

## 2. RECOMMENDATIONS FOR ACTION

### 2.1 Preamble

Taking cognizance of the following facts:

- (1) Arsenic in drinking water is a major public health hazard and should be dealt with as an emergency situation;
- (2) "Affected people" are those who are showing clinical manifestations, and

- (3) "People at risk" are those who are drinking arsenic contaminated water and do not necessarily show symptoms of arsenic poisoning.

Relief measures should be provided immediately through:

- (1) The supply of safe drinking water to all those affected and/or at risk because of current exposure, and
- (2) Treatment of patients suffering from arsenic poisoning.

Simultaneously, actions must also be initiated for developing long-term measures based on the scientific assessment of factors contributing to the arsenic problem and the identification of appropriate options for its control.

The implementation of both immediate and long-term measures should be decentralized as much as possible with the active involvement of people, affected or at risk, and of local community-based organizations.

## 2.2 Objective I – Immediate Relief Measures

### ***Recommendation 1 : Identify patients and/or populations at risk***

Organize the identification of patients as well as of the surrounding highly-exposed populations.

Arsenic task forces of adequate strength need to be created to rapidly identify patients with arsenic poisoning. The diagnosis of patients will be made by detecting pigmentation, de-pigmentation or keratosis. The goal will be to identify all the patients in one year.

When the patients have been identified, the surrounding wells should be tested in order to ensure safe water for consumers and to prevent exposure to those who, so far, do not have symptoms of disease.

Special effort should be made to identify arsenic exposure in children and in pregnant and lactating mothers.

***Recommendation 2 : Provide symptomatic treatment***

The immediate action for providing symptomatic treatment should include taking care of skin problems, and providing vitamins and nutritious diet. Serious problems should be referred to health centres or regional hospitals.

***Recommendation 3 : Provide medical care at health centres for seriously-affected patients***

Equipment and medicines must be available at the health centres for managing the seriously-affected patients. Support needs to be made available for this purpose from NGOs and international agencies (e.g. WHO, UNICEF and the World Bank).

***Recommendation 4 : Strengthen diagnostic facilities at regional level***

Many cases of arsenic poisoning are easy to diagnose. In more complicated cases, however, laboratory facilities will need to be improved at the regional level by providing such equipment as atomic absorption spectrophotometer so as to determine the arsenic levels in water as well as human tissues. For this, funds need to be made available from international agencies (e.g. WHO, UNICEF, UNDP and the World Bank).

***Recommendation 5 : Provide safe drinking water***

Immediate relief on emergency basis should be provided through the supply of safe drinking water (e.g. using tankers and/or introducing domestic treatment of water using appropriate methods of arsenic removal). Intensive information, education and communication (IEC) activities should be undertaken prior to

introducing these methods and concurrent monitoring of the effectiveness of these measures should be initiated.

In selecting the source of supply, the following order of preference may be followed :

- (1) Tubewells proven to be safe (use piped supply or tankers for distribution, wherever necessary).
- (2) Surface waters (e.g. ponds, rivers, canals) with appropriate and adequate treatment.
- (3) Rain-water harvesting and storage, using locally appropriate and hygienic methods for domestic and community supply.

Organize rapid assessment of water supplies based on all available water quality data and on cases of confirmed or suspected arseniasis so as to identify the "hot spots" needing immediate supply of safe water. Sources with arsenic levels above 0.05 mg/l should be clearly identified for priority action (sources with the highest concentration receiving highest priority). All unsafe sources should be marked and alternate sources of safe water arranged for the community. Particular attention should be paid to patients who should be advised to stop using the contaminated water source.

The arsenic-affected districts will require surveys of the existing water supply for ascertaining the levels of arsenic. The surveys should involve the following two steps :

- (1) Comprehensive site investigations of all community and private sources using appropriate and reliable field kits to find the presence or absence of arsenic. Irrigation sources should also be evaluated for reference and comparative information, and
- (2) Laboratory analysis of samples from site investigations so as to establish the exact arsenic levels of field-tested sources.

All of the field data should be compiled, and analyzed and entered into a national data bank. In addition to water quality data,

hydrogeological information should also be compiled in order to identify the arsenic-containing and arsenic-free aquifers. All this information should be entered into the national arsenic data bank.

***Recommendation 6 : Build capacity through training***

Some patients may develop serious complications due to arsenic poisoning but the untrained health personnel may not recognize these for many years. Therefore, in areas having arsenic problems, training should be organized for physicians, medical practitioners and other public health staff of both governmental and nongovernmental bodies for rapid case identification and management.

The key persons in each 'affected' and/or 'at risk' district should be identified as the district-level key trainers (DLKTs) and should be so trained. The DLKTs may include medical personnel, district planning officers, executive engineers, hydrogeologists, college teachers, and NGOs, etc. and should, in turn, train grass roots workers at local level.

Appropriate and comprehensive training programmes with curricula and course materials should be developed by the recognized national and regional training institutions.

***Recommendation 7 : Build awareness through mass communication***

Intensive awareness-raising activities should be undertaken immediately with regard to the negative health effects of drinking arsenic-contaminated water in order to introduce preventive measures in cooperation with local bodies, NGOs and others.

All avenues for increasing the awareness in this matter should be utilized, including the mass media and communication facilities of government/ nongovernmental organization(s). Specific posters, leaflets and other communication materials should be developed for this purpose.

***Recommendation 8 : Implement comprehensive and integrated studies***

The activities recommended above should be undertaken in an integrated manner combining the medical and water supply interventions at the district level in order to make the entire district population free from arsenic risks. Comprehensive studies should be initiated in one district, each in Bangladesh and India, with the support of UNICEF, UNDP, the World Bank, WHO and other donors in order to demonstrate the effectiveness of implementing these recommendations.

## 2.3 Objective II – Long-Term Measures

***Recommendation 9 : Strengthen inter-ministerial coordination and cooperation and establish expert groups***

In order to strengthen national level interministerial coordination for addressing problems of arsenic contamination of drinking water, a national apex committee should be formed, or if in existence, be modified, as needed, to effectively involve members of the government and public interest groups for jointly assisting in the development of policies and in the implementation of long-term strategies.

Expert groups should be established for identifying and addressing specific technical and social issues, as required.

***Recommendation 10 : Establish national database on arsenic in drinking water and resulting arsenic toxicity***

Document the extent of the problem by collecting all the requisite information generated by the investigation projects relating to drinking water supply and health problems and evaluate the data.

Based on such an evaluation, strengthen the national database on arsenic in drinking water. Establish a comprehensive management information system (MIS) to facilitate monitoring and better planning and implementation of programmes.

The data generated by the rapid case identification programme should also be stored and analysed centrally at an appropriate national institution having computer facilities and should form an integral part of the national database and MIS.

***Recommendation 11 : Review existing arsenic removal technologies and evaluate their efficiency***

A number of domestic and community water treatment methods have been developed to remove arsenic in drinking water. A review and evaluation of the arsenic removal treatment technologies and their efficiency should be undertaken with WHO support.

***Recommendation 12 : Prepare detailed site-specific project proposals***

Prepare detailed site-specific project proposals taking into account the techno-economic feasibility, in order to facilitate the mobilization of resources and donor support. Efforts should also be made to mobilize support from the private sector and NGOs.

***Recommendation 13 : Identify training needs***

Undertake situational analysis of training needs at different levels and establish appropriate mechanisms for capacity-building and institutional development. Include the subject of awareness of arsenic problems in the educational curricula of medical and public health schools. Continuous education of medical, engineering and laboratory staff should be ensured.

***Recommendation 14 : Establish appropriate institutional framework for water quality surveillance***

An institutional framework needs to be developed for regular water quality surveillance and control in the rural and peri-urban areas. A community-based approach dealing with the grass-roots should form an integral component of the programme.

***Recommendation 15 : Establish appropriate institutional framework for disease surveillance***

An institutional framework needs to be developed for regular surveillance and control of diseases arising out of arsenic poisoning.

Monitor the cases, identify the ongoing exposure and integrate the obtained data with the information available from the drinking water quality surveillance programme. A field kit for testing the presence of arsenic in urine needs to be developed. Monitor the participation of affected persons, PHC personnel, local self government personnel, and the urgent task force personnel. The information, education, and communication (IEC) activities should form an integral part of the disease surveillance and control programme in order that the general public and professional organizations are educated on the problem of arsenic in drinking water. Integrate the arsenic-related disease surveillance into other national disease surveillance programmes (e.g. National Cancer Surveillance) and activities relating to nutrition and reproductive health.

***Recommendation 16 : Establish national reference laboratories***

Establish national reference laboratories for undertaking the review and evaluation of analytical techniques adopted for the

determination of arsenic in drinking water. Also ensure that the quality of data is assured.

**Recommendation 17 : Support research projects**

The following research projects have been identified for support :

- (1) Assessment of the clinical manifestations of chronic arseniasis and the influence on them of various factors.
- (2) Efficacy of drugs and other means of treatment of arseniasis, including vitamins, nutritious diet, chelation agents and antioxidants.
- (3) Identification, through epidemiological studies, of the dose-response relationships among skin manifestations in order to determine the safe level of arsenic in drinking water.
- (4) Identification of factors which make populations susceptible to arseniasis, including nutrition.
- (5) Long-term cohort study of chronic arseniasis patients to ascertain the rates of progression of latent complications, including cancer.
- (6) Assessment of the efficacy of the recognized indigenous system of medicine and of homoeopathy in treating chronic arseniasis.
- (7) Assessment of the risk of exposure to arsenic in the environment and the food chain.
- (8) Epidemiological study of the affected populations to assess the morbidity patterns with special emphasis on the prevalence of arseniasis in children, pregnant women and lactating mothers.
- (9) Arsenic removal treatment technologies and their efficiency and cost-effectiveness.

***Recommendation 18 : Assess the financial requirements at national, provincial and local levels***

The implementation of the recommendations will require financial resources. Therefore, the financial requirements at the national, provincial and local levels will have to be assessed, keeping in view the broader perspective of a well-coordinated integrated package of health environment and engineering interventions using cost-effective and locally appropriate technologies and solutions.

***Recommendation 19 : Establish bilateral collaboration***

Establish bilateral collaboration between Bangladesh and India for the exchange of geological, chemical, hydrogeological, epidemiological and other technical information. Also establish collaborative visits and other activities of mutual interest.

The exchange of ideas, research data and results of arsenic containment activities should be fostered between governmental agencies, university institutions and research establishments of both countries (Bangladesh and India).

***Recommendation 20 : Establish international cooperation and collaboration***

In order to support the implementation of recommendations of this regional consultation, international cooperation and collaboration are felt to be essential. It is, therefore, recommended that international agencies such as UNICEF, WHO, UNDP and the World Bank, etc. as well as bilateral donors participate actively in the development of national programmes aimed at addressing this major public health hazard.