(c) and (d) During the visit of Chinese President Hu Jintao to India, in November, 2006, : India and China agreed to set up an Expert Level Mechanism (ELM) on trans-border rivers. The ELM has held five meetings, since 2007, the latest in April, 2011. Government takes up relevant issues relating to trans-boder rivers, with the Chinese side through this Expert Level Mechanism. India and China have also signed a Memorandum of Understanding (MoU) on Provision of Hydrological information on Brahmaputra River in Flood Season in 2002 which was renewed in 2008. Further, another MoU for the provision of similar data by China to India during the flood season in respect of Sutlej was signed in 2005 and was renewed in 2010.

**Pollution in water streams**

†2932. SHRI RAMCHANDRA PRASAD SINGH:

SHRI SHIVANAND TIWARI:

Will the Minister of WATER RESOURCES be pleased to state:

(a) whether it is a fact that, on the basis of a study conducted by the Central Water Commission, it has been found that 12 water streams areas in 8 States of the country are totally polluted and are not useful for human consumption;

(b) if so, the details thereof; and

(c) the length of the aforesaid water streams areas and the States where these are situated in and the towns situated along these water streams having more than one lakh population?

THE MINISTER OF STATE IN THE MINISTRY OF WATER RESOURCES (SHRI VINCENT PALA): (a) and (b) Central Water Commission (CWC) is monitoring the water quality parameters in river water at various water quality stations covering all major river basins. From the study of the ten years data (2000-2009), it is observed that the water quality parameters in many of the rivers have exceeded the prescribed Central Pollution Control Board (CPCB)/Bureau of Indian Standards (BIS) permissible limit due to which the river waters does not appear to be fit for direct human use. The details of which are given in statement-I (See below).

(c) The locations of water quality monitoring stations along with name of state and district at which the water quality parameters have exceeded the prescribed Central Pollution Control Board (CPCB)/Bureau of Indian Standards(BIS) permissible limit are given in statement-II.

†Original notice of the question was received in Hindi.

***Statement-I***

*Salient features of Water Quality Hot Spot in Rivers of India*

The quality of water is central to all of the roles that water plays in our lives. From the beauty of natural waterways teeming with wildlife, to the vital livelihoods that clean rivers and streams support, to the essential role that safe water plays in drinking water and health - good water quality is fundamental to the network of life and livelihood that water supports. Water is the source of life on earth, and human civilizations blossomed where there was reliable and clean freshwater. Use of water by humans - for drinking, washing, and recreation - requires water free from biological, chemical, and physical sources of contamination. Plants, animals, and the habitats that support biological diversity also need clean water. Water of a certain quality is needed to grow food, to power cities, and to run industries. Due to the fast pace of industrialization and urbanization a lot of effluent and sewage is being generated, for a major portion of which there are no effluent treatments. This has resulted in discharge of this sewage in to the rivers untreated or only partially treated. Besides this rampant use of fertilizers and pesticides, open defecation, lack of solid waste management practices also contributes to surface water pollution.

Central Water Commission (CWC) under the guidance of MoWR attempts to provide the water qvatity scenario of Indian rivers. The water outlay data is based for the average values observed during the last ten years (2000-2009) at 371 monitoring stations of CWC on almost all major, medium and minor rivers in India. In respect of Dissolved Oxygen and Biochemical Oxygen Demand, the Central Pollution Control Board (CPCB) classification has been considered for evaluating the hot spot in the rivers.

The physical and chemical quality of river water is important in deciding its suitability for cMrtona, purposes, fcs such the suitability of river water for potable uses with regard to its chemical quality has to be deciphered and defined on the basis of the some vital characteristics of the water. Bureau of Indian Standards (BIS) vide its document IS: 10500:1991, has recommended the quality standards for drinking water and these have been used for finding the suitability of river water. On this basis of classification, the natural river water of India has been categorized as desirable, permissible and unfit for human consumption.

River water quality is highly variable by nature due to environmental conditions such as basin lithology, vegetation and climate. Standard river water for use as reference is therefore not applicable.

The river systems that have been included in the report include - Indus, Brahmaputra, Ganga, Yamuna, Narmada, Tapti, Godavari, Krishna, Kaveri and Mahanadi. The physico-chemical parameters like pH, electrical conductance, Total Dissolved Solids (TDS), Chloride, Fluoride, Iron, Nitrate, Sulphate, Total Hardness, Calcium and Magnesium are the main constituents defining the quality of river water in surface water. Therefore, presence of these parameters in river water beyond the permissible limit in the absence of alternate source has been considered as river water quality hotspots.

River water quality hot spot tables of the rivers have been prepared depicting the main parameters mentioned above based on their distribution:

1. Bureau of Indian Standard have recommended a desirable limit of 6.5 - 8.5 of pH in drinking water. High values of pH greater than 8.5 are observed during the Monsoon season water quality stations at Seondha (Sind River) in Datia district of Madhya Pradesh and Gummanur (Ponniyar River) in Dharmapuri district of Tamilnadu state. During the non-monsoon season high values of pH greater than 8.5 at twelve water quality stations are found Seondha (Sindh), Kora (Rind), Garrauli (Dhasan), A.B. Road Xing and Khatoli (Parwati river), Aklera (Parwan river), Barod (Kalisind river), Tekra (Pranhita river), Gummanur (Ponniyar river), Maighat (Gomti river), Bawapuram (Tungabhadra river) and Tilga (Sankh rivers). Gummanur water quality station in Ponniyar River in Dharmapuri, Tamil Nadu was reported to have the highest pH values of 9.91 and 8.78 durring monsoon and non-monsoon period. These water quality stations found in the states of Uttar Pradesh, Madhya Pradesh, Rajasthan, Jharkhand, Maharashtra, Tamilnadu, and Andhra Pradesh.

2. BIS has recommended a drinking water standard for total dissolved solids a limit of 500 mg/l (corresponding to about EC of 750 uS/cm at 25°C) that can be extended to a TDS of 2000 mg/l (corresponding to about 3000 uS/cm at 25°C) in case of no alternate source. Water having TDS more than 2000 mg/litre are not suitable for drinking uses. High values of electrical conductance in excess of 3000 uS/cm are observed at three water quality stations Elunuthimangalam at Noyyal river, Erode district of Tamilnadu; Tal at Chambal river; Ratlam district of M.P.; Vautha at Sabarmati river, Kheda district Gujarat.

3. BIS (Bureau of Indian Standard) have recommended a desirable limit of 250 mg/l of chloride in drinking water; this concentration limit can be extended to 1000mg/l of chloride in case no

alternative source of water with desirable concentration is available. One water quality station Elunuthimangalam at Noyyal river, Erode district in the state of Tamilnadu has chloride concentration 1656 mg/l and 1175 mg/l during monsoon & non monsoon season respectively.

4. BIS has recommended an upper desirable limit of 1.0 mg/l of fluoride as desirable concentration of fluoride in drinking water, which can be extended to 1.5 mg/l of fluoride in case no alternative source of water is available. River/ground Water having fluoride concentration of more than 1.5 mg/l are not suitable for drinking purposes. Fluoride concentration more the 1.5 mg/l is observed at fifteen water quality stations in the states of Delhi, Tamilnadu, Karnataka, Bihar, Jharkhand, Haryana, UP., Kerala, Chhattisgarh and A.P. Fifteen water quality stations were recorded as having Fluoride concentration above 1.5 mg/l, the highest is at Thimmanahalli, Hassan in Yagachi river basin in Karnataka (4.08-monsoon and 5.07 - non monsoon).

5. BIS has recommended standard for drinking water the maximum desirable limit of Nitrate concentration in 10.16 mg/l as nitrate N (45 mg/l as Nitrate N03). All the water quality stations of CWC have nitrate concentration with in the permissible limit.

6. BIS has recommended an upper desirable limit of 200 mg/l of sulphate as desirable concentration of fluoride in drinking water, which can be extended to 400 mg/l of sulphate in case no alternative source of water is available. Water having fluoride concentration of more than 400 mg/l are not suitable for drinking purposes. Sulphate concentration more than 400 mg/l is observed during Monsoon season at Tal water quality stations in the state of MP. The water quality station at Tal, Ratlam in Chambal river basin has Sulphate concentration above 400 mg/l in river.

7. The permissible Iron concentration in surface water is less than 1.0 mg/litre as per the BIS Standard for drinking water. The occurrences of iron in surface water beyond permissible limit (>1.0 mg /litre) have been shown on the table as point sources. It is observed that high concentration of iron greater than 1.0 mg/l at twenty two water quality stations has been found in the state of the Madhya Pradesh, Himachal Pradesh, Jammu & Kashmir, Tamilnadu Karnataka, Kerala, Chhattisgarh, Jharkhand and Bihar. There are twenty two stations having Iron (Fe) concentration above 1.0 mg/l in river. The highest recorded iron concentration was in Kumhhari water quality station at Balaghat in Wainganga river basin (16.40 - monsoon, 64.39 - non monsoon). Out of these

of the twenty two stations, eleven were in Bihar-Jharkhand on the Ganga, Sone, Kiul, North Koel, Phalgu, Punpun and Gandak rivers.

8. BIS has recommended an upper desirable limit of 75 mg/l calcium as CaC03 desirable concentration of fluoride in drinking water, which can be extended to 200 mg/l calcium as CaC03 in case no alternative source of water is available. Water having calcium concentration of more than 400 mg/l are not suitable for drinking purposes. All the water quality stations of CWC have calcium concentration with in the permissible limit.

9. BIS has recommended an upper desirable limit of 30 mg/l magnesium as CaC03 desirable concentration of magnesium in drinking water, which can be extended to 100 mg/l magnesium as CaC03 in case no alternative source of water is available. Water having magnesium concentration of more than 100 mg/l are not suitable for drinking purposes. Relatively high value of magnesium in excess of 100 mg/l is observed at one water quality station Elunuthimangalam at Noyyal river, Erode district in the state of Tamilnadu.

10. As per the CPCB classification has recommended 5.0 mg/l concentration of dissolved oxygen for out door bathing. Water having below 5.0 mg/l Dissolved Oxygen concentration is not suitable for out-door bathing in river. Dissolved Oxygen below 5.0 mg/l is observed at 17 water quality stations in the state of Delhi, Uttar Pradesh, Rajasthan, Karnataka, Chhattisgarh, Jharkhand, Maharashtra and Gujarat. More alarming concentrations were recorded mostly in Chhattisgarh - Darrighat, Bilaspur in Mahanadi basin (0.8 - monsoon, 0.9 - non monsoon), MBPL, Bilaspur in Hasdeo basin (0.3 - monsoon, 0.5 - non monsoon) and Baridhinala, Paschim Singbhum in Subarnarekha river basin (0.8 - monsoon and 0.9 - non monsoon).

11. CPCB has recommended 3.0 mg/l concentration of biochemical oxygen demand for out-door bathing. Water having above 3.0 mg/l BOD concentration is not suitable for out- door bathing in river. Relatively high values of Biochemical Oxygen Demand more than 3.0 mg/l are observed at 36 water quality stations Mawi, Delhi, Mohana, Mathura, Agra, Auraiya, Etawah at Yamuna River; Seondha at Sindh river; Sahijana at Betwa river; Garauli at Dhasan river; Khatoli at Parwati river; Bamni and Bishnur at Wardha river; Pudur at Bharathapuzha river; Kanakpura and T.

Bekuppe at Arkavathi river; Thimmanahallt at Yagachi river; Elunuthimangalam at Noyyal river; Gummanur at Ponnoiyar river; Kanpur, Shahzadpur, Allahabad at Ganga; Pingalwada at Dhadher river; Vautha at Sabarmati; Darrighat at Apra river; Ghatora at Seonath river; MBPL at Hasdeo river; Adityapur at Kharkai river ; Baridhinala and Jamshedpur at Subarnarekha river; Kulpatanga at Kharkai river; Gomlai, Kamalanga, RSP Nalla at Brahmani river in the states of UP., Rajasthan, Delhi, M.P., T.N., Karnataka, Chhattisgarh, Haryana, Maharashtra, Orissa, Jharkhand, Bihar, Kerala and Gujarat. Very high concentrations were recorded in Darrighat, Bilaspur in Arpa basin (241.6 - monsoon and 282.4 - non monsoon) and MBPL, Bilaspur in Hasdeo basin (276.3 -monsoon, 259.8 - non mbnsoon). Thirteen water quality stations in the Yamuna river and its tributaries (Betwa, Hindon, Sindh, Dhasan and Parwati) recorded high concentrations of BOD.

12. As per CPCB guidelines for bathing (outdoor), the Total Conforms Organism MPN/100m) ' % shall be 500 or less. The main source of Total Coliforms in Indian rivers is sewage discharge, open defecation, cattle wallowing, disposal of animal caracass and unbumt bodies. Most of the Indian River stretches (middle and lower) are high in total coliforms. It has been reported that stretches which are high in BOD have high Total Coliform and fecal coliform.

13. All the water quality stations of CWC have arsenic concentration with in the permissible limit prescribed by BIS.

***Statement-II***

*Locations of Water Quality Monitoring Stations*

**Table: 01**

***Stations having pH value above 8.5 in River Water***

| Sl.No. | Water Quality Site | River | States | District |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | Seondha | Sindh | M.P. | Datia |
| 2 | Kora | Rind | U.P. | Fatehpur |
| 3 | Garauli | Dhasan | M.P. | Chhattarpur |
| 4 | AB Road Xing | Parwati | M.P. | Guna |
| 5 | Aklera | Parwan | Rajasthan | Jhalarwar |
| 6 | Barod | Kalisind | Rajasthan | Kota |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 7 | Khatoli | Parwati | Rajasthan | Kota |
| 8 | Tekra | Pranhita | Maharashtra | Gadchiroli |
| 9 | Gummanur | Ponniyar | Tamilnadu | Dharmapuri |
| 10 | Maighat | Gomti | U.P. | Jaunpur |
| 11 | Bawapuram | Tungabhadra | A.P. | Kurnool |
| 12 | Tilga | Sankh | Jharkhand | Shindega |

**Table** 02

*Stations having Electrical Conductance (EC) > 3000µS/cm in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Elunuthimangalam | Noyyal | Tamilnadu | Erode |
| 2 | Tal | Chambal | M.P. | Ratiam |
| 3 | Vautha | Sabarmati | Gujarat | Kheda |

**Table**-03

*Water Quality Stations having Magnesium concentration above 100 mg/l in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Elunuthimangalam | Noyyal | Tamilnadu | Erode |

***Table -04***

*Stations having Total Hardness (TH) concentration above 600 mg/l in River Water*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Tal | Chambal | M.P. | Ratiam |
| 2 | Elunuthimangalam | Noyyal | Tamilnadu | Erode |

***Table -05***

*Water Quality Stations having Chloride concentration above 1000 mg/l in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Elunuthimangalam | Noyyal | Tailnadu | Erode |

***Table-06***

*Water Quality Stations having Sulphate concentration above 400 mg/l in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Tal | Chambal | M.P. | Ratlam |

***Table -07***

*Stations having Iron (Fe) concentration above 1.0 mg/l in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | Kumhhari | Wainganga | M.P. | Balaghat |
| 2 | Udaipur | Chandrabhaga | H.P. | Lahulspiti |
| 3 | Villupuram | Ponnaiyar | Tamilnadu | Villupuram |
| 4 | Kidangoor | Meenachil | Kerala | Kottayam |
| 5 | Erinjipuzha | Payaswini | Kerala | Kasargod |
| 6 | Hogenakkal | Chinnar | Tamilnadu | Dharmapuri |
| 7 | Kanakapura | Akravathi | Karnataka | Bangalore |
| 8 | Akkihebbal | Hemavathi | Karnataka | Mandya |
| 9 | Sakaleshpur | Hemavathi | Karnataka | Hassan |
| 10 | Gaya | Phalgu | Bihar | Gaya |
| 11 | Koelwar | Sone | Bihar | Arrah |
| 12 | Japla | Sone | Jharakhand | Palamau |
| 13 | Mohammadganj | North Koei | Jharakhand | Palamau |
| 14 | Azamabad | Ganga | Bihar | Bhagalpur |
| 15 | Hathidah | Ganga | Bihar | Patna |
| 16 | Gandhighat | Ganga | Bihar | Patna |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 17 | Buxar | Ganga | Bihar | Bhojpur |
| 18 | Lakhisarai | Koel | Bihar | Lakhisarai |
| 19 | Sripalpur | Punpun | Bihar | Patna |
| 20 | Lalganj | Gandak | Bihar | Vaishali |
| 21 | Darrighat | Arpa | Chhattisgarh | Bilaspur |
| 22 | MBPL | Hasdeo | Chhattisgarh | Bilaspur |

***Table-08***

*Stations having Fluoride concentration above 1.5 mg/l in River*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Delhi | Yamuna | Delhi | Delhi |
| 2 | Mohana | Yamuna | Haryana | Faridabad |
| 3 | Math lira | Yamuna | U.P. | Mathura |
| 4 | Kuniyil | Chaliyar | Kerala | Mailapuram |
| 5 | Hogenakkal | Chinnar | Tamilnadu | Dharmapuri |
| 6 | Thimmanahalli | Yagachi | Karnataka | Hassan |
| 7 | Thoppur | Thoppaiyar | Tamilnadu | Salem |
| 8 | Azamabad | Ganga | Bihar | Bhagalpur |
| 9 | Gandhighat | Ganga | Bihar | Patna |
| 10 | Sripalpur | Punpun | Bihar | Patna |
| 11 | Damercharla | Musi | A.P. | Nalgonda |
| 12 | Bawapuram | Tungabhadra | A.P. | Kurnool |
| 13 | Darrighat | Arpa | Chhattisgarh | Biiaspur |
| 14 | MBPL | Hadeo | Chhattisgarh | Bilaspur |
| 15 | Baridhinala | Subarnarekha | Jharkhand | Paschimsingbhum |

***Table - 09***

*Stations having Dissolved Oxygen concentration below 5.0 mg/l in River Water*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | Delhi | Yamuna | Delhi | Delhi |
| 2 | Galeta | Hindon | U.P. | Meerut |
| 3 | Mathura | Yamuna | U.P. | Mathura |
| 4 | Bishnur | Wardha | Maharashtra | Wardha |
| 5 | T. Bekuppe | Arkavathi | Karnataka | Bangalore |
| 6 | Yennehole | Yennehole | Karnataka | Udupi |
| 7 | Bantwal | Netravathi | Karnataka | Dakshina kannada |
| 8 | Bareilly | Ramganga | U.P. | Bareilly |
| 9 | Takli | Bhima | Maharashtra | Sholapur |
| 10 | Derol Bridge | Sabarmati | Gujarat | Sabarkantha |
| 11 | Luvara | Shetrunji | Gujarat | Bhavnagar |
| 12 | Abu Road | Banas | Rajasthan | Sirohi |
| 13 | Chitrasani | Balaram | Gujarat | Banaskantha |
| 14 | Darrighat | Arpa | Chhattisgarh | Bilaspur |
| 15 | Ghatora | Seonath | Chhattisgarh | Bilaspur |
| 16 | MBPL | Hasdeo | Chhattisgarh | Bilaspur |
| 17 | Baridhinala | Subarnarekha | Jharkhand | Paschimsingbhum |

***Table: 10***

*Stations having Biochemical Oxygen Demand Concentration above 3.0 mg/l in River Water*

| Sl.No. | Water Quality Site | River | State | District |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | Agra | Yamuna | U.P. | Agra |
| 2 | Etawan | Yamuna | U.P. | Etawah |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 3 | Seondha | Sindh | M.P. | Datia |
| 4 | Sahijana | Betwa | U.P. | Hamirpur |
| 5 | Auraiya | Yamuna | U.P. | Auraiya |
| 6 | Garauli | Dhasan | M.P. | Chhatarpur |
| 7 | Hamirpur | Yamuna | U.P. | Hamirpur |
| 8 | Khatoli | Parwati | Rajasthan | Kota |
| 9 | Mawi | Yamuna | Haryana | Muzaffarnagar |
| 10 | Delhi | Yamuna | Delhi | Delhi |
| 11 | Galeta | Hindon | U.P. | Meerut |
| 12 | Mohana | Yamuna | Haryana | Faridabad |
| 13 | Mathura | Yamuna | U.P. | Mathura |
| 14 | Bamni | Wardha | Maharashtra | Chandrapur |
| 15 | Bishnur | wardha | Maharashtra | Wardha |
| 16 | Pudur | Bharathapuzha | Kerala | Palakkad |
| 17 | Kanakapura | Akaravathi | Karnataka | Bangalore |
| 18 | T.Bekuppe | Akaravathi | Karnataka | Bangalore |
| 19 | Thimmanahalli | Yagachi | Karnataka | Hassan |
| 20 | Elunuthimangalam | Noyyal | Tamilnadu | Erode |
| 21 | Gummanur | Ponniyar | Tamilnadu | Dharmapuri |
| 22 | Kanpur | Ganga | U.P. | Kanpur |
| 23 | Shahzadpur | Ganga | U.P. | Kaushambi |
| 24 | Allahabad | Ganga | U.P | Allahabad |
| 25 | Pingalwada | Dhadher | Gujarat | Vadodra |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 26 | Vautha | Sabarmati | Gujarat | Kheda |
| 27 | Darrighat | Arpa | Chhattisgarh | Bilaspur |
| 28 | Ghatora | Seonath | Chhattisgarh | Bilaspur |
| 29 | MBPL | Hasdeo | Chhattisgarh | Bilaspur |
| 30 | Adityapur | Kharakai | Bihar | Purba singhbhum |
| 31 | Baridhinala | Subarnarekha | Jharkhand | Paschimsingbhum |
| 32 | Jamshedpur | Subarnarekha | Jharkhand | Purba singhbhum |
| 33 | Kulpatanga | Kharkai | Jharkhand | Dumka |
| 34 | Gomlai | Brahmani | Orissa | Sundergarh |
| 35 | Kamalanga | Brahmani | Orissa | Angul |
| 36 | RSP Nalta | Brahmani | Orissa | Sundergarh |

**Assistance to States with inadequate water resources**

2933. SHRI PRAVEEN RASHTRAPAL: Will the Minister of WATER RESOURCES be pleased to state:

(a) the States which have surplus water resources and the States where there is no adequate facility/availability of resources, including drinking water; and

(b) what assistance was provided by the Central Government to non-surplus States during the last five years ending on 31 March, 2011?

THE MINISTER OF STATE IN THE MINISTRY OF WATER RESOURCES(SHRI VINCENT PALA): (a) National Water Development Agency has made/undertaken preliminary water balance studies for different river basins in the country for identifying possible inter-linking of rivers for transfer of surplus flood water from one State to another. However, no State-wise water balance study has been carried for assessment of States having surplus/deficient water resources.

(b) On the basis of these preliminary water balance studies feasible, inter-linking of river projects have been suggested to the concerned States.