National Workshop on Urban Wastewater: Livelihood, Health and Environmental Impacts in India

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Contents

The views presented in this report are based on the points raised by the participants of the workshop and are not necessarily those of Winrock International India, New Delhi

1. Background

Wastewater has a high potential for reuse in agriculture. It offers an opportunity for increasing food and environmental security by avoiding direct pollution of rivers and surface water, conserving significant proportions of river basin waters, and disposing off municipal wastewater in a low-cost, sanitary manner.

However, wastewater for irrigation poses a number of health and environmental risks at various levels. Though wastewater use in agriculture is an age-old practice, there is no systematic information on it, particularly on issues such as farmers' needs and preferences, and health and environmental risks.

The objective of the project "Urban Wastewater: Livelihood, Health, and Environmental Impacts in India" – supported by the International Water Management Institute (IWMI) and implemented by Winrock International India (WII) and its partners from Ahmedabad, Delhi, Kanpur and Kolkatta – was to add to the existing knowledge on urban wastewater use for agriculture in India. The project involved the following activities:

(i) Undertaking primary research on current practices, cost/benefits of wastewater use in agriculture vis-à-vis social, economic, health and environmental parameters, through in-depth case studies in four locations

(ii) Identifying best practices for mitigation of negative impacts

(iii) Assessing replicability of potential cost-effective technologies

(iv) Carrying out nationwide assessments of the extent and significance of wastewater use

Additionally, the project helped in sensitizing stakeholders at different levels – water users, development organizations, governments and research organizations – about the negative impacts of urban wastewater use in agriculture and possible mitigation strategies so that could make sound investments in water for agricultural development.

In the four project cities of Ahmedabad, Delhi, Kanpur and Kolkatta, wastewater was being used for agriculture (growing vegetables, food grain and horticulture crops) and aquaculture. While this practice helped create livelihoods for a significant population of vulnerable communities (small and marginal farmers and landless), its use was also found to cause potential health risks to communities exposed to wastewater and consumers of crops/fish produced from the use of wastewater. Another adverse impact of wastewater was on the environment in the form of deterioration of stream water and groundwater quality, as well as soil quality.

Since wastewater use in agriculture has its benefits in the form of livelihoods and income generation, and sufficient literature as well as experience exists to allow it to be utilized with minimal risk to public health or the environment, there is a need to define a legislative framework for its large-scale implementation. A coherent national policy for wastewater use in agriculture and various other sectors is necessary, too. In this respect, sufficient attention must be given to the bottlenecks/key issues in institutional handling of wastewater.

To discuss these issues with representatives from the government/local municipal bodies, civil society, NGOs and academia, WII organized a national workshop on January 31, 2006, at the United Services Institution in New Delhi (see Annexure 1 for a list of participants).

2. The Workshop

The workshop was divided into four sessions:

1. Inaugural
2. Delhi and Kolkatta Case Studies
3. Ahmedabad and Kanpur Case Studies
4. National Perspective and Policy Issues

See Annexure 2 for details.
See Annexure 3-9 for the presentations.

This workshop proceedings presents the key responses to the presentations and the ensuing points of discussion.

2.1 Inaugural Session

2.1.1 Welcome Address, Dr Kinsuk Mitra, President, Winrock International India

After welcoming all participants to the workshop, Dr Mitra flagged three key issues that set the platform for the ensuing presentations and discussions. These were:

1. As in several other sectors, in the area of urban wastewater management too, a substantial amount of scientific data is available on different aspects of wastewater. However, very little of this research is actually applied towards improving management of wastewater, and this is one of the major stumbling blocks.
2. To manage urban wastewater effectively, an improved understanding of the interplay of the various factors – physical, environmental and socio-economic – that affect this potential resource is necessary.
3. Mostly social and livelihood related issues regarding urban wastewater use are assessed, while the larger ecological impacts are only superficially studied. Assessing ecological impacts is a very complex and difficult task, but is very necessary while seeking sustainable solutions to urban wastewater management.

2.1.2 Keynote Address, Dr P.S. Rana, Chairman and Managing Director, HUDCO

Dr Rana highlighted the following points:

1. The sustainable management of water would be one of the key issues in the future. In this regard, there is an urgent need to work towards a state of "water equilibrium" where the demand for and supply of this resource would match.
2. As is the case in rural areas, in urban areas too micro-water management needs to be undertaken. For this, water bodies that store surface water should be promoted.
3. Currently, urban planners do not make any provisions for water bodies. Typically, 2–5 percent of an urban area needs to be under water bodies so that the groundwater tables may be recharged effectively. The corresponding figure for rural areas is lower at 1–2 percent, since percolation rates are lower in urban settlements that are mostly concretised. In this regard, HUDCO has identified three sites for water bodies in Delhi that would be able to store approximately 1.25 billion cubic meters of water, which would be able to supply sufficient water to the entire National Capital Region.
4. To have "clean" water that could be stored in water bodies, wastewater must be treated as close to the point of contamination as possible. This would not only make treatment effective but also economical.

5. Storing water in surface water bodies is an effective way of minimizing pollution of groundwater. As the water percolates into the soil from these water bodies to the aquifers, it undergoes a natural process of purification that removes most of the contaminants.
6. For the effective management of water and wastewater, all stakeholders (urban and peri-urban communities) will have to be actively involved. In this regard extensive awareness generation and educational campaigns need to be undertaken.

2.1.3 Comprehensive Assessment Program, Dr Bharat Sharma, Senior Researcher, IWMI, New Delhi

Dr Sharma provided an overview of the Comprehensive Assessment (CA) program, under which this project was undertaken. Some of the salient features of CA are given below:

1. CA is an innovative multi-institute process aimed at identifying existing knowledge and stimulating thought on ways to manage water resources to continue meeting the needs of both humans and ecosystems.
2. The CA critically evaluates the benefits, costs, and impacts of the past 50 years of water development and challenges to water management currently facing communities.
3. It assesses innovative solutions and explores consequences of potential investment and management decisions.
4. The CA is designed as a learning process, engaging networks of stakeholders to produce knowledge synthesis and methodologies.
5. The main output of the CA is an Assessment Report. It aims at guiding investment and management decisions in the near future considering their impact over the following 50 years to enhance food and environmental security to support the achievement of the MDGs.

(See Annexure 3 for details.)

2.1.4 The Urban Wastewater Project, Shashikant Chopde, Sr Program Officer, Winrock International India

The focus of the presentation was on the background, objectives and methodology, and approach of the project (See Annexure 4 for details).

2.2 Delhi and Kolkatta Case Studies

In this second session, findings from the Delhi and Kolkatta case studies were presented (see Annexure 5 & 6 for details). In both these cases, peri-urban communities are dependent on wastewater for their livelihoods. The following key points were discussed:

1. Currently, urban wastewater is a free commodity. However, if it were to be priced it could adversely impact the livelihoods of the communities dependent on it as a source of irrigation and nutrients.
2. Floriculture using urban wastewater is emerging as a major 'gainer' in Delhi with very little health impacts for the consumers.
3. Urban wastewater does provide a potential market that could be tapped, however, this should not be done at the cost of poor communities dependent on this resource for their livelihoods.

4. The East Calcutta Wetlands (ECW) is a natural "treatment plant" for the urban wastewater generated by the city. It provides a win-win situation in which sewage from the city is treated and poor communities living around the ECW can use this resource for livelihood generation.
5. The importance of wetlands is grossly underestimated. Wetlands can drastically reduce the costs of treatment of urban wastewater if they are judiciously preserved.
6. A caste-based community system for utilization of wastewater has been developed in the ECW in which "rules of use" have been defined. There are also traditional systems of wastewater treatment, as found in the ECW, which can provide useful learning to modern practices.
7. It has to be recognized that practising agriculture using wastewater is different from the normal irrigated agriculture and, that, the issues in the former would be different from those in the latter. Therefore, a different set of strategies to deal with issues pertaining to agriculture using wastewater will need to be adopted.
8. Heavy metals accumulate slowly; therefore, though sample surveys may reveal these to be within the prescribed permissible limits, they could still have adverse impacts on human health and the environment in the long run.

9. For sewage waste, decentralized systems of treatment are most effective, while for industrial waste centralized treatment units are required. This distinction is often not made while treating wastewater. The mixing of industrial effluents and domestic waste should therefore be avoided as far as possible.
10. Peri-urban agriculture is most often not officially recognized as an urban land use, even though it is widely practised in several areas.
11. Currently, treatment of urban wastewater does not address environmental contaminants such as heavy metals. Therefore, such contaminants tend to accumulate in the soil from where they are transferred to crops and its consumers. Treatment activities will need to focus on environmental contaminants, too.
12. The use of wastewater for livelihood generation should not be eulogized since its negative impacts on the environment are complex, with potential long-term ramifications. Careful assessment of the ecological impacts of the use of wastewater needs to be undertaken before promoting it as a source of water and nutrients for peri-urban farmers.
13. With regards to the quality of wastewater, biological indicators should be used in conjunction with physical parameters. This would provide a cumulative process for monitoring wastewater quality.

2.3 Ahmedabad and Kanpur Case Studies

In the third session, findings from the Ahmedabad and Kanpur case studies were presented (see Annexure 7 & 8 for details). In both states, the use of urban wastewater by peri-urban communities was found to have, often severe, adverse health impacts. The following key points emerged from the discussion:

1. Farmers who use urban wastewater for agriculture despite the adverse impacts that this has on their and their families' health, do so because they do not have access to any alternative sources of water.
2. There are issues of equity and justice related to the use of wastewater. For example, in Kanpur, it was found that the use of untreated or poorly treated wastewater led to a 30 percent reduction in crop production. Despite this, farmers have to pay a cess to use this wastewater in their fields. Thus, application of wastewater is increasing the vulnerability (in terms of adverse impacts on livelihoods and health) of many poor in Kanpur, while those affected continue to make payments for accessing this water.
3. Soil remediation is a technique used for removing contaminants accumulated in the soil – in this case due to the use of wastewater (used by the Indian Institute of Technology, Kanpur). However, treating the soil in this manner would have little effect unless it is coupled with adequate treatment of wastewater itself, the source of the contaminants.
4. These days, domestic wastewater is not as safe as it is often considered (compared to industrial effluents). With the increasing use of chemicals at the household level, the amount of chlorinated compounds and detergents found in domestic wastewater has risen.
5. It is important to make a "chemical overview" of wastewater before it is allowed to be used for irrigation, even if this water comprises primarily domestic waste.

6. The volumes of wastewater generated are so large that managing these quantities become a technical problem. Therefore, besides treating the wastewater, one should explore strategies for reducing the amount of wastewater generated.
7. There is a need for "zoning" in urban planning. This would help ensure that industries are not located next to water bodies and that industrial estates are so established that they facilitate centralized treatment of effluents.
8. Greater emphasis needs to be placed on developing and strengthening the institutional mechanisms involved in the treatment of urban wastewater. The role that urban and peri-urban communities can play in this must be explored.
9. An expert committee of the Ministry of Urban Development (MoUD) has developed a manual in which one of the chapters is devoted to the methods of using wastewater and the types of crops that can be cultivated using this water. The chapter also defines the acceptable limits of various physical parameters for the wastewater to be used.

10. The MoUD recognizes the need to work towards segregating industrial and domestic wastewater.
11. According to the MoUD, approximately 100 cities in the country have some sort of wastewater treatment plants but do not function to their full capacity.
12. The MoUD feels that a "GOVT-NGO-Public-Private" partnership is necessary to tackle effectively the issue of urban wastewater.

2.4 National Perspective and Policy Issues

In the fourth and final session, a WII staff presented the findings of the national assessment that was undertaken as part of this project (see Annexure 9 for details). The key points that evolved, and largely summing up the day's discussions, are given below:

1. Urban planners and implementing agencies must introspect on whether urban development should be allowed to continue without developing simultaneously the capacity to effectively treat the wastewater that would be generated. This is important since, typically, urban development is inequitable, and while the sections of society that are economically more secure benefit from this, the poor have to face the brunt of the waste generated.
2. To develop improved strategies, it is imperative to learn from the successes and failures of projects that target the treatment and management of wastewater (eg, GAP/YAP). There exist successful technical and institutional models that could be adapted in new projects.

3. For agriculture that uses urban wastewater certain rules must be defined and enforced, for example, there should be a control on the crop types cultivated – salad vegetables tend to absorb more contaminants than other crops – and use of protective gear (boots, gloves) by farmers dependent on wastewater should be made mandatory.
4. As indicated by the MoUD, there exist norms for the application of wastewater. These need to be enforced.
5. In this age of globalization, the political and economic situation of the country must be considered. As per the current trends, there is a growing population of urban poor whose livelihood activities, including the use of wastewater for agriculture, largely fall within the "informal sector". These communities must be included in any meaningful initiative aimed at the effective management of wastewater. However, thrusting formal norms on this informal sector would not work. Therefore, institutional incentives would need to be provided to these communities to actively participate in such ventures.

6. It is widely accepted, by the government too, that sewage treatment plants (STPs) do not function effectively. This is due to bottlenecks that these STPs face:
    a. Poor power supply
    b. Lack of funds – though STPs have backup generators they do not have the funds to purchase diesel
    c. Lack of trained manpower
    d. Due to poor sewer networks, the area covered under these STPs is limited
    e. Capacity to treat solid waste is poor
    f. Public participation/awareness is lacking
7. It is urgent to explore means of reducing the quantum of wastewater generated by urban centres. Combining this with effective treatment would lead to better results.
8. At the policy level, low priority is currently accorded to urban wastewater collection and treatment as the focus primarily lies on supplying potable water. As a result, the amount of funds allocated towards wastewater management is proportionately lower. There is, therefore, a need for policymakers to recognize the threats and opportunities that urban wastewater provides.