

MITIGATION OF FLUORIDE AND FLUOROSIS: CONCERNS AND ACTIONS

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Introduction:

Since the International Decade of Safe Drinking Water and Sanitation the major efforts was to focus on the development of affordable source development of ground water. The spot source development reduces the cost thus eliminating the treatment with an assumption that the ground water is primarily safe from any contamination. Recent discoveries of Arsenic in the ground water in Bangladesh and Eastern India and in many other similar geological structures around the world and presence of Fluoride in volcanic rock formations raised the question about the sustainable progress towards safe water for all. While provision of safe drinking water to the community without biological contaminants, remained the primary target for reduction of the water borne diseases, the permanent damage that are caused due to the presence of Fluoride and of many other toxic elements in underground water has given us the warning enough to focus on the quality and not merely on the quantity of the water. The International workshop on *Fluoride in drinking water: Strategies, Management and Mitigation* being held in the city of Bhopal, in the first year of the new millennium is very timely and possibly the first international meeting in this millennium to focus this important issue. To me it is a great pleasure to revisit this historical city since we launched with the support of you the Fluoride sub mission under the auspices of the Technology Mission. It is also significant that Honourable Sri Digvijay Singh, the Chief Minister of the State of Madhya Pradesh was not only an active supporter of the Water Mission but has now launched a series of

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technology missions under his leadership to tackle the basic issues touching the life of the people.

The management and mitigation issues of Fluoride were taken in a systematic fashion as the sub mission under the Technology Mission on safe drinking water launched in India by our beloved Late Prime Minister Sri Rajiv Gandhi in the year 1986. It is the first time in the whole world that such a step was taken to mitigate Fluorosis. The programme witnessed credible success. India was the pioneer to focus the attention of both the scientific, medical as well as engineering community to this problem, which was very much pushed under the carpet in many areas of the world. It is interesting to note here that the contributions made by other international partners like UNICEF, Netherlands Aid, DANIDA, KFW/GTZ and now DFID to this effort especially in Gujarat, Andhra Pradesh and Madhya Pradesh.

MISSION
MODEL

UNICEF specially supported the states to map out the fluoride endemic areas and also helped to develop the fluoride removal technology further beyond what was already developed as the Nalgonda technique. However, the Technology Mission played the most important role in networking between water supply and health agencies. Possibly in no other areas excepting in guineaworm eradication such collaboration exist that closely. Capacity building activities were promoted among professionals as well as among grass-root level functionaries. Water quality testing laboratory infrastructure and modern items of equipment and appropriate training for Water Analysts did receive very high priority among the various activities that were launched. Research and Development activities promoted in the Engineering and Health Sectors have also paid rich dividends.

Fluorosis
Cell.

A Fluorosis Control Cell was established under the Mission and was supported by the Government of India at the All India Institute of Medical Sciences (1987 - 1997) for co-ordinating the activities between the Water Supply and Health Departments of the 13 State Governments where excess fluoride and Fluorosis was then known to be endemic. The activities of the Water Mission were pursued with vigour and enthusiasm by all Scientific Institutions and Scientists in the country besides the State Water Supply

Agencies. In fact it is a global model now being promoted and followed in many countries.

The Strategy:

The simplest strategy for fluoride mitigation is to provide the population with fluoride free water. However, the availability of source and the cost is the main question. To the surprise of all, the almost total absence of information and knowledge even in the middle of the eighties in a population which can afford costly alternative the then uninformed medical professionals came up with *damaging surgery* solution which could not offer any remedies at all. The linkage between water and fluoride and dental or skeletal Fluorosis was not known even in educated community and the severe damage on the skeleton was unknown in general. Even in a population with severe health problems as a result of fluoride, the fluoride toothpaste was merrily marketed with a vigorous campaign till the mission took up the issue with the Health Ministry in the centre.

*Underground
water -*

The main task of the mission was not only to map out the endemic areas and identify the target population but also to create awareness of the pollution, educate on the household treatment and simple remedies. This coupled with permanent solutions of alternate source of water brought up the permanent solution. The importance of the rainwater harvesting in bringing in the low cost alternative cannot be ignored. The traditional structures of rainwater harvesting like step wells became infested with guineaworm. So at that time the message given to the population was to shift to underground water and then with the presence of toxic elements switching back to surface water was a difficult communication challenge. The success of Jhabua in guineaworm affected area and also promotion of water harvesting structure shows how an effective communication and education system can overcome such a hurdle.

The initially identified affected population of 25 million people in 13 states has now grown to a large figure of 66 million covering 17 states in India. The main endemic areas were confined at that stage to Gujarat, Andhra Pradesh, Rajasthan and part of Madhya

Pradesh but now high fluoride had been reported increasingly from Haryana, Punjab, Delhi, Karnataka, Maharashtra, Kerala, Jammu and Kashmir, West Bengal, Uttar Pradesh, Bihar, Orissa, Assam and Tamil Nadu. The effect of the high irrigation in part of Punjab and Haryana has not been fully studied as increasingly the fluoride content is increasing in that area

The Knowledge, Information and Communication Issues:

The Fluorosis Control Cell established by the Mission at the All India Institute of Medical Science, New Delhi, generated very valuable data on the prevalence of excess fluoride in water and Fluorosis. It was evident that Dental Fluorosis incidence in children ranged from 2% to 33% in Gujarat; Skeletal Fluorosis incidence ranged from 1% to 75% in certain areas in Gujarat. The third form of the disease i.e. Non-skeletal Fluorosis ranged from 25% - 75% of the population of the endemic districts of Haryana and Karnataka.

Extensive R & D activities carried out by the Fluorosis Control Cell, at AIIMS, led to the development of a scientific procedure which is simple, inexpensive and meaningful for early detection of fluoride poisoning among the community. This was one of the milestones achieved by the Water Mission as the disease could be identified before it appeared in its full-blown form crippling the individuals. The Fluorosis Mitigation was truly possible since these developments in the country. Fluorosis has no treatment or cure; but it can be easily prevented provided the ingestion of fluoride and its poisonous effects are detected early. The protocol / procedure developed in India is now a model for the rest of the world to follow.

Water Mission and Panchyati Raj:

India pioneered to look at the issues of rural drinking water supply and sanitation not as an engineering and delivery oriented activity but as an entry point to rural development, sustainable development and first step to the change in the quality of life recognising the

fundamental rights of people. Technology Missions were not strictly a technology programmes but societal missions. The missions and particularly the Water Mission was almost a movement with fullest participation of all national and regional laboratories, all departments and actions cutting across the ministries and above all the people themselves. This was a real experiment on integrated approach to development. The Mission received most hearty support from all political parties. However, in spite of that, the fact is that it remained a top down approach as the local decision making and operations were still centralised in the hand of the Public Health Engineering Departments. They were efficient in delivery but not certainly were for decentralisation and sustainability.

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With the Panchyati Raj Act and three tier constitutional institutions all other rural development activities were decentralised and yet the drinking water supply remained a strong hold of the central and state agencies. This neither brought the ownership feeling in the mind of the population nor they felt the sense of a responsibility and remained mere 'beneficiaries' and never the owner and caretaker. The failure of the large treatment plants either for desalination or for fluoride removal bears the testimony that even with 'free' supply the community will not have the sense of partnership. Now with a separate Water Supply department the divide is greater. The Central Government may reconsider to put the subject of rural water supply again under one umbrella of rural development. The present arrangement though helps to focus on the priority given to the subject also replaces the integrated rural development approach by a sectoral approach.

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Separate
w/ S.M.
not needed

The Scientists, Medical Institutions and Research Institution, which were the close collaborators of the mission also, need to continue to be the backbone of programmes providing the basic input and science to the approach and policies. A programme like Fluoride mitigation can not succeed without them in the team.

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Global Centre of Excellence for Fluorosis Mitigation:

The wealth of information and the expertise that the nation has in the Fluoride and Fluorosis Mitigation programme is commendable. The Fluorosis Research and Rural Development Foundation (FR & RDF) set-up in Delhi under the leadership of Prof. (Dr) A.K. Susheela as a Non-Governmental Organisation during 1997 upon closure of the Fluorosis Control Cell of the Mission has now emerged as a Global Consultation Centre. Bilateral and UN Agencies besides the Collaborative Council is drawing upon the resources of this NGO. UN Water Supply and Sanitation Collaborative Council recognises the Institute as a Global Centre of Excellence and the present Director Dr. A K Susheela has been also recently elected in Brazil Global Forum as the National Co-ordinator of the Vision 21 activities in India.

Vision 21 for India:

The UN Water Supply and Sanitation Collaborative Council with all the constituents from the grassroots level and up to the national governments and international agencies prepared the Vision 21 documents for the sector and presented to the Hague Second World Water Forum in March 2000. I am especially happy to mention here that both Sri Digvijay Singh and Sri C P Thakur were there to provide the required leadership and encouragement to the large Indian delegation in the forum. The forum warmly endorsed the Vision and also identified the high priority to be given to the much-neglected area of Sanitation and Hygiene. It was most satisfying to observe the integrated approach as presented by the participants from their varied background and experience to achieve maximum return out of water management for health and in economic terms. The priority was NOT merely on the 'safe' water but on the health, hygiene, and behavioural pattern of the users on sanitation.

Linking Water Supply, Sanitation and Poverty Reduction: A Vision in reality:

In recent years, a series of international consultations have brought to public attention a startling but unavoidable conclusion: a major part of humankind lives amidst immeasurable misery. Billions of the world's citizens live without access to hygiene, sanitation and water, and just as important, their lot will not be improved in the foreseeable future in the absence of a collective action and partnership at all levels. Very frequently also water is being mentioned as an entry point for poverty reduction in the speeches of many heads of the international agencies. However, though much lip service has been given to this subject in reality the concerted efforts that the globe had seen in the International Decade for Water during the eighties had withered away. We only hear that mere privatisation will solve all such problems. International agencies which took leadership role during the international decade slowly diluting their activities or moving away from the very fact and evidence that even now water borne diseases is the major cause for malnutrition and death of the children.

Jhabua However, the Vision 21 has given that call for a collective action at the ground level to use the Water Supply and Sanitation to change the life of an ordinary person in a rural or urban area. Clean water, clean immediate environment, better health and hygiene will not only improve the quality of life but also will improve energy and productivity. Study in guineaworm eradication has clearly shown the doubling in the agricultural productivity in Nigeria. The Jhabua experience in Madhya Pradesh deserves much better packaged message to the world. As that had been achieved by just regrouping and converging the existing government programmes, it does not attract much attention from the external support agencies, and these lessons should be learned and spread instead of attempting to create new laboratories and creating new models. I am glad that the State of Madhya Pradesh has been able to not only learning that lesson but also multiplying the same in other districts of the state.

Vision 21 in a global sense, tried to collate such lessons from the ground and capture the basic principles. It drew on accumulated experience of the water and sanitation sector,

particularly gained through the International Drinking Water Supply and Sanitation Decade (1981 - 1990), and the consensus reached over during the nineties. In the course of the Vision work, community groups and individuals contributed more than the institutions and agencies around the world have provided major contributions to this collective wisdom. The recent Gujarat Jal Disha initiative, the Technology Mission experiences through the late eighties and the recent Madhya Pradesh experience provided valuable input to the process.

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Iguacu
Forum

The endorsed Hague Vision 21 was further discussed in Iguacu Falls in Brazil during the Fifth World Forum of the Collaborative Council to develop the action programme to implement that Vision. For the first time, Fluoride took the centre place in that debate and Dr. Susheela ably presented the issues to the participants of the Forum and Ms. Jane Jones from UK National Pure Water Associations highlighted the undesirable approach fluoridating water in the west.

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As the newly elected Executive Secretary of that Council it is my duty and pleasure to explain a few basic principles which are universal in nature and may be useful for the policy makers and planners.

Rights to Water and Free Supply Policy:

Vision 21 puts people at the centre of all planning, activities, operations and maintenance of Water Supply and Sanitation for development. It is "Water for the People". It is not a jargon and not a mere slogan but the key principle for ALL activities for drinking water and sanitation activities and based on lessons learned. I am purposely avoiding the use of the word 'sector' here. It is no longer a sector or sub-sector in terms of water management of water resources but is one of the fundamental activity to achieve the human right of the people. It is the basic input for improvement of the quality of life of the people.

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'Rights' also brings responsibility to people. Today the people have no right on water and so they perceive even well intentioned action by the government as outside their responsibility. Even if a handpump is broken down, while the villagers will be in a position to repair a complex motor car will not touch the same as if it is only the duty of the government. Also they have become attached to the subsidised supply of water as a misinterpretation of right. Water supply can not be free. Someone has to pay for the cost of its delivery. Even if the clear decision is taken to deliver the water its cost of developing the source and its operation has to be covered by someone. Very often the earnestness with which new sources are developed the operation and maintenance is always neglected and so the capital investment is lost due to defunct water points. If the normal market situation is accepted the price of the commodity increase in times of short supply. While in India in times of drought the water produced and supplied at higher cost becomes free! How a system can survive while it is neither in a perfect market situation nor in a situation where the people are in charge and responsible for its management and survival? It is not the drought but the management of the water resources which is the root cause of our predicaments which need to be addressed through a visionary direction and collective actions developed through a consultative process in development of the water policies at all levels.

We should learn a lesson from South Africa in that process. The new government came to power with expectation and hope of the downtrodden over a struggle against apartheid. The large efficient water companies dealing with the water distribution was white dominated and meant for the large white farmers, mining industries and white settlements. The new government went through a process of consultation at all levels very similar to our debate on Panchyati reforms and developed the new water policy and a separate sanitation policy. They learned a lot from the Indian experience but did not copy it blindly. They declared water for the people and the involvement of people at all stages but not a promise of free water and not a subsidised sanitation. Yet they did not embrace general privatisation but selective role of the private sector.

Umgeni Water Supply Company not only developed a model for dual pricing in urban areas for different income group but also adapted a river basin management with subsidy and capacity building for rural sanitation to protect the downstream water resources to reduce the cost of its treatment. This action did not reduce their stock values but increased it in the market. We need such innovative thinking and action from our planners and managers at all levels. The reform starts first in the mind and then in the action. We should be first clear about the goals of the reforms and then develop through collective thinking process. If we are not clear what we want to achieve it results only in a motley group of projects without any real impact. The successful efforts of West Bengal to promote the environmental sanitation without subsidy is an example how the people are more fond of choice and want to be in control of their future instead to blindly accept a standard top down project.

White Paper
Gujarat

From a shared Vision to a Shared Action:

The Iguacu Action Plan is a paradigm based on such lessons learned. The plan is based on the following principles of Vision21:

- *Building around people's energy and creativity*
- *A holistic approach*
- *Commitment and compassionate leadership with effective governance*
- *Focus on the poor in both rural and urban areas*
- *Synergy among all partners*

The Goals:

The Vision 21 goals on water has also been endorsed by the Secretary General of the United Nations in his presentation to the General Assembly of the world leaders as part of the poverty reduction activities.

As part of the halving the population of people in poverty in each country:

- **Halving the percentage of the population without safe water**
- **Halving the percentage of population without sanitation**
- **Universal public awareness of hygiene**
- **80% primary school children educated about hygiene**
- **All schools equipped with safe water and sanitation**
- **50% reduction of diarrhoea disease incidence**

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Vision 21 Action in India:

Government is not a mere provider but the promoter, facilitator, promoter and the leader but not the only one actor in the scene. Panchyati Raj is meant for decentralisation and yet the water supply and water resource management is the one area where it is still highly centralised. Time has come to decentralise the funds and also the actions with real decentralisation of the decision making power in the people. Without that no reform will be successful.

The participatory process makes Vision 21 genuinely unique. In India it is the product of very many consultations, beginning in 1998, which have brought together more than 3,000 women and men at local, district, national, regional and global levels. They have shared their aspirations and their strategies for practical action toward universal access to hygiene, water supply and sanitation. Vision 21 is not therefore a document intended to sit on bookshelves gathering dust. Though it was primarily confined to Gujarat Jal Disha model it derives the lessons from other states and this is the time to spread the message. Vision 21 recognises that if the goal of water, sanitation and hygiene for all is to be achieved, people's roles must change.

The most important actors in this new paradigm will be individuals and groups in households and communities with new and important responsibilities for their own water, sanitation and hygiene services, as part of a collective strategy. Others play vital roles as well. Public authorities will need to support individuals and families in these efforts clearing large-scale obstacles and carrying out the work households and communities

cannot manage for themselves. Similarly, water sector professionals must combine their technical skills with an ability to communicate with others. Capacity building in true sense of these individuals will be the prime action for the people in power.

Vision 21 stands in its own right, as a new agenda for Human Right and Development.

Fluoride Mitigation and Vision Action:

The Vision principles are equally applicable to tackle the issues related to Fluoride. The lessons learned is that people will act with knowledge and with their empowerment to take correct decision but will not respond even if free and costly plants (structures) are provided through a top down programme.

The experience of Gujarat and Madhya Pradesh we would like to spread through at least eight or ten states in India to start with where response will be positive. Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, West Bengal are the possible first line of states. Dr. Susheela as the national co-ordinator will be supported by a group of advisors with Dr. Anil Agarwal as the chairman of that Advisory Committee. Dr. Ashok Chatterjee of Ahmedabad will be the preacher and everyone starting from the highest-ranking officials or political leaders to an ordinary person in the village or urban slum will be equal member of this movement. The way Digvijay Singhji participated in the Hague conference equal to any other participant and shared his experience in that conference shows the way we should organise our conferences and the meetings.

Some issues related to the Vision 21:

- International agencies should not give mere lip service to the Water and Sanitation issues. Water borne diseases are still the main cause of death and malnutrition. The challenge to these agencies is not to divert their efforts to other easy and political

direction but to face the real problem affecting people. The failure in the past lies in the paradigm and not in the goals.

- Governments need not merely develop large programmes with huge allocation of funds. Time and again we have seen that does not solve the problem in a sustainable manner in the long term. The holistic approach will demand a closer co-operation between Health, Education and Water sectors, focus on the children and youth to change the behaviour and by putting people in the centre.
- Mobilise the special support to build the capacity identifying the gaps by actually working with people. Sometimes the simplest solution lies on the ground and not in the Bhavans.
- Create a mass movement for Environmental Sanitation and Hygiene Education and to put the unattractive subject in the heart of development. Let us remember Mahatma Gandhi who had put Sanitation and hygiene as top item in his practise and teachings.
- Use the week of 15 - 22nd March in every year as the "Clean Water Health and Hygiene week" culminating at the World Water Day thus reminding us the need to clean water free from bacteriological contamination and deaths due to that. These activities will be best made at the grass root levels at schools and communities. All international agencies should support the efforts of the Governments, Panchyats and NGO. I would specially request the Mission to take this lead.

Some specific issues related to Fluoride:

- India has already developed the technology for removal of fluoride from the drinking water both at the community level and at household level of operations. The activated alumina and Nalgonda technologies have been developed, field tested with several modes of water delivery systems requires handling by the community and by the Government Departments as well as the research institutions like NEERI, IITs, AIIPH & H. The Alum and Lime (for Nalgonda Technology) and Activated Alumina (for Activated Alumina filter) suppliers need to get their product(s) Certified by Bureau of Indian Standards and other competent authorities and to label the product as "Defluoridation grade". This would help standardisation of the

procedure by the community. The Rajiv Gandhi Mission should provide lead in this standardisation effort.

- The Mission should consider tie-up with Industries Department for the right grade of Activated Alumina supply for defluoridation of water. Once the raw material of good quality is available in plenty, the Activated Alumina Filters for defluoridation of water will be in the market at an affordable price.
- Capacity building / Human Resource Development activities may follow the model set by the Government of Rajasthan and UNICEF (Jaipur) for supporting **updates** for Teachers / Faculty of the Engineering and Medical / Dental Colleges. The governments may take initiative to incorporate the basic messages in all medical curricula.
- The model of NGO introducing the household models through private vendors is very interesting and need to be encouraged. The private entrepreneur initiative must be encouraged in an effort to encourage rural employment as well as sustainability.
- Fluoridation of water should be discontinued in some parts of the world and specially developing countries where excess fluoride already is present in water, milk and food.

Role of the International agencies:

Fluoride took part

- WHO need to take a proactive stand on the criticism on the existing Fluoride guideline and the regional office in New Delhi should advise the Geneva HQ for taking correct action based on Indian experience. The present WHO guideline for fluoride that 1.5 mg/ litre is "desirable"; is **unsuitable** and also a clear stand should be taken on fluoridation of water based on facts from the various case studies around the world. Senegal reduced the standard for fluoride from WHO guideline 1.5/ litre to 0.6 mg/ litre; during early 1990s due to health reasons. In many European Nations, fluoridation is not encouraged for health reasons.

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- WHO is in the process of bringing out a revised edition of the "Fluoride Monograph" initially published during 1970. The draft monograph is now available on the Web

site. Scientists around the globe and many international agencies have made serious comments on the unsuitability of the new monograph and have sought for a complete revision of the manuscript. The South Asian region should collate and send the information and facts to Geneva for its correct presentation. India should raise these issues and concerns in the World Health Assembly. I appeal to the Ministry of Health to take that lead.

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Concluding Remarks:

The need to view and assess the issues of Fluoride and Fluorosis in the developing and even in the developed world with an unbiased mind is necessary and overdue. WHO should take the lead in that. The developing world with its extreme climatic conditions, high intake of unsafe water, shortage of well treated water, draught, poor nutritional standards, illiteracy, unsanitary conditions have far more damaging effects on the health of the poor. For the poor population in a developing country the reversal of the damage is impossible. We need to visualise that if the people are in the centre of the process and then only their muted voice should be heard and that is the role of our leaders and planners.

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I also visualise India to take a leadership role in mobilising the global opinion and to focus the roles of the international agencies to the health related issues of water supply and sanitation. I urge upon the leaders in the Health ministry to raise these unattractive and mundane issues, which are very much touching and affecting the lives millions of the poor in the developing countries in India and around the globe.

The end message is that we must improve in our Communication, information and knowledge dissemination to the people, which will allow them to decide what is best for them to take action and stop developing programmes in a top down manner. This will be the greatest reform.

Abolition of CRWP as
Fluoride to be restricted.