

Wadi Zabid: the urgent case for managing water in a basin

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600 years old 'rules' on water consumptions rights; supposedly well-studied modern diversion structures and the development of groundwater-based irrigation in Wadi Zabid, are putting at risk a population that has lived in the Zabid valley for centuries.

This is Al Mujelis on the Tihama coast. There used to be 5000 people in Al Mujelis. Now there are 1500.

Date palms were a common sight in this Tihama coastal area; currently they are buried in sand dunes. About 3500 people, now environmental refugees, moved away from the coastal village to nearby towns such as Hodeidah. Those that have stayed behind, in their ancestral homes, earn a very meagre living by engaging in some coastal fishery. With strong winds blowing for five months in this area and nothing to hold it, the desert is likely to encroach further and further. Al Mujelis is at the very end of the water system. In the past, the area used to get occasional run away floods from the Wadi Zabid and Wadi Rima. These occasional floods recharged the groundwater.

There have been very drastic changes in the water flow patterns in the wadi systems over the last thirty years and these show in the desertification of the lower areas of Wadi Zabid. These changes need to be taken into account and a rethinking of water management in this basin is required.

Wadi Zabid is supplied by base flow and spate flows from the Wadi Zabid catchments. Of the 109 Mcm/year that is available on average (with wide fluctuations) in Wadi Zabid, about 70% is base flow and around 30% is flood flow. The first major change was the hectic and uncontrolled construction of small dams in the mountain regions. One study under the Irrigation Improvement Project calculated that water capture in the upper catchments area has increased so that the percentage of rainfall that forms runoff (base flow plus flood flow) has declined from around 7% to around 5%. This may have reduced the inflow into the Wadi Zabid system in the Tihama lowlands with as much as 30%.

The second big change concerned the lowland area itself. The situation changed in the 1980's, when the diversion structures in the upper reaches of the river were 'improved' under a large number of investment programs. In 1979 this modernisation of the spate irrigation system was completed. The traditional systems of earthen spurs was replaced by five permanent concrete diversion structures and 123 km of canal distribution network serving a net area of about 15,200 ha. These new permanent structures made it much easier to control flood water in the upstream area. Whereas previously the earthen structures would break and would release water to the downstream areas, ever since this was no longer the case: less flood water reaches the lower parts of the river and there is less direct irrigation and less recharge of groundwater taking place in these areas. Moreover, the diversion weirs had another major effect, they blocked the subsurface flow: this is the water that is flowing below the surface in the river beds. As is clear from above, 70% of the water is perennial subsurface water. The diversion structures have blocked these subsurface flows. The results has been that the groundwater wells upstream of the weirs now have ample water – but downstream wells are running dry, because the subsurface flow is blocked and because the spate flows don't reach the downstream areas anymore.

All this adding up, means that the entire downstream area is drying up and even wells used for drinking water do not fill up again. The villagers in the coastal areas never having travelled to the upstream areas were unaware of the changes taking places and ascribed water reduction to a prolonged absence of rains, whereas it is primarily because of the large capture of water in the mountain areas and the upstream part of the Tihama plain.

The water tables dropped in Al Mujelis and much of the natural soil moisture was lost, while before groundwater was less than half of a meter deep. So as to provide additional irrigation to their date palm orchards, Al Mujelis farmers developed wells. This caused groundwater to drop even more. As very little money is made with date palms, the orchards were eventually abandoned. The forsake of date palms had an immediate direct effect on the landscape of al Mujelis, it was at this time that sand dunes started to take over the area. Al Mujelis has yearly five months of heavy winds; with the protection of the date orchards gone, the area soon turned into a desert. The annual sandstorms took over the area and sand dunes covered farms and date orchards that were the main source of livelihoods. In the 1990's IFAD funded a project to control the desertification – making five deep wells that were to irrigate some protective plantations. With the project over however no one paid for the pumping costs and the wells were converted in rural water supply points.

Although the situation is critical in coastal zone, prompt actions could still allow the area to avoid total desertification, and at least restore water levels in drinking water wells. Three primary action plans should be considered to help manage the water in the Wadi Zabid basin. The Water Law of 2002 drafted by Yemen has provisions for Basin Committees. It is urgently required to start this up. In Wadi Zabid there is already an Irrigation Council. This Council is mainly concerned with water disputes and maintenance of water in the command area from the five diversion weirs. It should be enlarged to also look at the upstream and downstream water rights.

Secondly, it is time to introduce on a system wide basis more efficient water uses – by different crop choices and better precision-based irrigation. Experience is that such controlled irrigation not only saves water but also increases yields, because for example there will be less problems with crops pests and diseases.

Finally, the age old water rights from the times of Al Jabarty should be reconsidered. The rules controlling water distribution of the flood water were formulated 600 years ago by the renowned scholar Al Jabarty, whose grave is still a place of pilgrimage. The situation has now dramatically changed – even in the Tihama groundwater is now the main sources of water. The distribution of spate water should be rethought so that it optimizes the recharge for the wells in the larger area for the productive farming it sustains. The subsurface flows should not be blocked from the weirs. These traditional rules allow the upstream water users to retain almost all of the water – but this was when there were few people, no concrete diversion structures, and groundwater recharge was natural.

Although there is no actual historical record, the Al Jabarty rules are based on time slots for different parts of the areas. The area is distributed in to three groups (upstream; middle stream and downstream) and each group is entitled to water in a certain part of the year.

The upstream group receives all base and spate flow from Oct 19 to Aug 2 (288 days) with a mean water allocation of 79.93 Mcm for gross application of 1.85m, whereby water is allocated for a specified number of days to each canal, depending on the location of the intakes and is the distributed according to the Ala'ala Fala'ala (upstream to downstream, one by one) rule.

The middle stream groups receives all water between Aug 3 to Sept 13.

The downstream receive all spate flow from Sep 14 to Oct 18 (35 days) with a mean water allocation of 16.55 Mcm for a gross application of 0.96m.

As most floods occur from July to September the upstream and middle stream area are clearly far better off. Because of the modernized weirs they can better control the water, yet the subsurface flows should not be blocked from the weirs.

While these rules are in place, there are violated in favour of the already privileged upstream farmers. The main digressions are that substantial area of under banana cultivation in the upstream area receives flood water, yet these lands are outside the area defined as being entitled to spate flows. There is the practice of some upstream farmers taking 3-4 spates flows

for their banana farms in disregard of the Ala'ala Fala'ala rule, whereby the water should go downstream once their land had been irrigated once. During the modernisation of the system in the 1970's-1980's an effort was made to reconsider these rules – but this effort failed. Things have become more pressing ever since and it is time for a new effort to create more fairness in the Tihama water distribution. This requires a large concerted effort bringing together farmers, water users, local government and all others. The first is to bring people together in different part of the basin and create a better understanding how water use in one area affects the other areas; the second is the leadership and magnanimity to respect all each other need to survive and have a decent livelihood.



Photo by MetaMeta/WEC

“Families from Al Mujelis village have been forced to abandon their homes after the place was covered by sand dunes as water from Wadi Zabid and Wadi Rima stopped reaching the area.”