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MHT

Women's action towards climate resilience for urban poor in South Asia

RESILIENCE AGAINST IMPACTS OF CLIMATE CHANGE
-WATER MANAGEMENT

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Most cities in India have water management plans and monitoring systems and are heading towards a sustainable use of water resources. However, these plans do not always work at a slum level. In many slum areas, a large number of groundwater users with low withdrawal rates exist; making it complicated to integrate these areas into water management plans at a regional level.

Unauthorised drillings conducted in many a slum areas make management from top down even more complicated. Slums and informal settlements, especially in the outskirts of cities, are often disconnected to public services like water supply and sewerage systems, thus, making slum dwellers reliant on individual solutions. Even if slums are connected to public water supply, this is often insufficient in terms of frequency, duration and stability (Sekhar et al. 2005). The lack of infrastructure and capacity at slums to monitor the success of an implemented water management programme on the parameters of water quality and quantity is also one of the major problems.

Root of the crisis: water mismanagement

Poor sanitation management can cause seepage from sewage into groundwater. The contaminated groundwater then becomes the main cause for diseases such as throat infection, fever and skin diseases (Sekahr et al. 2005). Howard (2014) concluded in his study that in developing countries, many suburban and peri-urban settlements like slums are ignored during urban planning and water service infrastructure. This results in well-serviced city centers surrounded by slums and informal settlements without access to key infrastructure systems. Iyer et al. (2014) investigated a vulnerable urban ward in Ahmedabad with over 80% slums. Water supply is established for two hours in the morning and one hour in the evening. Problems arise with low pressure and quantity. Water quality surveillance programme is not sufficient in regard mainly to viruses, heavy metals and fluorides.

Water availability and climate change: Due to climate change the average air temperature rises, which induces an increased evaporation rate. Therefore, less water will be available to infiltrate through the soil passage into the aquifer leading to less groundwater recharge. Together with increasing groundwater exploitation this can be a reason for groundwater depletion. The increasing evaporation rate, especially in Gujarat, is a significant factor because the water supply is partly based on open channels systems which are subject to high evaporation rates (Government of Gujarat 2014).

> Field feedback in Jaipur: The settlement area of Nayikithari is a non-notified slum situated near the waste drain for the entire city. Massive flooding here costs 2-3 children their life each year due to drowning. Further, the natural marshy soil increases the risk of slipping into the drain.
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> Source: Community Focus Group Discussion (March 2015)

During the monsoon season the risk of flood events will be intensified due to the melting of glaciers and changing rainfall patterns, two more effects of climate change. Without an adapted and sustainable water management, extreme flooding can result in mixing of sewage, rain water and solid waste. Additionally, most of the water will leave the area by surface runoff leading again to less groundwater recharge.

The challenge is to enhance the sensitivity among the local population for the problem. The problem perception is only at a level where the consequences/impacts are recognized e.g. "water is contaminated, because it is yellowish", water levels are declining, flood events often occur and sewage gets distributed to everywhere. An examination of the causes and the hydrological/hydrogeological reasons behind the numerous water problems does not occur due to lack of knowledge of basic hydrogeological principles.

The immediate impact on slum dwellers

The lack of a water management at local scale has many negative bearings on slum dwellers, for example, people living in slums often depend on groundwater due to lack of other water sources. In areas where shallow groundwater is available, wells are often very shallow as deeper drillings are expensive. However, shallow aquifers are especially vulnerable to contamination and therefore groundwater is often contaminated. An inadequate water management will therefore lead to an increase in water borne diseases from the use of contaminated water (groundwater or surface water). Additionally, an increase of vector borne diseases is also very likely.

> Field Feedback from Ranchi: The community relies on water access via the closest river, however, in many places, the water has been contaminated by upriver industries. Despite the discharge of effluents, residents have no other option but to consume the water from this source.
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> Source: Community Focus Group Discussion (March 2015)

Contamination in slum water: water management plans and frameworks for cities can be undermined at slum level as there is no control about private drillings, and the quantity and quality of the pumped water. For example, inadequate well designs can lead to the direct infiltration of flood water. Incorrect construction of wells can lead to a hydraulic circuit between different aquifers. This means that a vertical connection between two aquifers in a well occurs and the deeper, normally unpolluted aquifer will become contaminated through the water from the shallow aquifer, which is very often already contaminated (CGWB 2011). This happens in Ahmedabad, Gujarat, where problems with brackish water in the shallow aquifer exist (CGWB 2011). Missing groundwater protection zones furthermore can lead to contaminations which could be easily prevented.

Demographic data

To implement an adapted water management it is of utmost importance to have reliable and high-quality information on the whole water system in the area. This will be a main challenge, because many different types of data have to be collect. Information about the number and type of wells, the depth of wells and the use of wells is needed. Groundwater levels have to be measured and monitored and the number of existing aquifers has to be identified. Furthermore, it has to be surveyed which aquifer is used by local population and which one is used by the municipal water supplier.

Community usage patterns: Moreover, all existing water bodies e.g. talabs, rivers, channels and their use by the local people has to be known. From all these water sources, water quality testing,

at least for indicator parameters, should be done. It is also important to collect data about existing connections to municipal water services, for drinking water as well as for sewage water.

> The access to clean water is a key direct factor in enhancing the resilience of slum dwellers against the consequences of climate change (temperature rise, water borne diseases, extreme flood events).

To come up with a solution, it is important to know the number of people living in the area as well as how many households are connected to municipal water supply, including public taps and piped water and how many households are dependent on individual solutions like own private drillings. The same data scheme has to be applied to the sanitation sector. It is important to know the number of households equipped with own toilets and the number of people, who use public toilets, if they are available, or who depends on open spaces. Furthermore, the quality and quantity of sewage storage capacities have to be analysed as well as the sewage canals and other sewage infrastructures.

Focus Group Discussion in Nakdangpura, Ahmedabad (March 2015)

Coping mechanisms

An existing coping mechanism is, for example, participatory groundwater management, which was already successful implemented in Saurastra, Gujarat, India. Widespread groundwater depletion in the 1980s causes, among others impacts, fluorosis and severe problems in the agricultural sector. Many small recharge measures like sink pits and small check dams were promoted and successfully implemented (MetaMeta Consultancy 2011).

Lack of communication: A barrier in establishing management solutions in urban poor areas could be the lack of communication and knowledge transfer between the experts and the relevant communities as well as the insufficient participation of the poor people. From a socio-economic view it is important to keep in mind that the acceptance of measures and solutions could be low if these require areas, which were already used or could be used in the near future for (unauthorized) settlements or various commercial activities, which would enhance the economic or social situation of local people directly.

> The access to clean water is a key factor in enhancing the resilience of slum dwellers against the consequences of climate change (temperature rise, water borne diseases, extreme flood events).

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"Mahila Housing SEWA Trust (MHT) aims to build capacities of women from slum communities to take lead in resilience action against heat stress, extreme precipitation events, water scarcity and contamination and vector borne diseases. The proposed community based resilience model will be women-led, integrated; evidence based, and will focus on innovative communication strategies to promote a culture of resilience action. "