.N., Ergenzinger, P., 2003. Effect of the Dead Sea–Red Sea canal modelling on the prediction of the Dead Sea conditions. *Hydrological Processes.* Hydrol. Process. 17, 1607–1621 (2003).

BEYTH, M., 2007. The Red Sea and Mediterranean-Dead Sea canal project. *Desalination,* 214 (2007) p365–371.

BISWAS, A. K. 2004. Integrated Water Resources Management: A Reassessment. [Online].

Heinrich Böll Stiftung. Available at: www.menschenrechtwasser.de/downloads/Integrated_Water_Resources_Management.pdf (Accessed 17December 2007)

COLLIER, D. 1991. New Perspectives on the Comparative Method. *In:* D. RUSTOW AND K. ERIKSON eds. *Comparative Political Dynamics: Global Research Perspectives*. New York: Harper Collins, 7-31.

COURCIER, R., VENOT, J. P., MOLLE, F., 2005. Historical Transformations of the Lower Jordan River Basin (in Jordan): Changes in Water Use and Projections (1950-2025*). Comprehensive Assessment Research,* Report 9. International Water Management Institute, Colombo, Sri Lanka.

DOMBROWSKI, I., 2003. Water Accords in the Middle East Peace Process: Moving Towards Cooperation? In: H.G. Brauch et. al. eds. *Security and Environment in the Mediterranean - Conceptualising Security and Environmental Conflict*. Berlin/Heidelberg/New York: Springer Verlag.

ECOPEACE/FOEME, 2007. An Analysis of the Latest Research Commissioned by EcoPeace/FoEME on the Red Sea to Dead Sea Conduit and its Relevance to the World Bank Led Study. Amman, Bethlehem and Tel Aviv: FoEME.

FRIENDS OF THE EARTH MIDDLE EAST (FOEME), 2004. *Advancing Conservation and Sustainable Development of the Dead Sea Basin - Broadening the Debate on Economic and Management Issues*. Amman: FoEME / EcoPeace. Available from: http://www.foeme.org/index_images/dinamicas/publications/publ22_1.pdf (Accessed 15 January 2008).

GERRING, J., 2007. *Case Study Research. Principles and Practices*. Cambridge: CUP.

HUPPERT, W. 2005. Was ist IWRM? – Plädoyer für ein differenziertes Verständnis des Konzepts „Integriertes Wasserresourcen-Management“'. In: S. NEUBERT, W. SCHEUMANN, A. V. EDIG AND W. HUPPERT, ed. *Integriertes Wasserresoucen-Management (IWRM). Ein Konzept in die Praxis überführen.* Baden-Baden: Nomos Verlagsgesellschaft, 15-30.

LIJPHART, A., 1971. Comparative Politics and the Comparative Method. *American Political Science Review,* Vol. 65, 682-693.

LOWI, M. R., 1993. *Water and Power. The politics of a scarce resource in the Jordan River Basin*. Cambridge: Cambridge University Press.

MOLLE, F., TURRAL, H. 2004. Demand management in a basin perspective: is the potential of water saving overestimated?. *Comprehensive Assessment of Water Management in Agriculture Research*. International Water Management Institute, Colombo, Sri Lanka.

VENOT, J. P., MOLLE, F., HASSAN, Y., 2007. Irrigated agriculture, water pricing and water savings in the Lower Jordan River Basin (in Jordan). *Comprehensive Assessment of Water Management in Agriculture Research,* Report 18. International Water Management Institute, Colombo, Sri Lanka.

WOLF, A.T. 1995. *Hydropolitics Along the Jordan River: Scarce Water and its Impact on the Arab-Israeli Conflict.* Tokyo: United Nations Univ Press.

ZEITOUN, M., WARNER, J., 2005. *Hydro-Hegemony - a Framework for Analysis of Transboundary Water Conflicts.* King's College, University of London. London: 7. October 2005.