

Internship
at
Public Health Engineering Department, Nagaur

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1) **INTRODUCTION:**

In India, the ratio of people who have access to safe water has improved from 72 percent in 1990 to 88 percent in 2008. Steady progress has been made toward the objective of providing sustainable access to drinking water throughout India. However, development of water source and water supply facilities has not kept up with the rise in water demand associated with the population growth and economic development. This results in excess dependency on groundwater, and discontinuous and unstable water supply is a constant challenge. Furthermore, in some areas, the groundwater contains substances harmful to the human body such as fluoride and arsenic, greatly exceeding the standard provided by the World Health Organization (WHO) Guidelines for drinking water quality.

Located in Northwestern India, State of Rajasthan has an annual rainfall of 531 millimeters, less than the national average in India (1,200 millimeters). The groundwater has been over exploited due to the limited availability of surface water, resulting in a chronic ground water shortage.

In Nagaur District (population: approximately 3.31 million) of State of Rajasthan, the main source of water supply is groundwater which invariably does not conform to WHO standards as it contains excess of fluoride. Despite its unsuitability, residents are forced to use the groundwater for drinking due to a lack of other water resources, resulting in problems such as dental and skeletal fluorosis among them. A survey in 2016 found that approximately 34 percent of children in the district between the ages of six and fourteen had fluorosis. About 80 percent of the population in the district does not have access to safe water, placing the district as having one of the most dire water shortages in the state.

BACKGROUND

- (i) Nagaur is a centrally located district of Rajasthan State of India which is a part of great Indian Thar Desert. In the district there is serious situation of depletion of ground water aquifer and deterioration in quality in the Nagaur district. GoR decided to take up Phase – II Project “The Rajasthan Rural water Supply and Fluorosis Mitigation Project (Nagaur)” under as an urgent priority to provide sustainable drinking water supply to remaining 986 villages and 7 urban towns of Nagaur District under JICA Finance.
- (ii) Public Health Engineering Department Government of Rajasthan has constituted a separate and independent “Project Management Cell (PMC): Headed by Chief Engineer of the Department. The Fluorosis Mitigation Project Unit (FMPU) will work under PMU, headed by Joint Director (Medical).
- (iii) As per the condition of JICA assisted Rajasthan Rural Water Supply and Fluorosis Mitigation Project – Nagaur, the implementation of the software part of the work of Fluorosis Mitigation Project would be carried out through hiring of NGO.
- (iv) The Objective of the Assignment: To study status of Dental Fluorosis in various age groups in six blocks of Nagaur district, Rajasthan.

2.0 SCOPE OF WORK UNDER FLUOROSIS MITIGATION PROGRAMME:

The scope of the work for carrying out the remaining activities of the Fluorosis Mitigation Programme through:

- (a) School approach
- (b) Community approach
- (c) Hospital based approaches

In 986 villages and 7 blocks in Nagaur district, Rajasthan.

2.1 SCOPE OF WORK FOR SCHOOL APPROACH

1. Developing capacity of (i) Diet Counsellors and (ii) Health Assistants to conduct survey in schools for prevalence of anaemia (low Haemoglobin) and fluoride toxicity effects among the students.
2. Developing IEC materials viz. Pamphlets, Booklets, Posters, Wall Hangings etc. for display in school corridors, library and classrooms besides distribution to the school children besides necessary pre-coded proforma for recording school data.
3. Screening the school students from all upper primary, secondary and senior secondary schools (both Govt. & Private) for prevalence of Dental Fluorosis (DF) and Bone Deformity (BD) and prepare a list of students affected by DF & BD.
4. Screening the DF & BD affected students from for prevalence of anaemia by checking check Haemoglobin (Hb) level through using portable digital Haemoglobinometer in the schools.
5. Collecting urine samples from the anaemic students and school drinking samples and handed over to the nearest Fluorosis Diagnostic Laboratories (FDLs) on the same day for fluoride testing.
6. Conducting group counselling in the schools for the Parents, Teachers and Students by the Diet Counsellors – how to eliminate toxic fluoride from the body and improve Hb by practicing interventions.
7. Conducting impact assessments (3 times) among students after practicing interventions at certain specified intervals by re-checking Hb and re-testing of urine fluoride level of the students.
8. To laminate veneering of severely DF affected students (Approx. 100 students) on pilot basis.

2.2 SCOPE OF WORK FOR COMMUNITY APPROACH

1. Developing capacity of PRI members and officials in the line Departments regarding Fluorosis Prevention & Control measures.
2. Developing IEC materials for display in gram panchayat offices, community centres, PRI offices, samudaic bhawan and other important places.
3. Developing capacity of (i) Diet Counsellors and (ii) Field Coordinators to conduct house to house survey in the community.
4. Conducting house to house health survey (100% in rural areas and 10% in urban areas) for the assessment of prevalence of Fluorosis among the community, living in the project area in a systematic manner through adequately trained personnel.
5. Organizing Focused Group Discussions (FGD) for dissemination of survey findings and creating mass awareness program on Fluorosis mitigation through Street plays, puppet shows, street marches, slogan shouting etc.
6. Conducting Impact Assessments (3 times) after practicing interventions at certain specified intervals using tablet computers (android technology and cloud networking).

2.3 SCOPE OF WORK FOR HOSPITAL APPROACH

1. Five (5) Fluorosis Diagnosis Laboratories (FDLs) are established and made functional in the following Govt. Hospitals of Nagaur district viz.
 - (i) District Hospital – Nagaur;
 - (ii) Sub-Divisional Hospital – Deedwana;
 - (iii) Govt. Hospital - Kuchaman;
 - (iv) Community Health Centre (CHC) – Jayal
 - (v) Community health Centre (CHC) – Degana as per the designs provided by PMC, PHED.

2. Laboratory Equipment, Chemicals / Reagents and other accessories for fluoride level in urine, blood and water samples and (ii) checking of Haemoglobin (Hb) of the patients besides supply of furniture for 5 FDLs are procured and provided.
3. To supply the required manpower for running the 5 FDLs.
4. (i) Laboratory Technicians, (ii) Diet Counsellors, (iii) Continuing Medical Education (CME) for Doctors (both Govt. & Private) are provide, working in Nagaur district.
5. Development, printing & dissemination of Information, Education & Communication (IEC) materials viz. Pamphlets, Booklets, Posters, Wall Hangings etc. for hospitals / patients as per requirement besides printing of adequate copies of pre-coded performa for OPDs.
6. Diet editing & Diet counselling to the Fluorosis affected patients through trained Diet Counsellors.
7. Monitoring Fluorosis affected patients till recovery.
8. Testing urine and water samples collected from schools / field and to share the data to the concern authority / Department.

3.0 IMPLEMENTATION METHODOLOGIES OF FMP FOR ACTIVITIES IN DIFFERENT APPROACHES:

The implementation methodologies /procedures of FMP works shall be as follows:

3.1 SCHOOL APPROACH (Focus is on 4 activities)

Activity 1: Development, designing, printing and dissemination of Communication materials and survey forms:

- (i) Development & designing of the communication materials by IEC Expert with the technical support from PMSC.
- (ii) Adequate number of copies of IEC materials & survey are printed.
- (iii) Dissemination of the IEC materials to the identified places (Schools / Education Dept. etc.).

Activity 2: Screening of students

- (i) The NGO staff (already engaged in CDS packages under RRWS&FMP) would screen the students (3,00,000 numbers) based on the symptoms of Dental Fluorosis (DF) and Bone Deformity (BD) and prepared a list of students for further health checking.
- (i) The Haemoglobin (Hb) level in blood of DF and BD affected students shall be checked by the Health Assistant (Agency staff) using portable Haemoglobin meter. Training of the Health Assistants (Agency staff) shall be provided by Experts (PMSC).
- (ii) The urine samples of the anaemic students (low of Hb) shall be collected by the Field Assistants (Agency staff) and handed over to the respective FDL(under Hospital Approach) on the same day. The Agency also collect and deposit school drinking water samples (2500 Nos.) to the FDLs.
- (iii) The Laboratory Technicians of the FDLs shall carryout the testing as per the standard protocol and communicated the test results to PMC/PMSC for sharing with the students & school authority. (Necessary funds for testing samples viz. consumables & reagents would be provided to the respective FDLs).

Activity 3: Prevention & Control

- (i) Agency shall organize Parents -Teachers Meetings (PTMs) in all schools in consultation with District / Block Education Officer.
- (ii) Diet Counsellors (Agency staff) shall provide diet editing & diet counselling to the parents along with their wards and share the outcome of the test results of the school authority.

Activity 4: Impact Assessment

- (i) First impact assessment (50% of students) after one month of practising interventions shall be conducted by Agency staff using the survey forms. During impact

assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.

- (ii) Second impact assessment (25% of the students) after three month of practising interventions shall be conducted by Agency staff using the survey forms. During impact assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.
- (iii) Third impact assessment (15% of the students) after eight month of practising interventions shall be conducted by Agency staff using the survey forms. During impact assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.

3.2 COMMUNITY APPROACH (Focus is on 6 activities)

Activity 1: Capacity building of Panchayati Raj Institution (PRI) members

- (i) The Master trainers shall be identified by the Agency staff and they would be trained by PMSC Experts.
- (ii) Capacity building of 1000 Panchayati Raj Institution (PRI) members by the Agency.
- (iii) Identification of the participants through Zilla Parishad / Block Panchayat, logistical and other related arrangements i.e. fixing venue, food, and stationaries shall be arranged by Agency.

Activity 2: Development and dissemination of communication materials (in Hindi & English)

- (i) The Agency with the technical guidance of Experts shall develop all the communication materials, which shall be reviewed by Experts & approved by the competent authority.
- (ii) Adequate number of copies (IEC materials) shall be printed as per specifications and distributed to the identified places for the dissemination through Agency staff

Activity 3: Development of software (MIS) for conducting house to house survey using android based technology.

- (i) The MIS software shall be developed by the Agency with technical support of PMSC.
- (ii) The house to house survey will be done by the Agency with the help of approved format.

Activity 4: Conducting house to house survey.

- (i) The Agency shall conduct the house to house survey (5.0 lakh households, which includes baseline as well as three impact assessments and terminal evaluations) in rural areas (100 % households) and urban areas (10% households) through trained personnel using tablet computers (android technology and cloud networking).

Activity 5: Sharing the survey findings

- (i) Diet Counsellors (Agency staff) shall organize the Focused Group Discussions (FGD) in the villages and places shall be fixed in consultation with PRIs.
- (ii) Necessary background materials for organizing the FDG shall be provided by Agency.
- (iii) Diet Counsellors shall share the outcome of the survey results to the public during the FDG and also discuss the prevention & control measures and the final outcome.

Activity 6: Impact Assessment

- (i) First impact assessment (50% of households) after one month of practising interventions shall be conducted by Agency staff using the android based technology.
- (ii) Second impact assessment (25% of households) after three month of practising interventions shall be conducted by Agency staff using the android based technology.
- (iii) Third impact assessment (15% of households) after eight month of practising interventions shall be conducted by Agency staff using the Android based technology

3.3 Hospital Approach (Focus is on 6 activities)

Activity1: Establishment of 5 Fluorosis Diagnostic Laboratories (FDLs):

- (i) To establish Fluorosis Diagnostic Laboratories (FDLs) 5 numbers in 5 Govt. hospitals as mentioned below:
 - (a) Construction of 2 FDLs at (i) Community Health Centre-Jayal and (ii) Community Health Centre-Degana as per specifications.
 - (b) Renovation / minor repair work for 3 FDLs as per requirement at (i) District Hospital - Nagaur, (ii) Sub-Divisional Hospital – Deedwana and (iii) Govt. Hospital at Kuchaman. [Civil work for 2 FDLs at Deedwana & Kuchaman is incomplete, construction work of Nagaur FDL completed but not made functional].

Activity 2: Development, designing, printing and dissemination of IEC materials.

- (i) Development & designing of the IEC materials would be prepared by IEC Expert (Agency staff) with the technical guidance of PMSC.
- (ii) Adequate number of copies shall be printed and distributed to the identified places / patients for the dissemination besides pre-coded proforma for recording patient's history in the OPDs.

Activity 3: Procurement of laboratory equipment and other Reagents / Chemicals for 5 FDLs.

- (i) To procure necessary equipment & other essential accessories, reagents / chemicals miscellaneous laboratory items for fluoride testing in blood, urine and water samples and for checking Haemoglobin shall be procured by the Agency. The list of equipment

for testing fluoride and checking Haemoglobin (Hb) are already provided in original FMP plan.

Activity 4: Capacity building of Laboratory Technicians, Diet Counsellors, ASHAs, ANMs and CME for Doctors

- (ii) Capacity building of Laboratory Technicians (1Lab Technician per FDL x 5 FDLs = 5 Lab Technicians - 10 days duration) and Diet Counsellors (1 Diet Counsellor per FDL x 5 FDLs = 5 Diet Counsellors - 5 days duration) shall be organized at Nagaur FDL and in a reputed institute respectively with the technical guidance of PMSC.
- (iii) Capacity building of ASHAs (2500 nos.) and ANMs (700 nos.) {half- day duration} are being conducted by PMSC / PMC in batches at PHCs / CHCs located in various Blocks.
- (iv) Continuing Medical Education (CME) for Doctors (350 numbers) shall be organized at Nagaur. CME for doctors in hospitals where FDLs are located shall be for 2 days duration; for other Government & private hospital doctors shall be for 1day duration. The invitation to Resource Persons, call letters for the participants through Medical & Health Department, necessary logistic arrangement including fixing the venue, honorarium for Resource persons, incentives to participants, procurement of background materials, refreshments shall be taken care by Agency.

Activity 5: Patient Management

- (i) The patients attending the OPDs, history of the complaints retrieved, shall be examined by the trained doctors and the suspected cases shall be referred to the FDL for confirmation of the Fluorosis disease.

- (ii) Fluorosis confirmation testing shall be done in the 5 FDLs of the respective hospitals by trained Lab Technicians only.
- (iii) Patients shall collect the test results and show it to the doctor.
- (iv) If fluorosis is confirmed, doctor shall advise the patient to visit the FDL again for practising interventions.
- (v) Necessary diet editing and diet counselling shall be provided by the Diet Counsellor in the FDLs.

Activity 6: Operation & Maintenance of the FDLs including sample testing:

- (i) Requisite Performa for recording patient's history, Biochemical test reports, referral cards etc. to be printed as per requirement by the Agency.
- (ii) The FDLs should have stock of required chemicals and other related items at least for 3 months.

4. IMPLEMENTATION SCHEDULE (40 MONTHS)

The implementation schedule for the balance FMP works for all the three approach activities shall be 40 months.

The following implementation framework is formed:

- (i) **Project Management Cell (PMC), PHED:** The Chief Engineer, PMC, RRWS&FMP will be the Nodal Officer for smooth functioning and implementation of the project and he will communicate & coordinate with JICA and District Collector, Nagaur. One Joint Director / Deputy Joint Director, from Health Dept., GoR would be deputed to PHED for overall supervision of the FMP activities.
- (ii) **Project Monitoring & Supervision Consultants (PMSC):** Necessary technical support for developing background materials, IEC materials, monitoring & supervision, reviewing & recommendation of documents shall be done by PMSC.