1. What do you mean by water pollution?

   Water pollution is the release of substances into the sub surface ground water or into lakes, streams, rivers, estuaries, and oceans to the point where the substances interfere with beneficial use of the water or with the natural functioning of ecosystems. In addition to the release of substances, such as chemicals or microorganisms, water pollution may also include the release of energy, in the form of radioactivity or heat, into the bodies of water. (Encyclopedia Britannica)

2. Explain Delhi's contribution to the pollution of the river Yamuna.

   The Yamuna's 22- km stretch in Delhi is barely 2% of the length of the river but contributes over 70% of the pollution load. Once called 'the lifeline of the city' is now one of the dirtiest rivers in the country. Delhi generates 3,267 million litres of sewage per day (mld), while the installed waste treatment capacity is only 2,330 mld. Out of 2,330 mld treatment capacity, 37% is underutilized and 1,270 mld of untreated sewage is allowed to enter the river everyday. The Najafgarh drain contributes to 60% of the total wastewater and 45% of the total BOD load, which is discharged into Delhi. A Central Pollution Control Board (CPEB) study on river water quality at the upstream of Wazirabad shows dissolved oxygen (DO) level at 7.5 mg/l and BOD level at 2.3 mg/l. At downstream Okhla, the DO level declined to 1.3 mg/l with the BOD at 16 mg/l, indicating considerable deterioration in water quality due to discharge of sewage and industrial effluents.

   The faecal coliform count, which indicates the presence of disease causing microorganisms, is nearly 25,000 times more than the prescribed limit for bathing. The coliform count at Wazirabad is 8,506/100 ml whereas at Okhla, it increases to 3,29,312/100 ml

   *Apart from pollution, sand mining mafia is also operative in changing the course of the river. Each day hundreds of truckloads of sand is carried out in the upstream of Wazirabad, UP border. It is sold

for Rs.800 per truckload in the outskirts of Delhi for construction purposes.

3. Which are the regulatory authorities involved in the cleaning and maintenance of the river?
    - Central Pollution Control Board (CPCB)
    - Delhi Pollution Control Committee(DPCC)
    - State Pollution Control Board (SPCB)
    - Delhi Jal Board (DJB)

    Delhi Jal Board is responsible for treatment and disposal of wastewater through an efficient network of about 5600 KMS of internal, peripheral and trunk-sewers. The capacity of Sewage Treatment Plants has been raised from 376.4 MGD to 402.4 MGD during the year 2000-2001.This capacity is further proposed to be increased to 512.4 MGD by next year. Out of 17 Sewage Treatment Plants (STP) under construction, the work of 12 has been completed and the work of remaining five STPs is under progress.

    The DJB has provided sewage facilities in all the approved colonies. Out of 567 unauthorized /regularized colonies, 414 colonies have been provided with sewage system and we have laid sewer lines in all re-settlement colonies. Sewer lines have also been laid in 93 urban villages.

    Major Civil society groups Organizations that came forward
    - Civil society groups
    - Microsoft
    - Educomp and Kent RO
    - Japan International Cooperation Agency (JICA)

4. Major steps and actions taken by the government so far for the cleaning up of the river.

    Yamuna Action Plan 1 (YAP1)

The Ministry of Environment and Forests (implemented by NRCD) launched YAP-1 in 1993 with Japan's loan amounting to 17.77 billion yen. Two types of schemes were taken up by YAP-1 :

1. **Sewerage components**
   This comprised construction of drain interceptors, division sewer lines, sewage pumping stations, and rehabilitation and construction of STPs.
2. **Non sewerage components**
   Non- sewerage components included works on low-cost sanitation, river front development, crematoria, plantation, and public participation

Altogether 29 STPs were constructed under this plan.

Yamuna Action Plan-2(YAP-2)

YAP-2 covers the time span from 2004-09. The loan agreement provided the financial assistance of 13.33 billion yen. Other than the construction and rehabilitation works of STPs and trunk sewers, the following components are included under this plan:

- Public Participation and Awareness (PP&A) Programs on public involvement in the decision-making process by utilizing numerous NGOs
- Institutional Strengthening and Capacity Building of the Urban Local Bodies (ULBs)
- Capacity Building for NRCD (which is executing agency for this Project)
- Water Quality Monitoring Program

Under YAP-II, sewerage components include construction and rehabilitation of trunk sewer, Okhla STP extension, Keshopur STP rehabilitation in Delhi; construction of STPs and STPs in UP. In addition to physical implementation of these facilities, capacity building and technology transfer are also important for more efficient and effective implementation and operation of sanitation facilities.

Total expenditure for the government

Yap 1(1993-) : 19.9 crore (spent in Delhi)

Yap 2(2004-) : 166.6 crore (spent in Delhi)

17 STPs with a capacity of 2330 mld : 745-1048 crores

15 CETPs : 256 crores

Total: : 1888.6 – 1491.6

5. The cause for the failure of YAP-1 and YAP-2?

Major factors, which affected the attainment of objectives of YAP-1, are related to original strategy on coverage, end of pipe approach, technology and a limited time horizon. The capacity of old existing STPs in Delhi remained underutilized (25-45%) because of limitations in the collecting system and power availability. The result is a continuous flow of untreated sewage flow into the river through the drains.

YAP-YAP-II and I address mainly the issue of domestic wastes. It is very difficult to control agricultural wastes for their nature and hence 12 untreated industrial wastewater flows into the sewer. To bring YAP-I and YAP-II into effect industrial effluents should be controlled according to the relevant affluent standards established by CPCB STPs built under YAP-1, was designed for the 1997 population load, which became insufficient by 2002 because of a tremendous increase in population.

Delhi's population has grown at a phenomenal rate of 47percent per decade (as against the national average of 21 percent), but planning and provisioning of infrastructure has not kept pace with the increase in population, resulting in rural villages, shanties and colonies without adequate sewerage infrastructure**.** Only around 54percent of the population is connected to this sewerage network, leaving 46percent of the population uncovered**.** The colonies, villages, and Jhuggi Jhopri (JJ) clusters without sewerage facilities are mainly in outer Delhi areas and the wastewater generated is presently flowing into river Yamuna through 18 drains and sub-drains. Of these 18 drains, the three major drains of Najafgarh and Shahadara contribute maximum pollution load. About 1764 MLD of wastewater flows through 190 sub-drains into these three major drains and then in the Yamuna river.

6. Funds spent and programmers implemented since 2006.

- 17 STPs built
- 10 CETPs built
- 30 km of trunk sewers repair (out of 130 km)
- slums removed from riverfront and low cost toilets built.

7. What are STPs, CETPs and Interceptors?

STP

Sewage Treatment Plant is a facility designed to receive the waste from domestic, commercial, and industrial sources and to remove materials that damage water quality and compromise public health and safety when discharged into water receiving systems.

Objective: - The Principal objective of wastewater treatment is generally to allow human and industrial effluents to be disposed of without danger to human health or unacceptable damage to the natural environment.

CETP

Common Effluent Treatment Plant is the concept of treating effluents by means of a collective effort mainly for a cluster of small-scale industrial units. It is similar to the Municipal Corporation treating sewage of all the individual houses. The main objective of CETP is to reduce the treatment cost for individual units while protecting the environment. It also helps to organize the disposal of treated wastes and sludge to improve the recycling and reuse possibilities.

Interceptors

Large sewer lines that, in a combined system, control the flow of sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus keeping it from overflowing onto the streets. Also used in separate systems to collect

the flows from main and trunk sewers and carry them to treatment points

8. Total number of STPs and CETPs in Delhi and their efficiency?

CETPs : 15
STPs :17

9. Upcoming plans for the cleaning up of river Yamuna.

The government is likely to give its approval soon for the ambitious Rs 1,656 crore Yamuna Action Plan-III, which is exclusively focused on Delhi, funded by the Japanese Government Environment Minister Jairam Ramesh said. Under the Yamuna Action Plan-III, the existing sewage treatment network in Delhi will be modernized in a very big way," he added. "There will be continuous monitoring of water pollution at Palla, where Yamuna enters Delhi from Haryana and there will be similar monitoring at Badarpur where Yamuna flows from Delhi back to into Haryana," Ramesh said.

The first one was already being installed in Wazirabad. The Minister said 47 per cent of Delhi's population is not covered by any organized sewerage network and this situation will continue until the completion of Yamuna Action Plan-III in 2015. "That is the big challenge. We have 26 drains that are now putting untreated sewerage directly into the river Yamuna.

Four projects have been lined up for the construction of STPs in Delhi by the end of this month. Yamuna vihar-25 mgd, Kondli-45 mgd, Okhla- 30 mgd, Kapa Hera- 5 mgd.