Photo: Olli Varis

Inter-linkages Characterise Future Urban Water, Food Security Needs

"The world finds itself in the middle of a period of rapid change," said Professor Malin Falkenmark, Senior Scientist at the Stockholm International Water Institute and Member of the Stockholm Water Symposium Scientific Programme Committee, on August 20, 2004, during the closing of the 2004 World Water Week in Stockholm. How humans cope with that change, with due acknowledgement to the physical realities of our world, and how we govern that change on many different levels, will go a long way in defining our world by 2025. If people are to be less hungry in 2025 than today, if they are to live in dignity with safe sanitation, and if our expanded urban areas are to be well-functioning, it will all have to be done in a sustainable manner. Following are the overarching conclusions and comments presented by Professor Falkenmark in Stockholm.

Photo: Mats Lannerstad

The 2004 Stockholm Water Symposium showed that the world finds itself in the middle of a period of rapid change, characterised by great and increasing complexity – a complexity that continues in raising the expectations on water-related professionals. The Symposium has had its focus on the drainage basin and in particular the internally linked issues of both urban security and food security. The Symposium has analysed these inter-linkages and discussed issues of governance within that biophysical framework.

Sustainability of future urban water systems

Water supply and sanitation are absolutely basic needs and have to be provided in order to unlock the productive activities of poor people. This is the very starting point for poverty alleviation and achievement of the Millennium Development Goals (MDGs). The question is, of course, where to find the water required in rapidly growing cities: what water sources to rely on, for how long, where to find the next generation of raw water sources and what drainage basin interests to compete with?

While wastewater reuse is now expanding in the wake of increasing water scarcity, its expansion towards reuse of water and nutrients in combination in order to bring the nutrients back to the soil was further analysed. Water reuse is particularly welcome since an increasing number of river basins are already overcommitted. This means that no more uncommitted water remains to meet expanding water demands. Different cases demonstrated some alternative water sources, including rainwater and desalination, with the latter now becoming increasingly realistic in terms of production costs.

A crucial question addressed was the future sustainability of water provision systems. Here, sustainability should be seen as a journey, not as an end. It will therefore be essential to avoid pollution of future raw water sources. Sanitation is on the march and eco-sanitation is gathering increasing interest and acceptance. But at the same time micro-pollutants that escape water treatment and purification efforts continue to raise increasing concern, especially in view of the potential effects on human fertility.

The management of urban water provision systems has been explored. In developing countries a particular challenge is overcoming the illegal connections, with which invasion slums try to manage their daily water needs. Moreover, the financing of the city system is the very backbone of a sustainable system but remains particularly tricky, not the least because of widespread corruption on different levels in society but also donor-imposed conditions, which tend to introduce unnecessary constraints. It has been stressed that there has to be a clear separation of policy, regulatory and service delivery functions.

Rural context – food needs twice as much water

While water supply and sanitation tends to catch 90 % of the general public and scientific interest, food production needs two orders of magnitude more water and therefore deserves at least the same interest. Besides urban security, the Symposium has therefore paid an almost equal interest to the consumptive water needs to feed humanity. Food production has a fundamental role in reducing poverty. It has been made clear that agriculture will need huge amounts of additional water. Water for agriculture is therefore going to be a BIG issue in the next few decades.

However, the water consumed in food production remains hidden behind outdated concepts where naturally infiltrated rain has not been seen as water in the eyes of the past water engineer. The old conceptualisation in fact poses an effective constraint to reaching food security, especially as rain-fed and irrigated agriculture may be linked to different ministries in national governments. The difference is no longer clear, however. Irrigated agriculture supplies only the additional water needed beyond the naturally infiltrated rainwater, while today's upgrading of rain-fed agriculture involves a dry-spell-mitigating supplementary irrigation. So both are irrigated and both are rain-fed. Consequently we need new distinctions when discussing water for feeding humanity.

In reality the key to crop production is of course the amount of water accessible to the roots – the plants don't mind where that water came from, whether infiltrating rainfall or infiltrating irrigation water – or for that matter, rising groundwater. Challenges to address in regard to global food security include the so-called crop-per-drop approach, which is basically equivalent to making productive use of all evaporation losses which can be regained, by catching water in the landscape on its way to evaporate. There remains here an enormous untapped potential. Moreover, infiltration has to be facilitated by various ingenious methods and adequate attention has to be paid also to root architecture.

A particular challenge is so-called closed basins, where all water is already committed, and how to address the conflict between increased food production and protection of aquatic ecosystems. Highlights from the discussions include both the remarkable benefits of mulching, and productivity losses suffered because of industrial metal pollution of the irrigation water.

Water resources and ecosystems – inextricably linked

Particular attention was paid this year to groundwater, stressing the nexus between energy and groundwater. It was stressed that small-scale groundwater irrigation is probably greatly underestimated and in fact particularly difficult to estimate and control. Moreover, the degree of both groundwater overdraft and groundwater pollution is difficult to judge. The latter is particularly disturbing since very long time horizons are needed to remedy deteriorated aquifers.

The links between ecosystems and water were addressed by the two Stockholm Water Prize Laureates – Professor Sven Erik Jørgensen of the Danish University of Pharmaceutical Sciences in Copenhagen, and Professor William Mitsch of the Olentangy River Wetland Research Park at The Ohio State University – in terms of environmental flow requirements to keep aquatic ecosystems healthy and protect the livelihoods of fishing populations. We learned that the environmental flow requirements may be the outcome not of scientific evaluations only, but of negotiations and societal judgements; that degraded lakes are possible to restore but only in a limited interval in terms of phosphorus pollution; and that wetlands have been seen quite differently by different generations. Today's focus is on restoring wetlands to safeguard their particularly rich biodiversity, but also the use of wetlands for ecological engineering to take care of pollutants.

Governance brings soft components to the fore

"Governance" is a new catchword to highlight the importance of the soft components of water resources management. It includes processes of making choices, decisions and tradeoffs and basically covers a whole package of diverse content with the aim of managing the whole nexus of land, water, ecosystems and society: legislation, institutions, stakeholder participation, reallocation, water banking, policy, politics, provision of water professionals, financing, incentives, etc. It includes dialogues in which three main partners will have to be involved – government, private sector and civil society – turning the process into a "trialogue." But it is essential that governance also includes the voice of marginalised people.

The governance concept will have to be unpacked and disentangled to see the functions of its different components to secure, to avoid and to foresee: to SECURE acceptable water supply and sanitation, food production, energy production, etc.; AVOID hazards from floods, droughts and bacteriological pollutants; and FORESEE impacts such as those of adding pollution load to the water, reducing both the usability of the water downstream and the biodiversity there, or impacts of increased consumptive use upstream, reducing the river flow and its dilution capacity, degrading water habitat and therefore both fish catch and biodiversity.

Conceptualisation

The Symposium made absolutely clear the importance of developing concepts in pace with new problems. Since a dialogue between many professional groups is getting increasingly essential due to the growing complexity, clear wording will be a precondition for common understanding. More important even is the fact that it is not possible to discuss a phenomenon if you lack a word for it.

The most evident example is the concept "green water flow" which has now opened enormous possibilities to link the water consumed in land use like forestry and agriculture to groundwater recharge and river flow. This ability is necessary for addressing equitable water use in a river basin and the hydrosolidarity that we are all striving at in the end between upstream and downstream activities and ecosystems.

There was evidence of the breakthrough at this Symposium of the two complementary types of water, the liquid blue water and the naturally infiltrated green water in the soil on its way to evaporate. Suddenly having a word for it has generated a boiling enthusiasm. It opens new possibilities to address even large-scale carbon sequestration in extended savannah soils, which are seen as an important way of mitigating climate change. There is a lesson to learn, however. A remaining lack of clarity regarding what a concept really means has made different groups interpret it differently. Or, as somebody said, "The green water concept is now being massacred by enthusiastic users."

This concept is one example of opening the door to components of water resources management which are essential to be clarified in view of the increasing complexity. There are four other examples where clear distinctions are now needed:

- Food production, where – as already mentioned – the past focus on irrigation has been neglecting the contribution from infiltrated rainwater as well as the whole field of rain-fed production. We must never forget that the true water resource is the precipitation.
- Ecosystems, where the past focus on aquatic ones has been neglecting the genuinely water-dependent terrestrial ones, which are consuming most of the precipitation over the continents and therefore have a strong influence on runoff production and base flow.
- Biodiversity, where the focus on river infrastructures and minimum environmental flow is neglecting the massive-scale water pollution that is now contributing to degrading biodiversity in freshwater and coastal ecosystems.
- Water withdrawals, where a new distinction will be essential between consumptive use where the water consumed leaves the catchment as green water flow not available for downstream reuse, and use involving a blue water return flow to the basin, available for reuse over and over again downstream.

There is here a fundamental difference to be aware of in all governance activities, namely the difference between perceived as opposed to assessed problems: politicians and the general public act from perceived problems, while experts work with diagnosis-based assessed problems. One has to always remember the slogan from the European Environment Agency:

Facts are facts, but perceptions are reality. ■

Drainage Basin Theme Continues in 2005

The 2005 World Water Week in Stockholm takes place August 21–27, and the preliminary title for the week's Stockholm Water Symposium is Drainage Basin Security – Soft and Hard Solutions for Regional Development.

The 1st Announcement/Call for Abstracts will be mailed together with the December issue of Stockholm Water Front, and also be available in November on SIWI's home page, www.siwi.org. Abstracts for proposed workshop presentations will be due by February 1, 2005.

Photo: Mats Lannerstad