Septage Co-treatment in UP: Potential, Practice and Prospects

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What is co-treatment

• Co-treatment is the scientific treatment of septage at an existing STP

• Two ways of co-treating
  ➢ Co-treatment in existing STP’s liquid stream – after a screening and grit removal process, septage is added to the sewage for treating
  ➢ Co-treatment in existing STP’s sludge stream – the liquid and solid components of septage are separated. Liquid component is added to sewage stream and dewatered septage sludge to the sludge arising from treatment of sewage.

• Factors determining quantity of septage feasible for co-treatment:
  ➢ spare capacity in existing STP
  ➢ BOD / COD characteristics of sewage & sludge
  ➢ Technology employed by the STP
Why co-treatment

• STP capacity of ~25,000 MLD is either installed or under construction
• Only two-thirds of the installed STP capacity is utilized in India; about 75% in Uttar Pradesh
• Total co-treatment potential may be septage generated from 1.5 - 3 million households
• Low-cost option for treatment of septage
• Established practice at several STPs in India
• MoUD Guidelines suggest that co-treatment of septage along with domestic sewage at an STP, if available, is the most desirable option
Key findings: Co-treatment potential in India

• **~400** cities and towns with STPs; average utilization of STPs ~66% (CPCB, 2013)

• **~2,200** cities and towns within a 30 km radius of these 400 cities with STPs
  ➢ ~ 47 million Households (in 2017) reside in these 2,200 cities and towns
  ➢ Account for ~50% of total urban households in India
  ➢ ~37% of the HHs (~17.5 million) in these urban areas are connected to septic tanks

• Existing unutilized capacity at STPs can be used for co-treatment
  ➢ Can serve upto 3.3 million HHs (~20% of HHs on septic tanks) from the urban areas around STPs

• 44 cities have co-treatment potential to meet 100% of septage generated
Kanpur case study on co-treatment governance process

- Commitment of KNN to implement the rules
- Confrontation with tanker operators
- Private desludging operators form an association
- After several meetings, agreement on tipping fee, collection fee & process
- Rules for co-treatment framed & issued in the public domain

Fines imposed on those disposing of septage illegally
High tipping fee imposed
Consultation between KNN & the Association
Disposal of septage at STP begins in Sep 2017
Incentive for operators outside KNN to register & discharge septage at STP

Commitment  Confrontation  Consultation  Consensus  Cleaner city, Co-opt rural areas
Drivers for co-treatment in Kanpur & Ghaziabad

- Unauthorized dumping - pollution
- Swachh Sarvekshan
- NGT Directives
Kanpur – Bingawan STP

• 210 MLD, UASB Reactor
• Receiving station created – INR 8 lakh
• Registration charge INR 1000; monthly tipping fee INR 3500 – 21 trucks
• Up to 1 lakh HHs served by co-treatment
• Receives 60-80 truckloads of septage daily
• About 0.18 to 0.24 MLD of septage is blended with 80-90 MLD of sewage
• No operational challenges
• Slight improvement in BOD values of treated water
Ghaziabad – Indirapuram STP

- 56 MLD, Sequential Batch Reactor
- Decanting at existing Sewage Pumping Station and at STP directly; no special facility created
- Registration charge INR 2000; no tipping fee – 23 trucks
- Over 1 lakh HHs served by co-treatment
- Receives about 60 truckloads of septage daily
- About 0.32 MLD of septage is blended with 50 MLD of sewage
- No operational challenges
- No records maintained
- No significant impact on effluent quality
- Backflow from nearby STPs in the outlet area?
Co-treatment: *Theory and practice*

- Reported quality of septage varies significantly
  - Pollution strength of septage is considerably lesser in many samples analyzed by researchers (Chennai, Bangladesh)

- Plants co-treating septage in India able to accept and accommodate higher quantities of septage (than theoretical estimates), without significant impacts on plant performance and effluent quality

<table>
<thead>
<tr>
<th>Plant</th>
<th>Theoretical estimate for septage addition (% of sewage flow)</th>
<th>Actual addition (% of sewage flow)</th>
<th>Number of truckloads discharged at plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanpur (Bingawan)</td>
<td>1.4%</td>
<td>0.3%</td>
<td>80</td>
</tr>
<tr>
<td>Ghaziabad (Indirapuram)</td>
<td>0.14%</td>
<td>0.8%</td>
<td>58</td>
</tr>
<tr>
<td>Chennai (Nesapakkam)</td>
<td>0.32%</td>
<td>2%</td>
<td>200</td>
</tr>
<tr>
<td>Goa (Tonca)</td>
<td>0.27%</td>
<td>4.8%</td>
<td>120</td>
</tr>
</tbody>
</table>

- This may be due to weaker strength of septage from
  - More frequent emptying
  - Different design of septic tanks (holding tanks / one chamber)
  - Septage from institutions such as hotels
Why co-treatment worked in Kanpur & Ghaziabad

- Regulation of desludging fee
- Nearby facility for decantation
- Consultations
- Strict enforcement
- Fixed fee for decantation
Future directions

• Better recording keeping at decanting stations
• Checking for industrial waste (random or regular analysis)
• Personal protective equipment for desludging workers
• Consultations and process to include septage from nearby rural areas for co-treatment
• If high septage flows, then installation of primary settling tank for primary treatment of septage to reduce pollution load