

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. **2840**
TO BE ANSWERED ON WEDNESDAY, JULY 30, 2014

COMAPS

2840. SHRI NIMMALA KRISTAPPA:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) The present status of implementation of the Coastal Ocean Monitoring and Prediction System (COMAPS);
- (b) The details of the findings and the data collected by COMAPS during each of the last three years and the current year, location-wise;
- (c) The details and the action taken by the Government on such findings;
- (d) Whether the system has achieved the desired results; and
- (e) If so, the details thereof and if not, the reasons therefor.

ANSWER

MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES (Independent Charge)
(SHRI JITENDRA SINGH)

(a) The Integrated Coastal Marine Area Management centre of Earth System Science Organisation (ESSO-ICMAM) has been implementing a program called “Coastal Ocean Monitoring and Prediction System (COMAPS)” with the objectives (i) to monitor water quality parameters periodically in selected locations in the coastal waters of India (ii) to develop possible prediction of sea water quality in these selected locations to assess the state of marine environment. Under the COMAPS program, the data up to 25 parameters such as dissolved oxygen (DO), nutrients, pH, Biological Oxygen Demand (BOD), plankton, benthos and pathogenic bacteria, etc., are being monitored covering different seasons at 20 coastal locations viz., Vadar, Veraval, Hazira, Thane (Mumbai), Worli, Ratnagiri, Malvan, Mandovi, Mangalore, Kochi, Kavaratti, Sandheads, Hooghly, Paradip, Visakhapatnam, Kakinada Ennore (Chennai), Pondicherry, Tuticorin, Port Blair.

(b) Seawater quality data collected over period has indicated areas of low, moderate and high. The data further indicates that the concentration of the nutrients and population of pathogenic bacteria are confined to 0 – 1 km at these locations except in Mumbai. A large amount of data is generated under the program. The data are also hosted on the website of ESSO-Indian National Centre for Ocean Information Services (INCOIS), Hyderabad for wider utility. The details of meta-data and salient findings are placed at Annexure-1.

(c) These details of the findings are being provided to the State Pollution Control Boards, who make use of the information to take remedial measures, if any.

(d) Yes, the program has been under successfully implementation successfully over a decade, with the participation of reputed national institutions.

(e) The data collected under COMAPS programme over the years have been compiled and organized into a database. Databases for Sandheads, Hooghly estuary, Saptamukhi, Subarnarekha, Digha, Haldia Port, Diamond harbor, Port Blair, Andaman & Nicobar Islands were completed. GIS based database on marine pollution was completed for Kochi, Vishakhapatnam, Koodankulam and Veraval. These data are provided to the State Pollution Control Boards, who make use of the information to take remedial measures

Details of metadata of COMAPS programs and findings are as detailed below:

Platform/ Sensor	Parameters	Locations	Frequency	Mode of reception	Availability	Accessibility	Remarks
Seawater Quality parameters	dissolved oxygen (DO), nutrients, pH, Biological Oxygen Demand (BOD), plankton, benthos and pathogenic bacteria	20 locations Vadinar, Veraval, Hazira, Thane (Mumbai), Worli, Ratnagiri, Malvan, Mandovi, Mangalore, Kochi, Kavaratti, Sandheads, Hooghly, Paradip, Visakhapatna m, Kakinada Ennore (Chennai), Pondicherry, Tuticorin, Port Blair	1/2/3/4 time in a year	Delayed mode	1992-2010 83 stations 2010 - onward 20 locations	Registered access through ODIS with visualisation and download options	Through INCOIS- ESSO

Findings of data:

A. 2011- 2012 Year:

1. Gujarat (Vadinar, Veraval, Hazira/Tapi): Along Gujarat coast, monitoring was carried out at Vadinar (Apr'11, Jan'12), Veraval (Jan'11, Mar'11, Sep'11 and Jan'12) and Hazira/Tapi estuary (May'11, Aug'11, Dec'11). Water quality of Vadinar was observed to be good with normal values of DO (6-8mg/l) and nutrients. Water quality of Veraval harbor continued to be degraded with low DO, high nutrients and high BOD due to discharge like sewage, waste from fish processing industries and also due to poor flushing. However coastal waters off Veraval were observed to be normal. Water quality of Tapi Estuary shows high nutrients and low DO in upper estuary, while normal DO and nutrients were high in middle and lower estuaries, indicating that the estuary is in stress condition. However, in monsoon, though nutrients were high in estuary, DO was normal (6-7mg/l), indicating flushing due to rainfall. DO was normal and nutrients were high off Hazira indicating contamination due to industrial and domestic wastes received through estuary.

2. Maharashtra (Thane creek/Worli, Ratnagiri and Malvan): Water quality of Mumbai/Thane creek (Apr'11, Sep'11, Jan'12 and Mar'12), Worli (Sep'11, Jan'12), Ratnagiri (Oct'11 and Jan'12 and Mar'12), Malvan (Sep'11, Jan'12 and Mar'12). Water quality of Thane creek was observed with lowest DO with High level of nutrients (NO₃: 20–80 μmol/l), indicate the high organic discharges. Water quality in lower Thane creek and off Mumbai, Ratnagiri and Malvan showed normal DO and moderate levels of nutrients. At Worli, all the water quality parameters were in the normal range and comparable with coastal area except increase in NH₄⁺-N suggesting the impact of outfall release.

3. Goa (Mandovi): Water quality adjacent of Mandovi river (Oct.'11, Mar'12, Dec'12) was **observed** to be normal level of DO (4–6mg/L), nutrients and SFLO (0.06–118 CFU/ml). In general, coastal water quality around this coast was observed to be good.

4. Karnataka (Mangalore): Water quality of Mangalore (Dec'11, Mar'12) shows the normal **range** DO (4–6 mg/l) and nutrients. Moderate incidence of pathogenic bacteria (SFLO: 0-2700 CFU/ml) indicates contamination due to domestic sewage discharge.

5. Kerala (Kochi): Water quality of Kochi (May'11, Nov'11, Mar'12) was observed to be good with normal DO (3–7 mg/l) and nutrients (nitrate: 1.6-22 μ mol/l). Significant levels of pathogenic bacteria (SFLO: 200-1520 CFU/ml) indicate influence of domestic wastes.

6. Lakshadweep (Kavaratti): Water quality of Kavaratti (May'11, Dec'11) was observed to be good with normal levels of DO and nutrients.

7. West Bengal (Sandheads, Hoogly estuary): Water quality of Sandheads and Hooghly (Apr'11, Jul'11, Oct'11, Mar'12) was observed to be good with high levels of DO (6-8 mg/l). Moderate levels of nitrate were observed (6-23 μ mol/l). High levels of pathogenic bacteria (SFLO: 25–64500 CFU/ml) indicate contamination due to domestic sewage.

8. Orissa (Paradip): Water quality of Paradip (Apr'11, Jul'11, Oct'11, Mar'12) was observed to be good with high DO values (6 – 8 mg/l) and normal range of nutrients. Levels of phosphate at Paradip were high indicating contamination, possibly from industrial sources. High levels of pathogenic bacteria (SFLO:10-21000 CFU/ml) indicate contamination due to domestic sewage.

9. Andhra Pradesh (Visakhapatnam, Kakinada): Water quality of Visakhapatnam and Kakinada (Jul'11, Oct'11, Jan'12) was observed to be good with normal levels of DO and BOD (DO:3-7 mg/l, BOD: 0.1-3.6 mg/l), indicating less pollution stress. Moderate levels of nutrients both at Visakhapatnam (NO_3 : 10-28 μ mol/l) and Kakinada (NO_3 : 4-50 μ mol/l) indicate terrestrial organic load. In general, water quality off Visakhapatnam and Kakinada were observed to be within normal range indicating fairly good water quality.

10. Tamil Nadu (Ennore, Tuticorin) and Puducherry: Water quality of Ennore, Puducherry and Tuticorin (Jun'11, Sep'11, Dec'11, Mar'12) was observed to be good with normal range of DO (2–6 mg/L) and nutrients (NO_3 : 3-12 μ mol/l). However, significantly high levels of pathogenic bacteria were observed at many shore locations, indicating contamination due to domestic sewage.

11. Andaman and Nicobar islands: Water quality of Port Blair (Feb'11, May'11, Aug'11 and Nov'11) was observed to be good with normal levels of DO (3–9mg/L) and nutrients. However increase in levels of pathogenic bacteria at Junglighat, Phoenix bay during Aug'11, (SFLO: 38–420 CFU/ml) was observed. In general, coastal water quality of Port Blair was observed to be good.

B. 2012-2013 Year:

1. Gujarat (Vadinar, Veraval and Hazira/Tapi): Water quality of Vadinar (Apr'12, Aug'12) was observed to be good with normal values of DO (5-8mg/l) and nutrients. Low DO and high nutrients were observed in Veraval harbor (Sep'12). Water quality of Tapi Estuary (Apr'12, Oct'12) shows moderate level of nutrients and DO, indicating that the estuary was in stress condition.

2. Maharashtra (Thane creek/Worli, Ratnagiri and Malvan): Water quality of Thane, Worli (Sep'12, Jan'13) was observed to be moderate with high levels of nutrients (NO_3 : 9–44 μ mol/l) and normal DO. However water quality of Ratnagiri and Malvan (Sep/Oct'12, Jan'13) was observed to be good with normal values of DO (5-8 mg/l) and nutrients.

3. Goa (Mandovi): Water quality of Mandovi (Dec'13) was observed to be good with normal level of DO (4–6mg/l), nutrients and SFLO (ND–12 CFU/ml).

4. Karnataka (Mangalore): Water quality of Mangalore (May'12, Sep'12, Nov'12 Dec'13, Feb'13) was observed to be good with normal range of DO (3–7 mg/l) and nutrients (4-23 μ mol/l). High incidence of pathogenic bacteria (SFLO: NG-3540 CFU/ml) indicates contamination due to domestic sewage and river discharge.

5. Kerala (Kochi): Water quality of Kochi (May'12, Sep'12, Nov'12, Mar'13) was observed to be moderate with moderate DO (2–7 mg/l) and nutrients (nitrate: 9-33 µmol/l). High levels of pathogenic bacteria (SFLO: NG-16000 CFU/ml) indicate contamination due to domestic wastes.

6. Lakshadweep (Kavaratti): Water quality of Kavaratti (Apr'12, Sep'12, Jan'13) was observed to be good with normal range of DO (4–8 mg/l) and nutrients. However, low levels of pathogenic bacteria (SFLO: NG-760 CFU/ml) indicate minor contamination due to domestic sewage.

7. West Bengal (Sandheads, Hooghly estuary): Water quality of Sandheads and Hooghly estuary (Jul'12, Dec'12, Mar'13) was observed to be good with high levels of DO (6-8 mg/l) and moderate levels of nutrients. However high levels of pathogenic bacteria at Sandheads (SFLO: 15–13500 CFU/ml) indicate contamination due to domestic sewage. At Hooghly estuary, levels of bacteria were relatively less (SFLO: 5-215 CFU/ml).

8. Orissa (Paradip): Water quality of Paradip (Jul'12, Dec'12, Mar'13) was observed to be normal with high DO values (6–7 mg/l) and normal range of nutrients. However, moderate levels of pathogenic bacteria (SFLO: 5-1700 CFU/ml) indicate contamination due to domestic sewage.

9. Andhra Pradesh (Visakhapatnam, Kakinada): Water quality of Visakhapatnam and Kakinada (Jun'12) was observed to be moderate with high nutrients, indicating terrestrial organic load. However, water quality (DO and Nutrients) off Visakhapatnam and Kakinada were observed to be within normal range indicating fairly good water quality.

10. Tamil Nadu (Ennore, Tuticorin) and Puducherry: Water quality of Ennore, Puducherry and Tuticorin (May/Jun'12, Sep'12, Dec'12, Mar'13) was observed to be moderate with normal ranges of DO and nutrients. However, significantly high levels of pathogenic bacteria were observed at many shore locations, indicating contamination due to domestic sewage.

11. Andaman and Nicobar: Water quality of Port Blair (May'12, Nov'12, Feb'13) was observed to be good with normal levels of DO (5–7mg/L) with low levels of nutrients and pathogenic bacteria.

C. 2013-2014 Year:

1. Gujarat (Veraval and Hazira/Tapi): Water quality of Veraval (Jan'14, Mar'14) was observed to be poor with low values of DO (0-7mg/l) and high levels of nutrients. Water quality of Tapi Estuary (Jan'14) shows high level of nutrients and low level of DO, indicating that the estuary was in stress condition.

2. Maharashtra (Thane creek/Worli, Ratnagiri and Malvan): Water quality of Thane, Worli (Jan'14, Mar'14) was observed to be moderate with high levels of nutrients (NO₃: 9–124 µmol/l) and normal DO (2-6 mg/l). However water quality of Ratnagiri and Malvan (Jan/Feb'14, Mar'14) was observed to be good with normal values of DO (5-7mg/l) and nitrate (1-6 µmol/l).

3. Karnataka (Mangalore): Water quality at Mangalore (May'13, Feb'14) was observed to be good with normal levels of DO (3–8 mg/l) and nutrients (nitrate: 5-12 µmol/l). High occurrence of pathogenic bacteria (SFLO: NG-8400 CFU/ml) indicates contamination due to domestic sewage discharge.

4. Kerala (Kochi): Water quality of Kochi (Dec'13) was observed to be moderate with levels of DO (4–8 mg/l) and nutrients (nitrate: 2-10 µmol/l). High levels of pathogenic bacteria (SFLO: 270-23500 CFU/ml) indicate contamination due to domestic wastes.

5. Lakshadweep (Kavaratti): At Kavaratti (May'13, Oct'13, Mar'14), DO (3–7 mg/l) and nutrients were in normal range. However, high levels of pathogenic bacteria (SFLO: NG-13600 CFU/ml) indicate contamination due to domestic wastes.

6. West Bengal (Sandheads): At Sandheads (Aug'13), high levels of DO (7-9 mg/l) and moderate levels of nutrients (nitrate: 1-5 µmol/l) indicate good water quality. However, high levels of pathogenic bacteria (SFLO: 250–15000 CFU/ml) indicate contamination due to domestic sewage.

7. Orissa (Paradip) : At Paradip (Apr'13, Jul'13), DO (6–8 mg/l) and nutrients were in normal range. However, moderate levels of pathogenic bacteria (SFLO: 25-4000 CFU/ml) indicate contamination due to domestic sewage.

8. Andhra Pradesh (Visakhapatnam): Water quality of Vizag (Jan'14) was good with normal levels of DO (7mg/l) and moderate levels of nutrients.

9. Andaman and Nicobar: Coastal water quality at Port Blair (May'13, Aug'13, Feb'14) was observed to be good with normal levels of DO (5–7mg/L) and nutrients. Low levels of pathogenic bacteria were observed (SFLO: NG-120 CFU/ml).

D 2014-2015 Year:

1. Gujarat (Vadinar and Hazira/Tapi): Water quality of Vadinar (Apr'14) was observed to be good with high values of DO (6-7mg/l) with low levels of nutrients and pathogenic bacteria. Water quality of Tapi Estuary (May'14) shows moderate level of DO, nutrients and pathogenic bacteria indicating that the estuary was in stress condition.

2. Kerala (Kochi): Water quality of Kochi (Apr'14) was observed with normal DO (5–7 mg/l), nutrients (nitrate: 1-10 µmol/l). High levels of pathogenic bacteria (SFLO: 0-7600 CFU/ml) indicate contamination due to domestic wastes.

3. Andhra Pradesh (Kakinada): At Kakinada (Apr'14) water quality was observed to be good with normal levels of DO (5-7mg/l) and moderate levels of nutrients.

4. Tamil Nadu (Ennore, Tuticorin) and Puducherry: Water quality of Ennore, Puducherry and Tuticorin (Apr'14) was observed to be moderate with normal ranges of DO and nutrients. However, significantly high levels of pathogenic bacteria (SFLO: 230-2500 CFU/ml) were observed at many shore locations, indicating contamination due to domestic sewage.

5. Andaman and Nicobar islands: Coastal water quality at Port Blair (May'14) was observed to be good with normal levels of DO (5–8mg/L) and nutrients. Low levels of pathogenic bacteria were observed (SFLO: 6-177 CFU/ml).
