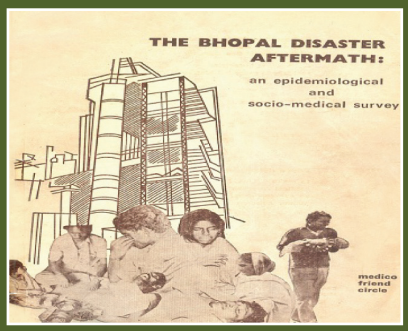


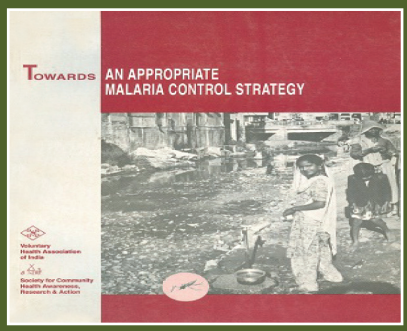









EXAMINING ENVIRONMENT AND HEALTH INTERACTIONS

Responding with communities to the challenges of our times

A SOCHARA-SOPHEA Publication

sochara
building community health

*"Equity, **ecologically-sustainable development** and peace are at the heart of our vision of a better world - a world in which a healthy life for all is a reality; a world that respects, appreciates and **celebrates all life and diversity;** a world that enables the flowering of people's talents and abilities to enrich each other; a world in which people's voices guide the decisions that shape our lives. There are more than enough resources to achieve this vision."*

- The vision statement in the People's Charter for Health drafted by the People's Health Movement

EXAMINING ENVIRONMENT AND HEALTH INTERACTIONS

Responding with communities to the challenges of our times

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Society for Community Health Awareness, Research and Action

with support from

Global Greengrants Fund, USA

July 2012

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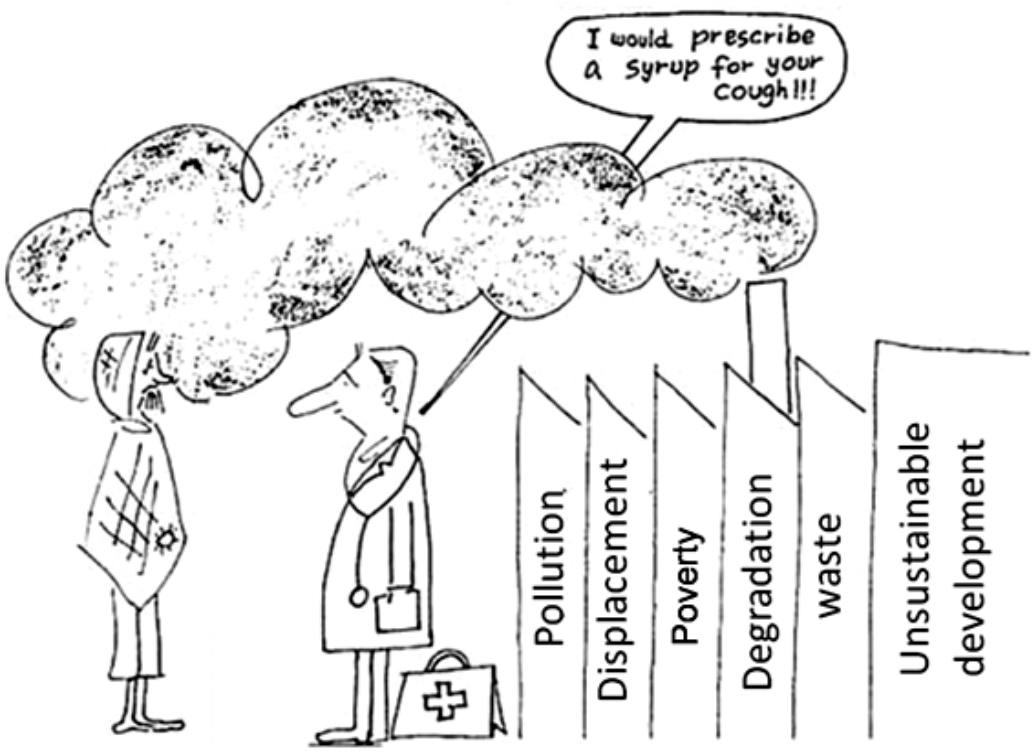

(Courtesy: SOCHARA Cartoon Gallery http://www.sochara.org/CartoonGallery/index2.htm)

A note from the authors

The Environmental health component of the CHC-SOCHARA journey since 1984, has been a very unusual one. Never planned as a definitive objective, it evolved through an interactive responsiveness of the CHC team to a range of requests and challenges starting from an active engagement with the Bhopal gas disaster.

It was a path less travelled but a path that was made by just walking into the unknown. As the journey moved beyond Bhopal, to Harihar, Mangalore, Tumkur, Kasargod, Kodaikanal, Eloor, Kolar gold fields, Warangal, Cuddalore, Mettur, Chitradurga and so on, the CHC-SOCHARA team discovered the challenges of pesticides, viscose rayons, malaria, endosulphan, mercury, tobacco, radiation, industrial pollution, manual scavenging, farmers suicides and the increasing complexity and magnitude of the environmental health challenge in India.

This interactive responsiveness embedded in a social-community paradigm of action undertaken by the team led to experiences in participatory research, lay epidemiology, policy advocacy, health promotion, communication, networking, capacity building, multi stakeholder dialogue, governance, legal and ethical issues and the challenges of representing the voice of the people. The most important of these has been the development of the CHESS network - a loose and growing network of organisations and individuals who keep in touch with each other as they explore the emerging challenges of environmental health in the country.

It was an exciting journey, full of the unexpected, but always filled with learning experiences. In intense, seemingly unplanned but intuitive way the environmental health journey symbolised the axioms of community health that CHC outlined in the late 1980's. Rights and responsibilities, autonomy, integration, building decentralised democracy in decision making, facing up to inequity, community empowerment, confronting the bio-medical paradigm, and trying to make policy and action responses more person centred and community oriented, socio-epidemiologically grounded, more democratic and accountable.

Like all we have done, learnt and discovered over the years, environmental health action has to be part of a new vision with respect for creation. It is an integral part of a transformatory effort to build an alternative social-political-economic-cultural system in which a healthy environment becomes central for all people.

Adithya has done yeoman service by journeying patiently through the documentation and the stories from this experience, helping to establish a framework for more planned and sustained action on environmental health and climate change, recognizing them as significant challenges to public health and community health.

By grounding his passion and commitment in the exploratory journeys of all who walked this path in the last three decades of the CHC-SOCHARA experiment, through this document he has laid a foundation on which to build a more systematic framework of research and action for the future. I am thrilled that this will now become a planned objective of the next phase of the SOCHARA journey.

I am sure this document will be an important milestone in this exciting journey ahead.

Ravi Narayan
An environmental health activist professional

A memorable journey of learning and reflection...

I was fortunate to have had the opportunity of writing this report. For someone attempting to understand 'environmental health', this exercise allowed me to dive into a sea of past experience in the field. SOCHARA's experience in environmental and occupational health is diverse, rich, innovative and interesting. I conducted several interviews and read several published and unpublished documents, all of which I enjoyed.

Working on this report taught me many things. An important lesson was of the complex and challenging nature of work in the field of environmental and occupational health. A point which became especially stark was the power differential between those causing environmental degradation and those consequently suffering due to it. There is also a need for greater amount of sustained documentation, research and advocacy in this field if any change has to be effected at the field level.

This report was written for wider readability and not just for public health professionals. To facilitate easier reading, a brief lay summary has been provided at the start of some chapters. Scientific details have been also been provided in some places. The usage of the term 'environmental health' here also includes occupational health.

I would like to thank Dr Thelma for giving me the opportunity and Dr Ravi for his continuous guidance and support. Ms Lavanya and Dr Rakhal gave some very useful feedback which also helped shape this report. Mr Swamy and Mr Joseph reduced my worries by helping me find many of the documents I was looking for. And finally, I thank the entire SOCHARA family who kept me in good spirits through this period.

For me, this report marks the start of a journey. I hope I can take forward all that I have learnt through this process in my own work.

Adithya Pradyumna
MBBS MSc (Environment and Health) PGDip (Sustainable Development)
Research and Training Assistant, SOCHARA

About SOCHARA

The Society for Community Health Awareness, Research and Action (SOCHARA) and its functional units have promoted a people-centred paradigm for health and development, envisioned through a community health movement and a community health approach to public health problems. Two decades into its inception, SOCHARA continues to participate and strengthen health movements in India and around the world, supporting and engaging with people, communities, professional bodies and governments for equitable health and development, towards the goal of 'Health for All'.

In India, large variations are seen between social groups in indicators of health and development. These stark variations emerge when one considers caste, class, gender and geography while analyzing health data. It is therefore imperative to look at health and healthcare systems through an equity lens for socially just health action. SOCHARA approaches community health action through research, enquiry, reflection, innovation and taking into account the socio-political-cultural-economic-environmental context. This 'community health' approach is also being nurtured in the next generation of community health leaders through its fellowship and other training programmes.

SOCHARA's participation in the Global Peoples' Health Movement (PHM), the *Jan Swasthya Abhiyan* (the Indian chapter of PHM), the local PHM chapters, and the National Rural Health Mission (NRHM), to name a few, are aimed at strengthening the public health system based on the principles of comprehensive primary health care, ensuring equitable access to good quality care, addressing health determinants and reducing health disparities.

At present, SOCHARA works through four clusters – Community Health Cell or CHC (Bangalore), Centre for Public Health and Equity or CPHE (Bangalore), CHC Extension Unit or CEU (Chennai), Centre for Public Health and Equity or CPHE (Bhopal). Each of these clusters has their individual work agendas, within the purview of the society's objectives and the vision of Health for All. During the institutional journey from 1984, and especially since 1991 when the society (SOCHARA) was registered, many public health challenges have been addressed and responded to through innovative action, training, research and advocacy initiatives. Environmental health is one such area – the SOCHARA response being stimulated by the Bhopal Gas Disaster in 1984.

Chapter 1: INTRODUCTION

"If you want to learn about the health of a population, look at the air they breathe, the water they drink, and the places where they live"

Hippocrates, The Father of Medicine, 5thCentury BC

While knowledge on the complex interactions between environment and health continue to grow, exposures to hazardous agents have become even more commonplace at home, at workplace or on the road. Technological advance, while improving health in some ways, is also contributing to ill-health in ways that have not been well understood. Evidence suggests that communities that are poorer, marginalised or dependent on natural resources for livelihood suffer disproportionately from environmental degradation and pollution. Conducting epidemiological studies in those communities is very challenging due to exposure to multiple hazardous agents in their jobs and residential environments. And as seen from the conferences for climate change mitigation, the responsibility of addressing environmental pollution could be anybody's work, somebody's work or nobody's work, depending on who is looking at it.

Although Environmental Health was not SOCHARA's primary agenda, a substantial contribution has been made in this field, a true and complete representation of which will hopefully be reflected in this report. The Community Health Environment Survey Skill-share (CHESS) initiative, in which SOCHARA plays a key role, has been an effort to bring environmental, health and social groups and movements together. This initiative, which builds up skill in research methodology and supports the use of epidemiological evidence in the pursuit of environmental justice by peoples groups, has seen four national workshops and several post-workshop ventures to empower grassroots organisations and communities.

This report is an effort to document the various environmental and occupational health projects SOCHARA has been involved with, and understand the roles that have been played in each of them. Responses made by SOCHARA during natural disasters, including the post-tsunami relief work in December 2004, have not been included in this report.

Published definitions of Environmental Health and Justice

To further introduce the subject of discussion, some published definitions of 'Environmental Health', 'Environmental Justice' and 'Occupational Health' are presented here. These "should be viewed as a broad sweep of possible definitions, and by no means

the totality of existing definitions" (1). They project several aspects of environmental health ranging from *prevention* to *professional practice;* and from *health of people to health of environment.*

Environmental Health:

"Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics." (World Health Organisation, Geneva)(2)

"Environmental health is the branch of public health that protects against the effects of environmental hazards that can adversely affect health or the ecological balances essential to human health and environmental quality." (Agency for Toxic Substances and Disease Registry, US)(1)

"……the effects of environmental agents on human health. These include epidemiological, clinical, or experimental studies of man. "Environment" involves occupational or personal environments as well as the global environment, land, water, and air." (Archives of Environmental Health, UK)(1)

"Environmental health is the study of the effects on human health of all external abiotic conditions and influences, including naturally occurring phenomena and anthropogenic environmental pollutants." (Reviews on Environmental Health, Israel) (1)

"Environmental health includes both the direct pathological effects of chemicals, radiation and some biological agents, and the effects (often, indirect) on health and well-being of the broad physical, psychological, social, and aesthetic environment, which includes housing, urban development, land use, and transport." (European Charter on Environment and Health)(1)

"Environmental health is that branch of public health that deals with the human health effects of exposure to chemical, physical, and biological agents in the community, workplace, and/or home." (Idaho Department of Health, US)(1)

"When we talk about environmental health, we mean the way our health is affected by the world around us, and also how our activities affect the health of the world around us. If our food, water, and air are contaminated, they can make us sick. If we

are not careful about how we use the air, water, and land, we can make ourselves and the world around us sick. By protecting our environment, we protect our health." (Hesparian)(3)

Occupational Health:

"Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities and; to summarize: the adaptation of work to man and of each man to his job." (Joint ILO/WHO Committee on Occupational Health (1950)) (4)

Environmental Justice:

It refers to those cultural norms and values, rules, regulations, behaviour, policies, and decisions to support sustainable communities where people can interact with confidence that their environment is safe, nurturing and productive (5).

Environmental Health: reflective remarks (6)(7)

Some introductory thoughts on the theme of Environmental Health which were expressed by SOCHARA staff members are presented here.

The concept: A good environment contributes to wellbeing, and wellbeing is the definition of health. While there are specific links between environment and health, the generic link cannot be separated at any point. Environmental Health, among other things, includes the impact of degradation and pollution of land, water, air, biodiversity and ecology on community health. Occupational hygiene deals with the immediate environment inside the workplace.

The History: When Community Health Cell[1] (CHC) was setup in 1984, there was no explicit mandate on Environmental Health, though there was always an implicit understanding. CHC's involvement in environmental health began after the Bhopal Gas Tragedy. The disaster brought both Occupational Safety and Environmental Health onto discussion tables. Later on, the work on malaria control with focus on urban planning, architecture

1. CHC was set up a few years before the registration of the society (SOCHARA).

and large developmental projects also helped SOCHARA rediscover 'environment' in community health.

SOCHARA's work in this field: None of CHC's work in environmental health has been a "CHC project". The work done at Bhopal created recognition, following which CHC was approached several times for environmental health campaigns. Requests from community based groups have been responded to, and a catalyst role has been played to assist the process at various stages of community led campaigns. Epidemiological assistance has been given to these groups during their projects and campaigns.

Priority issues: Over the years there has been a quantum jump from local to global issues and from occupational health to environmental health. Globalisation and developmental activities driven by the motto of "economic growth at any cost" are leading to ecological and health costs that have been poorly understood. Due to SOCHARA's involvement with the Peoples Health Movement[2] (PHM), globalisation and its health impacts is a theme of interest. Climate change and its consequences are now a major health concern and SOCHARA envisions increasing involvement in this area.

The other issue of concern is the apathy and indifference towards environmental degradation by political regimes with short-sighted visions and agendas. The onus is thus upon civil society to get engaged and be proactive. Over the past 25 years, the problems have only grown in magnitude. Difference in opinion between leaders and organisations in this field has also weakened the environmental movement at national level.

Role of civil society organisations: It is important for civil society health organisations to understand the science behind the health impacts to take appropriate actions. For this purpose, it is important to also define the science from the community's perspective. The primary role for health institutes should be to understand, communicate and act based on evidence; the translation of the science into evidence based action rather than action based on ideology. The dominant paradigm of science should also be put to question in a clear systematic way.

All the roles that are to be played by organisations for achieving environmental health justice are important in their own right. Sensitisation of the society and the recognition of the work of others are important. The strategy needs to be multilevel, and every citizen needs to be involved. The link with the scientific community is important too, which would give the researchers and communities to collaborate in mutually beneficial work.

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2. Peoples Health Movement (PHM) – A global network of health networks and activists working towards equity in health and health care to achieve 'health for all'. http://www.phmovement.org/en/about

The Environmental Health agenda: There is a need to put environmental health as a cross cutting agenda. After years of effort, *gender* is now widely considered as a cross cutting issue in all sectors, and it is important, urgent and possible that the same happens with *environment*. The Ministry of Health and the local civic authorities too needs to be involved in this. A multilevel action plan is needed to target every level of health work.

Despite a relatively small technical group, SOCHARA has played a supportive role in several environmental campaigns. An internal evaluation would be useful to further understand this involvement. Environmental health should also become general Peoples Health Movement (PHM) interest. In the midst of 'human rights', 'health for all', 'equity' and 'gender', 'eco-sensitivity' should also find its well deserved space. There is a hope that with the CHESS initiative, environmental and occupational health would become a core agenda and not looked upon as a speciality area. There is potential for SOCHARA to grow as an even more eco-sensitive group. There is also a need to reflect on SOCHARA's work with respect to the environment section of the Peoples Health Charter.

Box.1 shows the key words which emerged from the interviews with SOCHARA staff on the theme of environmental health. A draft Environmental Health definition has been presented at the end of this report, which includes ideas presented in published definitions and the ideas presented in this report.

Box.1: Key environmental health concepts that emerge from the above reflections:

- Wellbeing
- Generic and specific inter-connectedness between Environment and Health
- Cross cutting issue, Eco-sensitivity
- Local and global context
- Ecological and health costs poorly understood
- In the midst of short term unstable political regimes, responsibility is on civil society to sustain and advocate the agenda
- Role of science and evidence for planning action, and the danger of only ideological positioning
- Value of experiential learning and action
- Epidemiological assistance and supportive role
- Multi-level work needed

An Overview of Environmental Health activities at SOCHARA

SOCHARA actively participated in a wide range of environmental and occupational health projects and campaigns between 1984 and 2010, as shown in Figure 1. This report provides further details of those projects and campaigns in which significant contributions were made.

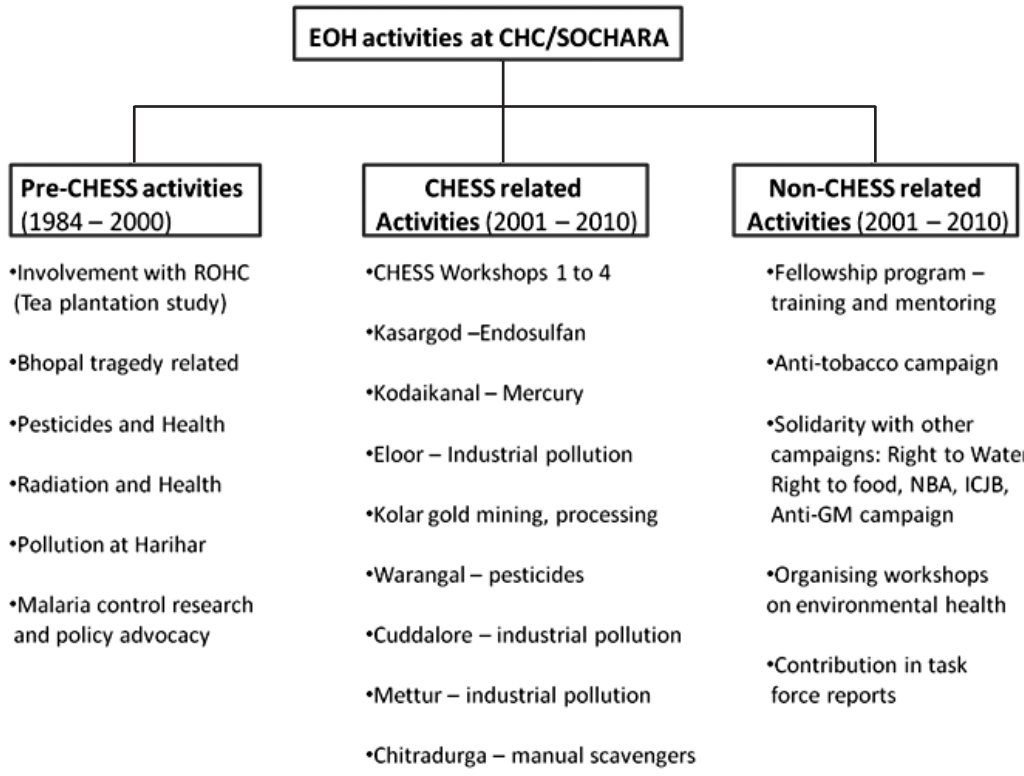

Figure 1: Classification of SOCHARA's EOH activity (1984-2010)

These projects have been classified in relation to the first CHESS (Community Health Environmental Survey Skill-share) workshop conducted in 2001. All EOH projects prior to 2001 have been termed as *Pre-CHESS activities.* Those which were connected to the CHESS network have been listed under *CHESS related activities,* and all post-2001 ventures not related to CHESS have been categorised under *Non-CHESS activities.*

Pre-CHESS EOH ventures were ad-hoc responses to occasional requests made by communities or activist groups, except in case of the Bhopal campaign where there was

continuous and planned involvement. Research and advocacy for the Bhopal victims was carried out between 1985 and 1994.

The CHESS initiative has led to relatively more planned, purposeful and continuous work on the subject. Most of the EOH work between 2001 and 2010 was associated to the CHESS workshops and network. Several community led campaigns in Tamil Nadu (at Kodaikanal, Mettur and Cuddalore), Kerala (at Eloor and Kasargod), and Karnataka (at Chitradurga) have seen SOCHARA's direct involvement in research and advocacy. There are several other initiatives, including research and advocacy on malaria control measures which will be dealt with later in the report.

Themes of occupational hygiene, industrial pollution and vector control are some of the many that have been worked on. The primary identity of SOCHARA members in most of these projects is that of researcher-activist. Though most campaigns have not led to total environmental justice for the affected communities, there has been an appreciable degree of community mobilisation, empowerment, monitoring, cleaning up and compensation in some of them.

Chapter 2: STORY OF BHOPAL

The first major call for environmental health work came suddenly and unexpectedly in December 1984 in the form of the Bhopal Gas Disaster. At that time, CHC[3] was taking over as convener of the medico friend circle[4] (mfc) and as the editorial office of the mfc bulletin for the years 1985-86.

The disaster was unprecedented, killing thousands of people overnight and permanently injuring several thousand more. While the local residents and the rest of the world were still coming to terms with the disaster, mfc received requests from local groups and civil society organisations for their involvement with the relief efforts. These requests started arriving when the mfc annual meeting was being held in December 1984, where it was decided unanimously that the group will get involved with the campaign for relief and justice at Bhopal. The reasons for their involvement were many and urgent.

Confusion was aplenty. Doctors had various theories on how the affected should be treated. The guilty company, Union Carbide, had refused to share information on the nature of the gas that had leaked, and the government was not making any serious efforts to enquire or communicate the information either. Without this information, whatever treatment regimes had been initiated were based on whims, and several lives were being lost due to inappropriate treatment. Groups from the affected community and the society at large questioned the stance taken by the government and the company.

CHC along with several other members of mfc initiated a process of research, communication and rehabilitation of the victims of the disaster. The monthly mfc bulletin carried updates of these activities from the field. The priority was to identify and address the gaps in the ongoing process of relief and rehabilitation.

In an effort to empower the affected communities and the local physicians with the necessary information, a unique and innovative communication effort was made in the form of an informative illustrated manual called 'Hamari Sehat Hamari Ladai' was also drafted with the Ekalavya trust.

mfc was also one of the first civil society groups to initiate a detailed research exercise at Bhopal. This study systematically revealed the health impact on the exposed

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3. The society (SOCHARA) was registered in 1991. Until then, CHC was the only identity of the organization.

4. mfc or medico friend circle is a national platform for health practitioners to discuss and act on issues of equity-oriented public health importance. For more information, visit their website at: http://www.mfcindia.org/main/perspective.html

communities. The nature of these health effects suggested a chronic cyanide poisoning like mechanism, which added evidence to the existing controversy about how the health effects were caused. Several recommendations were given to the government and other groups based on this study, and a call was made for the use of evidence-based sensitive action. One recommendation was the controversial support to the use of a compound called 'sodium thiosulphate' to detoxify the victims. Later on, the results of a detailed study by the Indian Council of Medical Research supported the use of thiosulphate for the treatment and rehabilitation of victims. An epidemiological review paper was also published with the available evidence on mortality and morbidity due to Bhopal tragedy. The evidence generated through these processes was continuously updated and presented at international conferences including the Permanent Peoples Tribunal. Later that year, mfc also organised a meeting on Pesticides and Health where the health impacts of the production and use of chemicals in agriculture was discussed.

Shiv Vishvanathan, a well known anthropologist wrote later about mfc's scientific report on the health situation in Bhopal as "probably the most sane, compassionate piece of scholarship on the problem of relief in Bhopal" (8). An excerpt from that article is provided in Box.2, which is followed by a detailed report on CHC's involvement in the Bhopal campaign.

Box.2: Excerpt from 'Imagination of a disaster', by Shiv Vishwanathan (8)

"But what is most fascinating is the manner in which text and context are related. Voluntary health specialists have repeatedly advocated that the focus of study should be suffering in the community, rather than the patient as an isolate in the hospital. The first they argue, leads to a holistic view of disease while the latter propagates a reductionist view of illness and an atomistic view of the patient. The latter view which underwrote the pulmonary model, is based on numerous vertical studies rather than an integrated search for interconnections. In a telling paragraph the MFC report suggests, 'The approach of examining say 200 eyes or 200 lungs and so on independent of one another lacks this integration. Strange it may sound, but it seems to derive the rationale – unconsciously – from the pulmonary model, wherein toxic gas directly hits the target organ (lungs, eyes etc) to produce damage without any intrinsic connections – which is at the heart of the 'cyanogen pool' model'.

It is this anthropology of gestalts that is fascinating about the report. What it offered were two clusters which deserve further exploration:

Patient as an analytical grid --> patient as a person

Clinical gaze of the doctors --> victim's speech aids diagnosis

Focus of diagnosis is the hospital --> focus of diagnosis is the community

Diagnoses as mechanics of cause and effect --> diagnosis as an analysis of inter-relationships

Pulmonary Model --> Cyanogen Pool Model

Anti Thiosulphate --> Use of Sodium Thiosulphate as a critical tool"

"How many Bhopals will it take to shake us out of our apathy?" (9)

Advocacy for the right to health of the affected community

CHC took up the editorial chair of the mfc bulletin at the end of 1984. Following the Bhopal[5] Gas Disaster[6], the editorial of the January 1985 edition of the mfc bulletin (10) expressed that it was time to question:

– the corporations, about their ethics and functioning,

– the government, about transparency and their role in protecting people, and

– the people, about their awareness and role in remediation.

109 Medico Friend Circle Bulletin
January 1985

Editorial

The Bhopal Disaster

We live in a world in which violence, waste and manipulation have not only became central elements in our lives but which have become profitable for the merchants of death, the rapists of the earth and those who manipulate our behaviour, our fears and desires.

– Anwar Fazal
International Organisation of Consumer Union

The world's worst ever man made industrial and ecological tragedy took place on the 3rd of December 1984 at Bhopal 30 tonnes of stored methyl iso cyanate escaped into the atmosphere killing over three thousand people and over 3000 cattle and affecting over a lakh people (official estimates!). Even these shocking statistics hide the actual enormity of the human tragedy – of the lives lost, the families affected, the people blinded and ill and the thousands impoverished.

Public and Govt reaction to this catastrophe had resulted in relief efforts. Wide media publicity has led to the spontaneous formation of citizens groups and collectives to look into not only the deeper issues of this event but also to prevent such events in the future. Zahreli Gas Kand Sangarsh Samiti (Bhopal), PARISARA – Movement for Environmental Protection (Bangalore), Movement for a Safe Environment (Bombay) and Movement for Environmental protection (Madras) are some examples of this upsurge.

Notwithstanding the phenomenal human tragedy and suffering caused by this event which need relief, rehabilitation and compensation efforts, all concerned citizens should not miss the opportunity to analyse/understand the deeper socio-political and technological crisis of which this disaster is only a symptom.

This is the time to question –

- The role of multinational corporations and the double standards in their functioning in the developing world;
- The Govt's role and complicity in improper siting, continued licensing, improper monitoring of dangerous industries and in the continued flouting of its own rules and regulations;
- The national industrial and development policy in the light of people's health and ecological issues;
- The political exploitation of the poor especially the slum dwellers and workers;

Figure 2: mfc bulletin - January 1985

mfc was a signatory to the public statement released on December 22, 1984 by 14 civil society groups in Bombay (now Mumbai). Stating that the tragedy at Bhopal was not an accident but a crime against people, civil society was urged to press for the following demands made in the statement:

- Establish citizens committees for monitoring rehabilitation work

5. Bhopal is the capital of Madhya Pradesh state of India.

6. The factory responsible for the disaster was owned by Union Carbide, an American based multinational company. This facility produced compounds which would eventually be used in manufacturing pesticides.

- Punishment for guilty parties, including the corporation, state governmental authorities and central governmental authorities
- Rehabilitation, compensation, and aid for victims
- Upholding the right to information
- Review existing laws
- Conducting environmental and epidemiological studies around existing and proposed industrial sites
- Upholding rights for workers, unions and citizens committees

Health problems of the victims

Several health problems were noticed by victims, doctors and researchers. The mortality itself was high, but morbidity reflected multiple target organs – problems with vision, breathing, digestion, aches and pains, generalised weakness, menstrual abnormalities, in-utero problems, lactation failure and psychological effects (11). These were managed symptomatically by the medical fraternity. Breathing problems persisted amongst many of the exposed, even months after the disaster. No information was made available to women who were pregnant at the time of the disaster about the potential effects of the chemical on the outcome of pregnancy. The option of Medical Termination of Pregnancy (MTP, or elective abortion) was not discussed with them by the medical officers.

Gaps in knowledge and communication

The mfc study in Bhopal[7] and other research revealed that a lack of communication was a major obstacle in the intervention and rehabilitation activities there (12). A continuing education strategy for the local doctors and the affected people was recommended as a necessary intervention to meet this gap. The lack of translation of existing knowledge into supportive intervention was another major gap. Mental health too was identified as a neglected dimension of the rehabilitation efforts. These shortcomings led to ignorance, confusion, controversy and anarchy, and reduced the effect of intervention at the field level.

A *community health approach* was suggested as the best method of communication between various levels of stakeholders, keeping the participation and needs of the

7. Details of this mfc study are available in the next section of the report titled 'Research efforts to guide and support remediation'

community in mind. It was recommended that one "must see the situation in totality to understand true measure of the problem". Integrated community based epidemiologically sound research and collaboration between governmental and voluntary agencies was also suggested.

However, availability of information did not improve greatly with time (13). To make matters worse, there was rampant mis-communication in media, and withholding of information by the company and the government. An effort was made to inform the local doctors, victims and health workers about the health situation following the disaster, through a Hindi publication by Eklavya and *mfc* called *Hamari Sehat Hamari Ladai (Our Health, Our Struggle)* (14).

Figure 3: Cover of *Hamari Sehat Hamari Ladai*

Figure 4: A collage prepared from the pages of *Hamari Sehat Hamari Ladai*

Figure 4 presents a sample of the illustration and text from *'Hamari Sehat Hamari Ladai'.* It was a comprehensive illustrated manual on the health problems faced by the affected communities. The intention was to empower them with the requisite knowledge. The information provided was not just about the diseases and treatment, but also about the peoples' right to information and the right to appropriate healthcare. The manual was an innovative intervention in communication, and was probably the first time in the country where such an effort was made in knowledge translation for people affected in an environmental health tragedy. mfc, through this and other efforts, may have provided the only credible medical and health related information to the community (8).

Continued discussions within mfc

The theme for the January 1986 mfc meeting at Khandala was *'Issues in Environmental Health – a case study of Pesticides'.* The theme was decided due to concerns that emanated not just from the Bhopal tragedy, but by the developmental model being adopted in India which appeared to neglect health impacts to marginalized communities. The focus of the discussion was the researching of environmental health problems, using pesticide exposure as case study. An issue of the mfc bulletin (15) was dedicated to this topic, excerpts from which are presented in Box.3. A compilation of papers (16) was also released during the meeting.

Advocacy efforts in the Bhopal Campaign continue to be strong, and this campaign has exposed the shocking lack of accountability of the government. Though there have recently been some small positive turns for the affected community, the events following this disaster leave a disturbing question in mind: For whom is the government really for - People or Corporates?

Box.3: Contents and Excerpts from the "Pesticides and Health" issue of the mfc Bulletin (15)

Health of the Environment: A Statement of Concern -

"The question clearly is: What sort of development do we want?"

Editorial

"Why Environmental Health? Why Pesticides?

Those of us involved in health and health care issues cannot fail to recognize the gravity of this situation or do we? Since this ecological insensitiveness is at the cost of human health."

Common pesticides: The Health and Environmental Hazards

"DDT – Environmentally persistent; virtually non-degradable; suspected carcinogenicity; hazardous to avian life"

Pesticides used in India and banned abroad

DDT: banned in Australia, Colombia, Greece, UK, USSR, Poland, Switzerland, USA

Pesticides and Health: some case studies

Occupational Health: "…found that there is an unnecessary risk to workers health".

Environmental Health: "This crippling deformity, later given the rather long winded name of 'Endemic Familial Arthritis of Malnad' (EFAM) appears to be linked with pesticide use."

Beating the pesticide mafia – need for consumer action

"As consumers we should ask ourselves whether we wish to continue allowing ourselves to be poisoned."

The Dirty Dozen Campaign

"The selection of the 12 most hazardous pesticides have been made to carry out an international public education, media and lobby campaign to pressure governments and manufacturing industries to act more responsibly…"

"The disaster became a tragedy only later" (8) due to the poor decisions and rehabilitation efforts made by the government, for which, the affected communities continue to pay the price.

Research efforts to guide and support remediation

From the mfc bulletin

Updates from ongoing research work by mfc members and the rest of the scientific community were published in the mfc bulletin. Abhay Bang of mfc reported that the symptomatic treatment given to victims of the tragedy, and the lack of documentation and certification of victims was making the situation worse (17). Findings of a study on Womens' Health (18) by Rani Bang and Mira Sadgopal of mfc found that gynaecological symptoms and signs were significantly higher among the affected population in

comparison to a 'control'[8] population. The Nagrik (citizen) Study (19) facilitated by the Voluntary Health Association of India highlighted that the thiocyanate levels were relatively high in the subsoil lakes, filtered water and blood (where they were three times as compared to controls from Bombay). This was the first clear evidence of the magnitude and nature of environmental contamination in the area. A plea was made to the research community to share findings with the affected community.

The mfc Bhopal Study

The field work for the mfc Bhopal study (20) was carried out in March 1985 and the report (21)(22) was published in October 1985. CHC was involved in the analytical and advisory roles of this cross-sectional study. The objectives of the study were to:

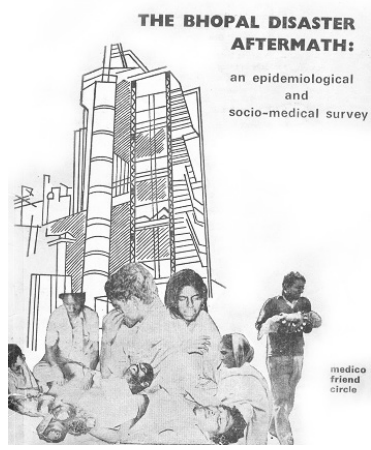

Figure 5: Cover of the mfc Bhopal study report

- assess the current health status on a sound epidemiological basis,
- assess findings in the light of the controversy between the *pulmonary pathology theory and chronic cyanide poisoning (cyanogen pool) theory*
- evolve a critique of the ongoing medical research and relief, identify important factors influencing the relief and rehabilitation,
- assess peoples' perceptions about the ongoing health services, and
- make suggestions for more meaningful relief, research and rehabilitation policy.

Summary of the study report:

JP Nagar and Anna Nagar, two areas of Bhopal, were selected as the 'study' and 'control' areas respectively, due to their similar socio-demographic structures but different exposure histories to the gas. Study participants were questioned on various symptoms (covering all organ systems), following which physician examination, lung-function tests and haemoglobin tests were conducted. The collected information was quantified and statistical comparisons were made between the study and control areas. A survey was

8. One of the methods in Environmental Epidemiology is to compare the health situation in two similar areas, one which is exposed to the hazard/intervention in question and one which is not exposed. This may help the researchers further understand the health impact of the hazardous exposure.

also conducted with a Peoples' Perceptions questionnaire to evaluate ongoing relief and rehabilitation services.

The analysis showed that 21 of the 26 symptoms inquired about were significantly[9] higher in the study area, and that "every individual from the study area reported at least one serious symptom whereas there were many who did not report any symptom from the control area" (21:p.26). "The simultaneous presence of all serious symptoms suggesting involvement of not only lungs but gastro-intestinal tract, brain and vision in as large as 62 percent of the sample population of the study area cannot be explained by the Pulmonary Theory" (21:p.40). The evidence supporting the cyanogens pool theory[10] was mainly indirect (21:p.41), but the presence of a wide variety of unconnected symptoms was its main support.

Questions were also raised about victims' compensation, the thiosulphate controversy and on further health research in Bhopal. Several recommendations were made to improve the situation of ill-health and injustice at Bhopal, and these have been summarized in Box.4.

Box.4: Recommendations from the report of the Bhopal epidemiological study by mfc (21)

Research

1. Focus should shift from hospital based studies of seriously ill patients to family/ community based ambulatory patients.
2. Clinical studies to validate use of sodium thiosulphate for mass therapy.

Care, Surveillance and Rehabilitation

3. Psychosocial assessment, counselling and rehabilitation are urgently required
4. Mass treatment with thiosulphate based on ICMR guidelines, maintaining good records.
5. Monitoring and surveillance programmes for assessing risks to pregnant mothers, unborn babies and newborn babies, and gynecological problems.
6. Important to have long term surveillance of lung function and eye symptoms

9. Statistical tests are applied to check if the difference in proportions of a particular health problem between two areas can be explained as a chance occurring. The outcome of these statistical tests is a probability figure or 'p-value'.

10. Health effects due to long term exposure to cyanide compounds within the body following environmental exposure

7. Comprehensive list of all victims for mass treatment, compensation and rehabilitation.

Communication

8. Evolve a continuing education strategy for all governmental and non-governmental health personnel through newsletters and informal group meetings. Identified areas include:
   i) Sodium thiosulphate therapy; Management of lactation failure
   ii) Identification and management of psycho-social stress
   iii) Risks to mothers and unborn foetus and need for surveillance
   iv) Family planning advice till completion of detoxification
   v) Role of respiratory physiotherapy, Caution against overdrugging
   vi) Need for surveillance of high risk groups, Importance of medical records
9. Dynamic creative nonformal health education of affected community with information built around their lifestyle, culture and socio-economic status. The areas identified include:
   i) Sodium thiosulphate therapy; Respiratory physiotherapy
   ii) Ongoing research programmes and informed consent
   iii) Risk to unborn and new born babies; Family planning advice
   iv) Management of lactation failure including low cost weaning foods
   v) Importance of records and regular checkups
10. Occupational rehabilitation and compensation: to be done imaginatively keeping in mind their previous occupations and the residual disabilities.

Coordination

11. The government must adopt a policy of enlisting the help of all non-governmental agencies and groups wishing to work in Bhopal. This process must be active and supportive.
12. It is imperative that the victims as well as the entire country must be provided with all the details of how the accident occurred, of the nature of the chemicals released and of the reasons why the detoxification by sodium thiosulphate has been so badly mismanaged.

Addressing gaps in knowledge

The pathogenesis[11] due to gas exposure was argued around three hypotheses in the mfc report:

– Lung damage

– Increased cyanide in the body (cyanogen pool)

– Psychological effects post disaster

Following the mfc study, attempts were made to address the identified knowledge gaps. A literature review was conducted on the use of the hypothesised antidote sodium thiosulphate[12] (23). Symptoms and signs in victims indicated that the causative factor for the health problems was cyanide poisoning. The results of three other studies also suggested multi-system findings. Also, in several separate cases significant improvement in health was noticed following treatment with thiosulphate. A double-blinded clinical trial[13] by ICMR also clearly suggested that thiosulphate significantly reduced symptoms in patients. Guidelines were prepared and provided to local doctors on the use of thiosulphate for treating victims.

A literature review titled *'Health impact of Bhopal disaster – an epidemiological perspective'* (24) was prepared 1987[14]. The paper summarised the health situation in Bhopal.

There was limited knowledge of the health effects of the chemical exposure that occurred. The identity of the released chemicals itself was a subject of debate. Medical personnel also found themselves unable to handle this unusual situation, pointing towards the inadequate training and preparation for industrial disasters. The economically disadvantaged communities bore a double burden of disease – malnutrition and exposure to hazards of industrialization. Therefore there was an urgent need for a toxicological investigation to aid rational therapeutic care (treatment and rehabilitation) of the victims. The symptoms and signs of exposure in victims, pathological findings in organ systems during examination and autopsy, and analysis of chemical agents provided clues to answer the above questions.

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11. Pathogenesis implies the mechanism through which a disease evolves

12. Sodium thiosulphate reacts with the cyanate ions in the body to produce thiocyanate, which gets excreted through the urine.

13. This method is considered the gold standard in Epidemiology. An intervention is randomly allocated to the study population, and results provide evidence on the effectiveness/efficacy of the intervention.

14. This was prepared by Dr Thelma Narayan as a part of her MSc thesis at LSHTM

The report described the disaster as an explosive, acute, point epidemic. The state government classified the degree of exposure of various areas using mortality rates of each area. Many additional factors were not taken into consideration though. For example, each grave used on the night of the tragedy was counted as one death though several bodies were buried in each.

Also, many families had fled from the scene, which led to the victims list being incomplete. Information on wind direction and atmospheric conditions were neither disclosed nor considered while classifying exposure. The demarcation of the total exposed area itself was a difficult exercise, the reasons for which were:

- No clear idea about the distance beyond which there was no exposure/effect[15]
- Mass migration post disaster led to a decrease in exposed population.

Box.5 shows the data on death counts following the Bhopal disaster from published reports. The variations in the figures illustrate the importance of defining the method of estimation when such data is presented. Without adequate description, such figures become non-interpretable.

Box.5: Mortality in Bhopal (24)

Death rates reported in various studies differed from each other based on:

– study design (including time of study) and sample

– reporting of deaths in various hospitals

Table: Data of post-exposure mortality in Bhopal from pre-1986 studies

Investigator	Time of study	Crude post exposure death rates
MP state government	Early post disaster	Severe: 23.4/1000 Less hit: 3.2/1000
ICMR	Shortly after disaster	48.5/1000 (males) 40.5/1000 (females)
Anderson et al	10 days post exposure	Worst hit areas: 30/1000
Banerji et al	1 month post exposure	Severely hit areas: 65.3/1000
Patel A et al	3 months post exposure	Severely hit: 86.6/1000 Less hit: 7.6/1000
Sathyamala et al	9 months post exposure	Severely hit area: 33.8/1000

15. This is a constant dilemma encountered for most environmental exposures.

A review of the available epidemiological evidence on the health impact of the Bhopal disaster was also a part of the same MSc paper. The conclusions of the paper have been listed in Box.6.

Research following the Bhopal tragedy saw the use of epidemiological, qualitative and participatory techniques. Evidence was built over time, both by the government and the civil society, but translation of knowledge into action was inexplicably and inexcusably lethargic by the government.

Box.6: Conclusion of the paper *'Health Impact of Bhopal Disaster – An Epidemiological Perspective',* by Dr Thelma Narayan (24)

The Bhopal disaster has been a human tragedy of immense dimensions. The suffering caused is incalculable. Important tasks remain ahead for the provision of the best possible care for the victims and for the prevention of such events in the future.

There is a need, first, for the measurement, understanding and documentation of the impact of the disaster on the health of those exposed, so as to be able to provide rational care. It is necessary also to document the seriousness of the effects so as to prevent an easy erasure from human memory of the event. Epidemiological skills could help in this effort as described in this report.

At the present time it is known that similar small-scale 'technological disasters' occur frequently. Larger scale disasters could also occur. Hence, along with the deeper causes of these disasters being tackled, there is a need to have a strategy to deal with such events.

Outlines for this are as follows:

It is necessary to have epidemiological data for an adequate understanding of the effects on human health. This would include data regarding the numbers and demographic structure of the population at risk, the age/sex/area distribution of the fatalities if they occur, and similar data regarding morbidity.

Through collaboration between clinicians and epidemiologists, it would be necessary to evolve simple, standard criteria for assessment and documentation of morbidity.

Similarly, a method to assess exposure needs to be evolved.

Collaboration and communication between administrators, service providers and researchers is important.

Close contact and communication with the affected people is the most important factor. In the absence of this, once could easily slip into esoteric, theoretical exercises, which are meaningless to the problem at hand.

These efforts have to be seen in the context of the broader issues raised by such events. In Bhopal, these would include: the economic relationship between multinationals and countries of the third world which determine factors like technologies and safety systems used; the exploitative relationship with the workforce and the local community to maintain high profit margins; the siting and safety systems of hazardous chemical plants; legislation regarding an implementation of safety controls; the workers, and communities, right to information; the role of pesticides; and the acceptable limits to the chemicalisation of our world. The true causes of the disaster and the scope to prevent such events in the future are/be in the matrix of these issues.

Solidarity with the campaign for community health justice

For their involvement with research and advocacy in Bhopal and encouraging the use of thiosulphate in treating exposed individuals, some mfc members were arrested and monitoring by intelligence officials over a period of few years (7).

Solidarity through media

Mfc constantly reminded the media and society about the impacts and consequences of the Bhopal tragedy (25). They also critiqued the role that was played by the media in communicating news from Bhopal (26)(27), as the media are important stakeholders in campaigns for social justice. Emphasising the importance of availability and accessibility of scientific information, mfc stated that, *"Illness of some people are given more importance than those of poor people and nameless"* (26). It was re-iterated that industrial and environmental hazards were not an unavoidable occurrence but rather organized violence against fundamental rights of humanity, health and access to justice (28). All in all, the "Communicating Bhopal" experience was a mixed bag, the media playing a supportive role in some situations and falling short in some others.

Solidarity through international conferences

The Permanent Peoples Tribunal (29) published two CHC-SOCHARA papers (24)(30) in the tribunal report (Figure 6), one on the epidemiological evidence of health impacts, and the other on industrial hazards.

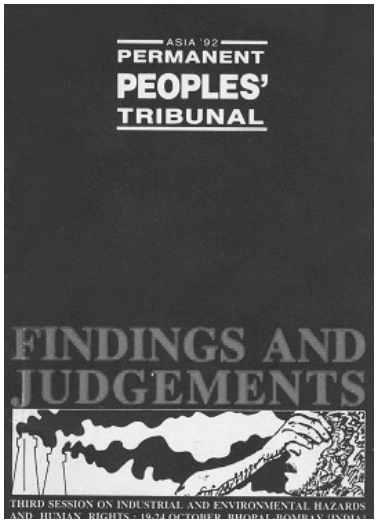

Figure 6: Cover of the PPT-Asia Report

The International Medical Commission on Bhopal, an international advocacy group comprising of doctors originally from Bhopal, organised a conference on the theme, for which a scientific review prepared by CHC-SOCHARA was included. The review was on disaster-related mortality and morbidity in Bhopal, and the response by the government and other groups (31). Additionally, inadequacies of the program, poor delivery of services, lack of documentation, absence of data (which would have helped in planning remediation measures), lack of "social accountability of research" (a feature common to disaster situations) and lack of support for basic needs were highlighted.

Over the years, direct work with the affected community at Bhopal has ceased, but solidarity with the networks for justice in Bhopal, the Sambhavna trust and the Bhopalis still remains. Fellows in the Community Health Fellowship Programme[16] at CPHE-SOCHARA[17] Bhopal are taken for field visits to these organisations and have the option of being posted with them. Events such as Bhopal Remembrance Day are conducted to mark the occasion of the tragedy, which bring together pollution impacted communities from different parts of Karnataka state (32).

Box.7: Pollution by Harihar Polyfibres in Dharwad, Karnataka

It was not much after the Bhopal Gas Tragedy that mfc were approached by Gopi Krishna of the Transnational Centre for Non violent Social Change, Harihar, Dharwad district. The complaint was against a rayon factory Harihar Polyfibres (Grasim) polluting river Tungabhadra and the local environment. Health effects of the toxic pollution occurring there had not been documented. CHC was then just a four member team of which only two had technical knowledge on epidemiology, and so only limited technical guidance was offered. A draft plan to understand the health situation there was also presented at the mfc meeting in 1986 (33). Regional Occupational Health Centre, Bangalore was requested to carry out the project which was conducted later (6)(34) following approval from ICMR.

16. The two-year fellowship programme at CPHE Bhopal was started in 2008, admitting twenty from Madhya Pradesh who are trained and mentored towards becoming community health practitioners.

17. CPHE or Centre for Public Health and Equity is another functional unit of SOCHARA started in Bangalore and Bhopal in 2008.

Box.8: Ionising radiation and health

An mfc meeting on *Radiation and Health* was conducted in 1984. Surendra Gadekar, a scholar-activist from North Karnataka and a member of the antinuclear energy network, felt that the Atomic Energy Commission of India had underestimated the health and environmental risks of nuclear energy. CHC, with others, had contributed towards the planning of a health impacts study of nuclear energy plants (7).

Also, Mr. Padmanabhan, a scientist working on cancer in Allepy, Kerala (due to the presence of thorium in the sands) and Kochi (due to the enriching plant, Indian Rare Earth) used technical feedback from CHC while researching the incidence of Mongolism and cancer in the fishermens' community in Allepy (7).

Chapter 3: STORY OF MALARIA

Malaria and other vector borne diseases contribute heavily to ill health in developing countries, including several areas in India. The central government's programme for control of malaria has seen many phases, but it still continues to be a major threat. As the conventional techniques used by the government were not leading to effective control of vector and transmission of disease, there was a need to relook and reflect on the effectiveness and appropriateness of those strategies (which include use of DDT[18], bed nets and a management protocol for cases with fever).

The opportunity for this deeper reflection came in 1996 when CHC partnered with the Voluntary Health Association of India in an initiative on malaria control. CHC members coordinated the effort and compiled a report on an appropriate malaria control strategy. The report demonstrated connections between mosquitoes and large developmental projects. Reminding that malaria is an environmental problem, it was recommended that each area should plan and employ locally relevant control strategies, along with the application of bio-environmental control methods using larvivorous fish (such as gambusia and guppy that eat mosquito larvae) which, though difficult to maintain, are effective and non-hazardous.

To further strengthen the evidence in the use of bio-environmental methods, studies were conducted to test effectiveness of larvivorous fish in community settings. Efforts were also made to popularize these methods in the community using local traditional communication methods like folk theatre (kala jatha), and communities themselves were involved in the implementation and maintenance of these methods.

The involvement with malaria control progressed through the policy front with the Roll Back Malaria initiative of the World Health Organisation. This initiative, which included several civil society partners, specifically recognized malaria as a major concern and aimed at reducing the malaria burden in the world. CHC participated as the editors of the Roll Back Malaria report for the WHO South East Asia Regional Office. Targets for the reduction in malaria morbidity and mortality were set for the region.

Having recognized malaria as an environmental problem, the interventions for control also needed to be environmental, and be implemented at the community level. For this, capacity building efforts of communities were made, with the drafting of training

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18. DDT stands for dichloro diphenyl trichloroethane. It is a pesticide used mainly for malaria control in developing countries. It is banned in most developing countries as it is a persistent chemical with impacts on ecosystem and human health.

modules for women's empowerment and participation in mosquito control at community and district level. An innovative module was also written on malaria and malaria control for high school students studying with Central Board of Secondary Education as a part of their curriculum in Environmental Studies.

Collaborations with several local citizens' action groups and municipal bodies in Bangalore and Mangalore were undertaken to improve mosquito control. Both the cities were home to malaria, where control of mosquito breeding was proving to be a difficult task. CHC along with other researchers from National Institute of Malaria Research identified that inappropriate urban planning and construction design was leading to widespread stagnant water pools where mosquitoes were breeding. The importance of each stakeholder was emphasized for the control efforts, and suggestions were made to the respective local governmental bodies to act as per the recommendations given. Improvement in the design of storm drains and roofs of homes, along with the use of bio-environmental control methods were some of the specific suggestions given.

SOCHARA's efforts to broaden the understanding of tackling malaria as an environmental problem, along with other work in the field of vector control have been shared in the section that follows.

Work with Voluntary Health Association of India

SOCHARA involvement in malaria control began with an expert group discussion on Malaria convened by Voluntary Health Association of India (VHAI) in April 1996. Following that discussion, a commission was setup to prepare a report on an appropriate malaria control strategy. SOCHARA members played the role of main contributor and expert group member, along with five other distinguished researchers (35). Excerpts from the report are in Box.9.

Box.9: *'Towards An Appropriate Malaria Strategy – A Report'* (35)

It was recommended that the malaria programme allow flexibility and diversity of response to diverse local situations, it being a focal phenomena governed by presence of parasite, vector, susceptible host and suitable environmental conditions in the community. Also, the "mosquitogenic" potential of large developmental projects such as dams, irrigation/canal systems and laying of roads and railway lines was highlighted, due to which Environmental Impact Assessment (EIA) must become mandatory for all developmental projects. Neem and citronella plantations were suggested as environmental interventions for families and communities to control malaria. In relation to the vector control, the concerns were:

- Development of insecticide resistance
- Environmental pollution due to use of insecticide for vector control
- Lack of adequate infrastructure and studies regarding the relevant environmental ecological factors for vector control in different areas
- Lack of inter-sectoral coordination with different departments and developmental projects (irrigation, agriculture, flood control, public works, water supply and drainage systems in urban areas.) for reduction in vector breeding
- Poor or absence of area specific spraying strategies
- Need to strengthen among other things bio-environmental control at all levels
- There is an important complementary role for voluntary sector

This report created credibility in the field of malaria for SOCHARA and paved the way for additional work in this field. Follow-up reports and articles showed through a broader socio-epidemiological analysis that the healthcare system was increasingly resistant towards rational and sustained malaria control (36). Issues of concern were:

- Human and financial resource intensive short term control methods such as *Insecticide treated bed nets* were being given priority.
- Projects like the Indira Gandhi Canal in Rajasthan (which brought water into a previously water scarce area) and changes in agricultural practices were also contributing to the spread of malaria.
- Health impact assessments were not being done for these 'developmental' interventions.

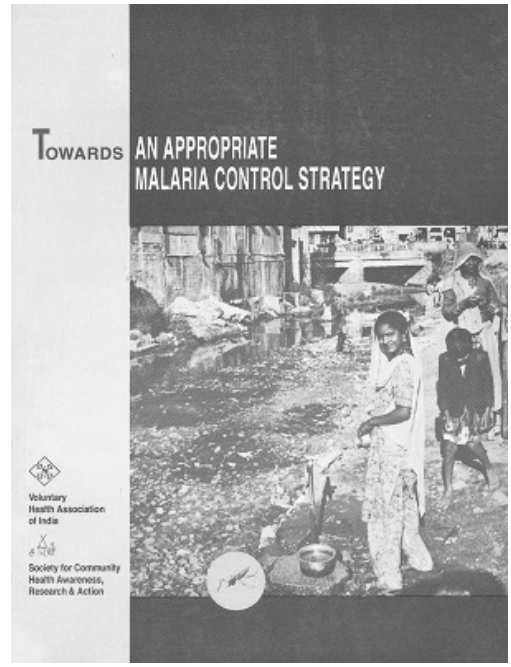

Figure 7: Towards an appropriate malaria control strategy (Cover)

Bioenvironmental methods were pitched as more sustainable long term methods. Bioenvironmental control research with larvivorous fishes was pursued by CHC and NIMR, and some papers were also written on it (37).

Policy reports and workshops

Roll Back Malaria

After the WHO announced the Roll Back Malaria strategy in 1998, CHC members edited and compiled the WHO SEARO report on Roll Back Malaria strategy (38). This initiative hoped to re-energise the malaria control programmes in each country and increase focus on the reduction in morbidity and mortality from malaria. Focus was given not just for treatment guidelines for malaria cases, but also for integrated vector management that included interventions like residual spraying, bed nets and bio-environmental control. Emphasis was also laid on community empowerment and participation, and it was recommended that multi-sectoral involvement including NGOs and private sector will further strengthen malaria control efforts.

Symposium Presentation

A presentation on the socio-epidemiological research challenge in malaria control was made at the Second Sir Dorabji Tata Symposium on *'Trends in Malaria and Vaccine Research'* in Bangalore (39). A table from the presentation summarizing the needed shift in paradigm in malaria research is presented in Box.10.

Community bio-environmental control of malaria

Bioenvironmental control in malaria is the use of larvivorous fish in open freshwater sources to help keep the larval forms of mosquitoes (especially anopheles) under check.

Figure 8: Kalajatha as a communication medium

In 2001, a campaign for control of malaria using bio-environmental methods was carried out in Tumkur. Several stakeholder meetings were held with officials at the village and district levels including the District Commissioner. Training programmes were also conducted in partnership with the Malaria Research Centre of the National Anti Malaria Programme.

To strengthen the evidence on this method, a study was carried out to test the effect of folk theatre (kalajatha) as a community based health education tool on the

bioenvironmental control of malaria in rural endemic areas of Karnataka (40). For this activity, five teachers and ten anganwadis were made available by state government's departmental directors. Two teams of 15 artists each were informed about community involvement in malaria control. They incorporated this information into a folk theatre performance and rehearsed. The kalajathas were conducted in December which was video documented (32). After two months of intervention, there was a significant reduction of malaria cases. A community assessment of the Malaria Research Centre bio-environmental study was also done. Following this, 225 participants for Tumkur district were training as 'preraks' (encouragers) for community organised malaria control in March, 2002 (32).

Box.10: In his presentation titled ***'Beyond Biomedicine – The Challenge of Socio-epidemiological Research'*** at the Second Sir Dorabji Tata Symposium (39), Dr Ravi Narayan mentions the importance of socio-epidemiological research by quoting several studies that show a community approach to control of malaria as a logical solution to the problem. Failure of public health in the control of malaria so far has been a result of the lack of this process. The environmental aspects of Malaria causation and control were highlighted too.

Malaria: socio-epidemiology focus of research and solution (39)

Focus	Factors (to be researched)	Solution / Control strategy
Bio-medical		
(Vector borne disease) (Agent-vector Environment)	Diagnosis Treatment Drug Resistance Insecticide Resistance Healthcare system failures	New diagnostic techniques New drugs New vaccines New insecticides Operational research (focus on technical and managerial problems)

Socio-epidemiology		
(Community at risk) (Society at risk) Social Economic Cultural Political Behavioral risk factors	Malariogenic development strategies Migration patterns Environment/ecological changes Poverty/Inequality (Access/affordability) Community (Knowledge-Attitude-Practice) Healthcare providers (Knowledge-Attitude-Practice) Resistance of public health system	Health impact assessment and response policy Health care policies for migrants Eco-sensitive development Poverty alleviation strategies Health education and IEC Continuing education and orientation Reform/strengthening of public health system

Capacity building efforts

Chapters in training manuals on malaria control were written by CHC-SOCHARA for womens' groups at village and district level (41)(42). This effort, part of the Women's Health Empowerment Training organised by the Ministry of Health and Family Welfare in 15 states of India, aimed at empowering women on health issues. Through capacity building exercises, the importance of water management in the local areas was impressed upon, especially in relation to stagnation around the house and around hand pumps. It was suggested that excess water should be drained off to vegetable gardens. The use of neem leaves to fumigate households and the application of neem oil on the bodies to reduce mosquito bites was encouraged. The breeding of gambusia fish in local lakes and growing *damro* (Ocimum basilicum) or *tulsi* (Ocimum sanctum) bushes near houses were other eco-friendly alternatives suggested. As the nodal agency for Karnataka, the CHC-SOCHARA team trained trainers and facilitated the process in six districts. A large state level workshop on integrated vector control was also organised through the Karnataka Taskforce on Health and Family Welfare in which CHC-SOCHARA played a key role along with the Department of Health and Family Welfare (6).

Similarly, an innovative module on malaria and malaria control was also written for high school students of the Central Board of Secondary Education, as part of curriculum for Environmental Studies (4). This was field tested by a team member in the Tribal Regional of Jharkand and West Bengal in April, 2000 as a part of an MSc Thesis (43).

Malaria control efforts in Mangalore and Bangalore

During 1999, CHC got involved with a malaria control and research initiative in Mangalore organised by a citizens group *Malaria Jaivika Niyantrana Samithi* (Committee for Biological Control of Malaria) of the *Mangalore Mahanagara Parisarasaktha Okkuta* (Mangalore City Environment Group) (44). Current policies and activities on malaria, vector monitoring and integrated vector control for water bodies in Mangalore were discussed. The importance of various stake holders, including environmental groups, NGOs, trade unions, and schools was emphasised. There was a call for inter-sectoral action, including contributions from the agricultural department, city corporation, urban development department, construction sector, fisheries department, local industries and others. Training on bio-environmental control was also conducted for NGOs, women's groups and volunteers from different organisations in Mangalore city.

Figure 9: Participatory exercise for malaria control at community level

While evolving a strategy for mosquito control in Bangalore (45), failure on the part of the Bangalore Corporation in implementing the recommendations given in an earlier Master Plan was highlighted. These included environmental improvement (especially in slum areas), multi-sectoral involvement, community participation, enforcement of Public Health act, better material management and use of appropriate technology for mosquito control. Concerns were raised about lake beds, storm water drains, construction activity, local water management awareness, road building, architecture and civil engineering with respect to their ability to provide breeding grounds for disease spreading mosquitoes. There was a plea to recognise the complexity, multi-sectorality and multi-dimensionality of the malaria problem and accompanying challenges. Participation with the Bangalore Agenda Task Force on Environmental Management

of Mosquito Nuisance was also one of CHC-SOCHARA's efforts in the campaign for malaria control.

Figure 10: A government official releases larvivorous fish into a pond

In SOCHARA's current focus of comprehensive primary health care and "health for all", malaria is just one component. But it is a great example of the health problems arising from the current developmental paradigm which ignores health and environmental costs.

Box. 11: Handigodu Syndrome

K P Sasi, a documentary movie maker was keen on investigating an epidemic of joint-pain in Malnad, Karnataka in the late 1970s and early 80s. This phenomenon was termed as "Familial Arthritis" and was seen mostly among males. The probable cause was eventually narrowed down to high concentration of pesticides in crabs which the men were mainly eating. CHC provided technical inputs on the illness and maintained correspondence with Sasi, other journalists and health workers. This case study was used to teach medical students the link between agriculture and health (7).

Box.12: Work on Dengue in Bangalore (6)(7)

Based on a newspaper article on Dengue outbreak in Bangalore in 1998, Dr Rajan Patil conducted preliminary investigation to confirm the authenticity of the news report. It was seen that serologically confirmed cases of dengue were indeed identified by the physician practicing in north-western part of Bangalore. Two surveys were conducted between June 1st and July 24th 1998 to further the information on this outbreak – the first was with other leading physicians and hospitals in the area, and the second was with the three labs in Bangalore which had dengue serology facility (Bangalore Institute of Virology, Mallya Hospital and Manipal Hospital). The data showed that 38 confirmed cases were detected, primarily by the private institutions (32 out of 38 cases). It was also seen that most professionals spoken to during the survey were unaware that dengue was a notifiable disease until the survey. The analysis also showed that there may be some clustering of cases in the north-western part of Bangalore.

The findings of this exercise were immediately shared at a workshop conducted at CHC on Dengue in Bangalore. This workshop, attended by 38 staff and postgraduate students from various medical colleges in Bangalore, covered themes including – clinical and epidemiological features of dengue, surveillance and notification related issues. It was decided that a follow-up session would be conducted to discuss the need for a more systematic survey in north-west part of Bangalore, and the need for awareness raising activity.

Dr Ravi Kumar, an official with the National Anti Malaria Programme who had attended a special training on Dengue control, was invited to share at a meeting on Integrated Vector Management using a community health approach to tackle the public health problem of Dengue.

Chapter 4: STORY OF CHESS

Several communities all over the world suffer the impacts of pollution of their air, water and land. Many of these are farming and fishing communities, who are affected even more, as the land and water are also their source of livelihood. Yet we see an increasing number of communities being buried under the weight of toxic chemicals and other pollutants in the wake of development.

This situation called for a struggle, not just for environmental justice but also for health justice. Health, it was realised, could be a powerful tool in this struggle. And so began the initiative of Community Health Environment Survey Skill-share or 'CHESS' in 2001. The brain child of community health practitioners and environmental activists, this initiative created a platform for communities impacted by pollution to express their struggle and the effects of the pollution on their lives and livelihoods. This simultaneously created a platform for health researchers to find meaningful and relevant research topics. Since 2001, this venture has seen four national level workshops, each covering several themes including industrial pollution, pesticides, toxic chemicals, mining, occupation health and lay epidemiology. In fact, lay epidemiology stands as the crux of this initiative. CHC co-hosted three of these workshops, providing resource persons for facilitating sessions on participatory research and lay epidemiology.

Through this initiative, several communities were empowered with the skills of systematic documentation of exposure and health related events. Skills and experiences are shared between the health workers of affected communities, and also between academicians and community health volunteers from affected areas.

Partnerships have evolved as a result of these workshops, and CHC has, in various capacities, been involved directly with affected communities in each of those cases. CHC members visited Kasargod in Kerala in an effort to video document the community's plight resulting from the aerial spraying of a pesticide endosulfan, and provided scientific inputs to the local groups attempting to study the health impact that had taken place. Evidence being shared by the company was also critiqued in a scientific manner.

The involvement with pollution impacted communities in Tamil Nadu has been more extensive, especially on the case of mercury pollution by the thermometer factory currently owned by Hindustan Lever Limited at Kodaikanal. The factory workers group was supported through medical examination, documentation of health problems, providing testimonies in the ongoing court case, and in reviewing and critiquing health related documents produced by the company.

In Cuddalore and Mettur in Tamil Nadu, polluting industrial complexes had decreased the quality of life and impacted livelihoods of the local population. In each of these places, efforts to document and communicate environmental pollution through community monitoring techniques by local volunteers are ongoing. These volunteers were also trained regularly in the identification and documentation of health impacts of pollution.

In Karnataka, manual scavenging still thrives, making it hard to believe that we live in the 21st century. Groups working for the upliftment of this oppressed community also participated in a CHESS workshop which helped build the bond with CHC. A project was taken up to study the health situation of manual scavengers in Chitradurga. This occupation poses a major risk to health through direct (suffocation while working in man-holes) and indirect means (rampant regular alcoholism prior to work hours). Groups working with manual scavengers (such as Thamate and Jeeva) now play an important role in the Karnataka State Chapter of the Peoples Health Movement.

These and several other communities in South India were assisted in one or many ways in their struggles by SOCHARA members, some of which have been described in the section that follows.

"CHESS is a national collective of people, communities and groups working against toxic pollution created by a range of unsafe and unsustainable activities (mining, industrial estates, waste dumping, pesticides, tanneries, radiation etc)" (46).

Community Health Environment Survey Skill-share

The idea of CHESS arose following discussions between environmental activists and CHC-SOCHARA. Greenpeace and other environmental groups approached SOCHARA in 2001 as they had encountered difficulties in court cases against polluting industries in several communities in India. (47)(48). Involvement in the Bhopal campaign had brought CHC-SOCHARA some credibility in the field, and they were approached to help strengthen health related epidemiological evidence for pollution impacted communities (7). A dialogue between interested groups was set up and a network of environmental activists was built to contribute to the process of CHESS workshop 1 (47). (49)

Box.13: Aims and intentions of CHESS:

The Aims of CHESS (49) are to equip community campaigners and health professionals to:

- Perform community health surveys
- Apply their results subsequently in campaigns

The intention (49) is to:

- end pollution
- hold polluters liable for full and long term rehabilitation of survivors' lives and their environment, and
- plan for means to initiate health care interventions to provide immediate and long term relief for victims of industrial pollution.

Participants at the various CHESS meetings have included activists and medical practitioners from pollution-affected communities, occupational health doctors/ activists, community health professionals/activists, toxicologists, lawyers, workers, and representatives from trade-unions, consumer groups, farmers groups, and researchers (49). For NGOs, CHESS is a forum where they get exposed to the kind of integration needed and the scientific thoroughness required for success of their campaigns (47). CHESS also presents a two-fold opportunity for researchers

- to find out the important EOH problems that need to be studied, and
- to make their skills useful to peoples' needs

CHESS workshops

As CHESS is a network without any individual ownership, the process of deciding the agenda for each workshop has been through participatory process (47).

CHESS Workshop 1 was held at United Theological College, Bangalore between the 13th and 15th of August, 2001. CHC-SOCHARA, Thanal, CorpWatch and Greenpeace organised the event. The platform brought together health professionals, community representatives, NGOs working on local issues, lawyers, and consumer groups. Its aims included (48)(32).

- Equipping community campaigners to perform community health surveys
- Using study results to empower themselves and assert their 'right to know'
- Ensuring the results are used to force polluters to pay for damages, which include clean-ups and compensation for people's health problems

Those in attendance included 23 resource persons from CHC-SOCHARA, Greenpeace, Toxic Link, ROHC and St John's Medical College, and 15 campaigners from Thanal (Kerala), Paryavaran Suraksha Samiti (Gujarat), Citizens for Alternatives to Nuclear Energy (Bangalore), Mines Minerals and People (Hyderabad), Palani Hills Conservation Committee, Endosulfan Spray Protest Action Committee (Kasargod), Periyar Malinikaran Virodh Samithi (Eloor), Chintan Environmental Research and Action Group (New Delhi) and other individuals (32)(50). Communities struggling against toxic pollution shared their experiences with the researchers. This was followed by a discussion to identify the main health concerns, the planning of health studies and the difficulties to conducting an epidemiological study in each of those situations (47). The effects of pollution on human health emerged as the main issue for discussion. CHESS became a forum for sharing skills and information on dealing with the threats to health from industrial pollution.

CHESS Workshop 2 was a much bigger event and was held at Visthar, Bangalore between 26th and 28th of July, 2002. It served as a follow-up to the first workshop. Approximately a hundred participants representing fifty groups (51) including resource persons from National Institute of Occupational Health and other epidemiologists from various regions attended this event. The intention was to provide the community groups with regional contacts of research professionals. Financial support for this event was partly obtained from Global Green Grants Fund (GGF), USA (52). The workshop focused on

- Hands-on skill training in lay epidemiology
- Conducting health surveys
- Dovetailing efforts to develop national policies and
- Strategies on key thematic areas such as pesticides and health; industrial effluents and health; radiation and health and corporate liability.

The workshop was attended and co-facilitated by Dr Elizabeth Guillette, a renowned epidemiologist from the US, who has worked on issues of children's health in connection with pesticide exposure especially in relation to physical and mental development. Three discussion groups were created to discuss problems of pesticides, industrial pollution, and toxins respectively.

'A Lay Epidemiology Module for Activists and Campaigners' (53), aimed at those who have no training or experience in epidemiology, was prepared at CHC-SOCHARA and distributed to all the participants. It covered subjects such as: basic epidemiology, bio-statistics, planning of health studies, designing questionnaires and surveying. The need

for a scientific temper among activists and the strengths of good science were highlighted (51). The document's table of contents has been presented in Box.14.

CHESS Workshop 3 was conducted in August, 2004 by Mines, Minerals and People (MMP), Hyderabad. CHC-SOCHARA team members were minimally involved in the organising of this workshop, and just attended as delegates. Issues related to mining and health was the specific theme of this workshop.

CHESS Workshop 4 was conducted by CHC-SOCHARA and Corporate Accountability Desk (CAD), Chennai at Vishranti Nilayam, Bangalore, between 28th and 31st of August, 2008. The theme of the workshop was occupational health of the unorganised sector. Occupational health is a much neglected issue despite workplace hazards, injuries and deaths rising to disaster-like proportions (54). The workshop was divided into two parts:

- Prioritising Worker's Health: A Strategy-cum-Resource Sharing Workshop held on 28th and 29th
- Occupational Health and Safety Training held on 30th and 31st

Box.14: Table of contents: *'A Lay Epidemiology Module for Activists and Campaigners'* (CHC publication) (53)

Definition of Epidemiology
Uses of Epidemiology
Iceberg of disease
Concepts of causation
Risk factors
Concepts of prevention
Modes of intervention
Validity
Reliability
Sensitivity and specificity
Tools for measurements
Incidence
Prevalence
Associations and causation
Criteria for attributing causal association

Why survey
Rationale of epidemiological survey
Aims of survey and other epidemiological studies
Epidemiological approach
Asking questions
Making comparisons
Survey
Formulation of hypothesis
Uses of survey
Sampling
Design of questionnaires
Pre-testing
Epidemic and its investigation

Figure 11: Delegates participate in a group activity at CHESS-4

The meeting aimed to bring together people of various capacities assisting workers' struggles for medical and economic rehabilitation, better health and working conditions. This included trade union representatives, labour support groups, public interest doctors, industrial hygienists, scientists, lawyers and academics. The Occupational Safety Training was conducted by Asia Monitor Resource Centre; a Hong Kong based labour rights and resource group (54).

SOCHARA is in direct regular touch with just few of the groups that attended the workshops. Formal feedback was not collected and follow-up was not done, which makes it is difficult to comment on whether the attendees' expectations were met. But informal interactions suggest that there was improved awareness on the importance of health evidence among environmental activists (47). It was also noted that activists were impacted more by CHESS than researchers. Hardly any new researchers join the initiative each year. There is a need for many more researchers to join the group (47).

Figure 12 shows the various ventures that arose following each CHESS workshop. Figure 13 shows the CHESS project areas of SOCHARA. These workshops are a rare forum which provides a platform to democratic dissent the poor accountability by the state and industry towards maintaining healthy environments. By providing a space for sharing, it also improves morale of those working on these challenging issues (47). It is however difficult to comment on the future direction of the CHESS initiative as no group individually owns it (47).

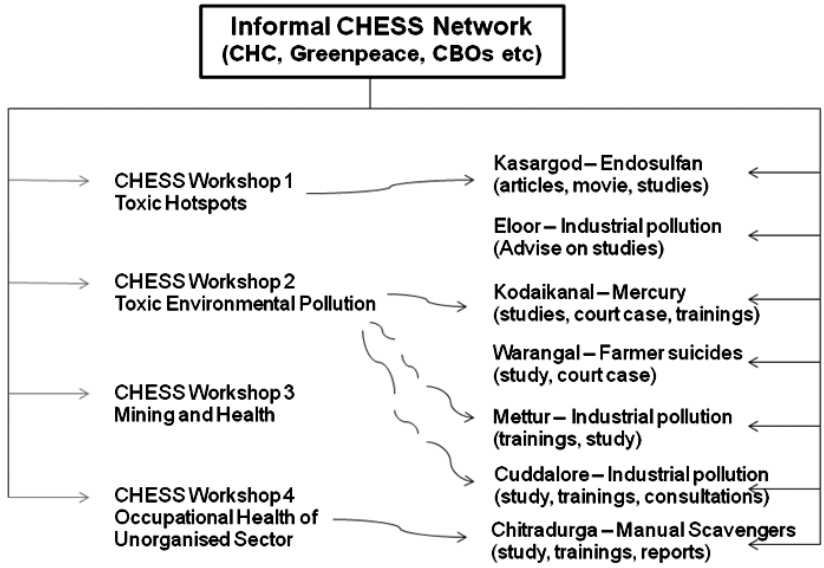

Figure 12: Understanding CHESS - how networks and ventures developed

Figure 13: Map showing the project areas associated with CHESS

CHESS in Kerala

Kasargod's struggle for a clean environment

The cashew plantations of Kasargod were being sprayed aerially with a pesticide called endosulfan by the Plantation Corporation of Kerala. This was done twice every year between 1978 and 1998. During this period the environment and human health in Kasargod suffered severely with the disappearance of several animal species from the area and the occurrence of unusual health outcomes in the local population including abortions, congenital defects, mental retardation and cancers. The campaign to ban the aerial spraying of endosulfan intensified in 1999.

In January 2001, a representative of the pesticide industry visited CHC to provide alternative evidence on the health and environmental impacts of endosulfan (7). To verify the company's claims on endosulfan, a review report was prepared by fellows at CHC which showed that endosulfan is a persistent and toxic chemical (55).

Some CHC-SOCHARA members visited Kasargod between 18th and 25th of January 2002 where they met Dr Romeo Quijano, a senior toxicologist from Manila, and Dr Revathy, from Pesticide Action Network, Malaysia. The affected villages were visited and evidence was collected on video camera by Dr Raj Kumar of SOCHARA. The video documentation led to the creation of a short film *'Sprays of Misery'* (32)(56).

After years of struggle, aerial spraying of endosulfan was stopped in Kasargod, and the use and sale of endosulfan was banned in Kerala following a high court judgement. Though health outcomes continue to plague affected families, the health profiles in the previously contaminated areas are improving with time (57).

Eloor's deteriorating health due to industrial pollution

Eloor is a village on the banks of river Periyar near Kochi, Kerala. It is home to several industries including the only DDT producing plant in the world (Hindustan Insecticides Limited), and a thorium[19] enrichment plant. Eloor is one of India's toxic hotspots. Results of tests conducted on the water from Periyar river and the local environment showed evidence of severe pollution, following which Greenpeace decided to conduct a heath study there in 2003.

CHC team members contributed as advisors in the epidemiological study at Eloor (58). The aim was to document the health status of the local population in comparison to a control

19. A radioactive element

Figure 14: Fact-finding mission at Eloor

group in a nearby village. The campaign is an ongoing one, and the local activists succeeded in pressuring the government to supply fresh water to the area, and to commission a more comprehensive health study. The pollution however has not been abated yet.

CHESS in Tamil Nadu

Partnerships between local groups in Tamil Nadu, Corporate Accountability Desk (CAD, an activist group in Chennai) and CHC began with the second CHESS workshop. Soon after the workshop, a study was conducted at Kodaikanal by SOCHARA members, which contributed to the highlighting of health impacts in the overall campaign. Some work was also done with the stone cutters in Mahabalipuram for which a questionnaire was developed and employed to monitor routine health impacts of the occupation (47).

The work in Cuddalore was initiated in 2006. There is a strong community led campaign in Cuddalore which has resulted due to systematic documentation and sustained support from activists (47). The campaigns in Kodai and Cuddalore are however affected by corporate influence, interference and apathy (47).

Figure 15: Community health activists from Tamil Nadu participate in a body-mapping exercise

Mercury pollution at Kodaikanal

Kodaikanal was home to the Pond's Thermometer factory since 1984. In 1997, Unilever took over the factory and the plant was renamed Hindustan Lever Limited (HLL) Thermometer factory. After almost two decades of operation, issues of environmental pollution, mishandling of wastes and worsening health of workers was brought to light by concerned groups like Greenpeace, CAD and CHC-SOCHARA (59). An initial visit by a medical team from SOCHARA encouraged the workers group to take the campaign further.

The company commissioned a study on the health status of workers and the environment in the factory, and presented the findings to the SOCHARA team. It was based on a sample of 255 workers in the factory. The SOCHARA team was not given a copy of the report either prior to the discussion or after it. SOCHARA's peer review, based solely on the information provided in the computer presentation (60), concluded that:

- there was lack of clarity in the study objectives
- occupational history of the workers was not adequately considered
- inadequate use of data on health from company records
- absence of exit interviews (when employees leave the company)
- average values of parameters presented without providing the range
- further analysis of those with higher urinary mercury levels needed
- quality control of lab tests not undertaken
- data was not analysed against all guidelines
- personal level monitoring of local environment would be a more accurate exposure measurement option

Box.15: Preliminary neurological investigation in Kodaikanal, TN

Dr. Mohan Isaac and Dr. Praveen had visited Kodaikanal to conduct a preliminary assessment of workers potentially exposed to mercury during their tenure with the thermometer factory (61). Thirty workers were examined on 27th July, 2001 and this included former and current workers. Findings and suggestions made were:

- no neuro-psychiatric symptoms/signs
- frequent ill-health
- health problems cited as main reason for resigning from job
- need for a complete assessment of all workers

Though it was a small study, it did a great deal for the campaign, and has been quoted extensively following its publication.

The CHC team was also invited by the Executive Committee meeting of the HLL factory workers union at Kodaikanal to make a presentation to the High Court Committee on behalf of the workers (62).

In 2009, the company eventually submitted its plan for cleaning the premises. A new debate has emerged on whether the "planned activity" would be adequate to decontaminate the area. SOCHARA has continued to be involved in this campaign by supporting the lawyers in investigations, critiquing health reports published by the company scientists, and providing technical medical inputs to the workers group (47). The Kodaikanal campaign highlights the importance of health based arguments while demanding justice.

Industrial pollution at Cuddalore

This town of coastal Tamil Nadu houses a SIPCOT[20] industrial complex with many pharmaceutical and chemical plants. Ironically, these pharmaceutical industries which produce life saving medicines are polluting Cuddalore's local environment with hazardous waste. Seeing their local environment getting polluted, residents got together to form the Local Area Community Environmental Monitoring Committee to systematically monitor the levels of pollutants in the area.

SOCHARA team members have participated in public hearings organised by the group (63), reviewed company reports, prepared factsheets on the polluting chemicals, given inputs to reports (64)(63)(65), helped lawyers prepare for cases, and also provided technical advice during gas-leaks and spills (66).

The community based health volunteers at Cuddalore attended the third CHESS workshop, and received additional inputs through another workshop conducted in Cuddalore by CHC team members. A plan was made for surveillance of health and developmental problems in local children, and this is yet to be implemented (62). The local group is committed to the cause, and strives to improve the situation through evidence gathering and advocacy.

Figure 16: a) Dr Rakhal at a public hearing at Cuddalore, TN; b) Dr Sukanya conducting a workshop at Cuddalore, TN

20. SIPCOT: State Industries Promotion Corporation of Tamil Nadu. More information at: http://www.sipcot.com/

Box.16: Global Greengrants Fund

Dr Thelma was a member of the Grant Making Advisory Board of the Global Green Grants Fund during the year 2003-04. She helped channelize funds for some of the environmental health activities including the CHESS trainings and Community Environmental Monitoring activity (52).

Industrial pollution at Mettur

Another town affected by industrial pollution in Tamil Nadu is Mettur. River Cauvery and the agricultural land around the polluting factory have been polluted by a "cocktail" of toxic chemicals.

SOCHARA was approached for professional inputs by activists from CAD. Compared to the community campaigns at Cuddalore or Kodai, this campaign lacked structure and strength as the community based group was not well settled. This led to an ad-hoc involvement.

The West Gonur Farmers Association is the primary campaigning group fighting a legal battle for "loss of ecology" of their farm lands due to the pollution by the Chemplast Sanmar factory. The health related advocacy served as an adjunct to that case.

Box.17: A report titled *'Unfolding Disaster – A study on Chemplast Sanmar's toxic contamination in Mettur'* (67) was released in November 2007 by Corporate Accountability Desk, Chennai in which Dr Rakhal has remarked, "the widespread presence of excessive levels of atleast 17 chemicals with known harmful effects and the possible combined effects of long term exposure to a cocktail of 52 chemicals points to nothing less than a potential public health disaster.....unless this dangerous situation is addressed urgently, there is potential for serious, unpredictable and potentially irreversible consequences as well as long term damage to environment, livelihood, food and water".

In 2007, eighteen workers were screened for health effects, of which three were found to be possible victims of vinyl chloride, chlorine gas and mercury exposure respectively. Christian Medical College (Vellore) further evaluated the three patients, one of whom was labelled as possible case of mercury induced peripheral neuropathy. This statement was however retracted by the college when the company produced a leprosy certificate for the same employee (47).

SOCHARA team members along with other health researchers critiqued a health study commissioned by the company (68). This study, which stated that there was no pollution or health impact due to the Chemplast Sanmar's activity at Mettur, was not peer-reviewed and was deficient in its rigour in addressing the stated objectives. Several gaps in the methods and analysis were highlighted.

Box.18: Reflections on the campaigns in Tamil Nadu: Dr Rakhal suggests that the main components of a powerful and potentially successful community campaign are the presence of a strong local community group, technical support for the research work and the assistance from activists (47). Since Mettur has had problems, mainly from the point of view of a strong community group focussing on health, it has been different from the other campaigns. That is the main stumbling block at Mettur. The Kodaikanal and the Cuddalore campaigns have stronger community groups, support from activists and also availability of technical support (47).

CHESS in Karnataka

Kolar mines – an occupational and environmental health issue

Kolar is the home to several thousand families who had been dependent on the gold mines for livelihood. These families suffered following the closure of mining operations in March 2001.

SOCHARA undertook a study on the health issues being faced by these families. For the study, the workers colonies in Kolar were interviewed. The data showed (i) occurrence of starvation deaths (ii) each family had unpaid debts (iii) high rates of suicide (iv) rising levels of mental ill health and chest related problems (v) anaemia among women common (69).

The situation's background was compiled into a conference document (70) in November 2004. It reported a large number of starvation deaths. Family members attributed over sixty deaths to 'stress and agony' from closure of the mines. There were no ration shops to take care of the families' nutritional needs, the company hospital was closed, and the poor sanitation facilities could potentially cause outbreaks of infection. The company had withdrawn water, sanitation and electricity services of the community.

The mill tailing dump, a cyanide laden health hazard from processed ore wastes, was found to occupy ten percent of the total area of the workers township. There was also a need to address the deplorable living conditions in the workers colony and the loss of employment. Several meetings were conducted to call for solidarity and action from

concerned groups for the betterment of the mine worker's colony at the gold fields. The issue of human rights violations at KGF were also discussed with the local municipal director (71).

Follow-up of this campaign was interrupted due to relocation of team members responsible for it. Such interruptions are commonly seen in community based campaigns which take technical support from outside. Hence the effort is made to empower communities with requisite skills to lead their own campaigns.

Work with the manual scavenging community at Chitradurga

Following the third CHESS workshop, a research exercise was initiated with a group called Jeeva in Chitradurga. The group worked towards safer employment and better compensation for the marginalised community of manual scavengers. Some members of the scavenger community were rehabilitated into other occupations. SOCHARA documented their health seeking behaviour and the health problems faced due to their occupation (72)(73). Engagement with community based organisations continues, and some of them also represent local chapters of the Peoples Health Movement.

Box.19: Silk workers and child labour study (74)

Karnataka is the silk industry hub of India. The unfortunate reality behind this, at least formerly, was that several children were involved in each stage of the production cycle. Movements for Alternatives and Youth Awareness (MAYA) along with support from SOCHARA members conducted a situational analysis of child labour in this industry in 2000 to advocate for further action on the issue with the government and donor agencies. Some areas in Channapatna and Ramanagaram were chosen for the survey, and it was found that 1591 children were employed in this industry in those areas. An occupation health study on the effects of sericulture work in filature units on health of children was conducted in Ramanagaram (control group in Malavalli) by Dr. Rajan Patil in association with Department of Paediatrics, St Johns Medical College, Dr Om Prakash, St Martha's Hospital, and Rotary Hospital, Ramanagaram (51).A socio-economic survey was conducted to analyse the links to child labour and SES. It was found that poverty was not the main determinant of child labour, but rather due to "sheer neglect and indifference on the part of the parents, community and the state."

Box.20: Pollution at Medak, Andhra Pradesh

This village is another industrial area which has documented pollution. There was a study conducted there by Greenpeace for which Dr Thelma served as an advisor. *'State of Community Health at Medak District'* (75) was the report released by Greenpeace for which Dr Thelma and Dr Mohan Isaac were advisors.

Box.21: Warangal, Andhra Pradesh: the case of farmer suicides

Warangal, a cotton growing area in Andhra Pradesh, was a hotspot for farmer suicides. Toxic link, Sarvodaya, Centre for Research Education and CHC partnered in a fact finding mission to study farmer deaths in the light of the reported occupational exposure to pesticides. A report of the fact finding mission *'The Killing Fields – Farmer deaths due to exposure to pesticides in Warangal'* (76) was published in January 2002. Dr. Rajan Patil of CHC was a part of the fact finding team. The report was on the use and misuse of pesticides in cotton cultivation, occupational toxicity and environmental impacts of pesticide use (based on absence of avian fauna in the area, a detailed ecological investigation was recommended). It was reported that the areas around Warangal were the highest consumers of pesticides in the country and an estimated 500 deaths were occurring due to pesticide spraying in Warangal each year during the spraying months from September onwards.

Other CHESS associated activities

The Bucket Brigade Conference

Figure 17: Dr Rakhal explains toxic exposure, symptoms and disease.

The four-day International Bucket Brigade and Community Environment and Health Monitoring Conference was held in New Delhi in February, 2008 (77). It was organised by Community Environmental Monitors (CEM), CHC-SOCHARA and Global Community Monitor and was attended by 40 delegates from India from 15 pollution impacted communities and 10 international delegates from pollution impacted communities in their own countries (US, Russia, Kenya, South Africa and Thailand). The conference provided a venue for sharing

local and global experiences in community monitoring, especially the use of environment monitoring as a tool for community mobilization, understanding the nature of chemicals and their toxicity, and campaigning for change using health evidence.

SOCHARA team members, being resource persons for the workshop, presented on several topics including concepts of health, determinants of health, concepts of health monitoring, and limitations of science and causal theory. They were also involved in planning and organising the sessions of the workshop (78). Later that year, a CHESS workshop on community monitoring (62) was conducted at Cuddalore for the communities affected by pollution by Dalmia Cement Factory and the ONGC pipelines (79).

The CHESS initiative, with its unique agenda hopes to bring about unity among communities struggling for a common cause and support them with professional inputs. A participatory exercise is needed to measure the extent to which the objectives were satisfied, and to understand the strengths, weakness, opportunities and challenges of this process.

'Infochange Agenda' issue on occupational health

SOCHARA members along with Madhumita Dutta and Nityanand Jayaraman edited an issue of the quarterly journal Infochange Agenda, on the theme of Occupational Health in India (80).

In the editorial *'Introduction: Work can kill'* (81), they highlighted that 40,000 workers die each year and several more get affected with occupational diseases, most of which are seen in the informal sector. These figures are in stark contrast to the official figure of 1,624 deaths. The poor documentation and data on occupational health in the country was attributed to poor reporting systems and coverage. Most of the deaths and illness among workers was occurring in the informal non-unionised sector, primarily in families which lie at or below the poverty line. Occupational health research was also being influenced by private firms.

Testimonies of workers suffering from occupational diseases were presented. These were followed by articles by various authors on themes including: occupational health policy in India, saltpan workers, legislations for workplace safety, chemical exposure, construction industry, garment workers, pesticides, "controlled use", sanitation workers, software industry, ESI, mercury, "survival over safety".

SOCHARA members also contributed to two articles. The first article, *'The neutrality of science'* (82), talks about the neglect of occupational health research especially with

respect to the unorganised sector. Scientists, while focusing on "method", were not focusing on research questions which were important from the community perspective. Also, appropriate dissemination of data was not being done. Communities had inadequate scientific support and advice in times of need. The scientific agenda and the science itself were also being influenced by corporate powers.

In another article titled *'ESI roadblocks'* (83) the plight of workers attempting to access Employee State Insurance services was highlighted. Despite deductions being made from their salaries, eight million workers and their families were finding it difficult to access ESI services and schemes. Most first contact ESI dispensaries were non-functional. The workers were not even aware of the several benefits and entitlements under the scheme. To further increase problems with access, forms were not being made available in local languages, and excessive amounts of paper work were needed for claiming benefits. A couple of case studies of patients involved in legal tussles with ESI for compensation were also presented.

Box.22: Interventions to reduce air pollution related health risks – workshop (84)

This two-day workshop was organised in Bangalore in January, 2008 by Cerana Foundation and Karnataka State Pollution Control Board and sixteen institutions including CHC, St John's, VHAI, CPCB and BBMP and was attended by over 120 participants including students, doctors and policy makers. It was open to the citizens of Bangalore and the agenda was to map issues and concerns of different communities suffering from polluted air (indoor/outdoor) and to strategise locally to work towards change. Thelma and Sukanya were involved in the planning of the workshop. Sukanya also participated as a resource person and spoke on the topic "Community Health and Air Pollution". The presentation introduced the audience to approach the problem through a balloonist view to understand to causes behind causes of air pollution which are affecting communities. A community health approach was suggested as the appropriate cost-effective way of reducing ill health because of air pollution. CHC committed to work with the steering committee to tackle air pollution related health risks by strengthening capacities in community health.

Box.23: Report on asbestos workers' health and struggle for compensation (85)

Dr Rakhal Gaitonde of SOCHARA and Madhumita Dutta of Other Media conducted a series of visits, meeting and interviews at Mumbai in November 2007 with former workers of an asbestos factory – Hindustan Composites Ltd. The objective was to document the workers' struggle for compensation for the health impacts of the job. It was found that a large number of workers had been diagnosed by physicians as having asbestosis, but even this was not helping them claim rightful compensation from the company due to poor judicial support, and this had led to a deep sense of betrayal among them. Over two years had gone by in waiting for a court hearing date. In 2004, 41 workers were confirmed to have asbestosis among the 183 tested. The interviews further showed that the precautionary and safety measures taken at work were inadequate, causing the workers to get exposed to asbestos dust (despite suction machines clearing upto 70% of the dust) and to other hazards like organic solvents. Regulatory authorities too allegedly never inspected the plant, and conducted air sampling at the main door and the canteen areas. The company also had strategically decided to hire contract workers on a periodic basis from the 1980s to reduce liabilities and the possibility of unionisation among workers. The workers themselves, though aware that the job was dangerous were not informed about the dangers, and they didn't see any other options for employment either. Even the doctors performing yearly checkups never gave them any advice or reports on their health conditions.

The workers reported increasing cough, breathlessness and tiredness with increasing years of work. Also, many alleged cancer deaths among ex employees were reported. The authors comments that despite the lay approach of this paper, a very high risk for cancer had been demonstrated. With the post of the compensation commissioner vacant, and the strong company lobby, the workers are of low morale for claiming for their compensation, and their health continues to deteriorate with the wait.

Chapter 5: POLICY ENGAGEMENT

Contributions to task force reports

SOCHARA team members have contributed to several policy reports and workshops, including state level health reports for Karnataka, Orissa and Gujarat. EOH issues have featured in each of these. Relevant details from these reports have been given in the following section.

Karnataka State Task Force for Health and Family Welfare – April 2001 (86)

The SOCHARA team contributed to the final report of the task force: *Karnataka – Towards Equity, Quality and Integrity in Health.* The report laid emphasis on several public health issues including water, sanitation, pollution, solid waste management, fluorosis and occupational Health. The importance of "Environment" as a determinant of health was mentioned, and issues such as agriculture, industry, housing, water supply, sanitation, tobacco control, poverty and development were discussed.

Water and sanitation: Highlighting the importance of providing safe drinking water and sanitation facilities to the public, coordinated action with the Pollution Control Board, Water Supply and Sanitation Boards and local government bodies was recommended for dealing with water pollution due to sewage, industries, agricultural and urban runoffs, and arsenic and fluoride contamination. Suggestions were given to improve availability of potable water in rural areas and to make sanitation facilities available in rural areas. Emphasising that multiple stakeholders were part of the process, the absence of a comprehensive policy on waste management and pollution control was stated. Recommendations were given separately to deal with general (municipal wastes) and special (hazardous, natural resource depletion) wastes, including efficient urban waste collection and disposal, regulation for industrial wastes, and the implementation of health and environmental impact assessments for proposed developmental projects. With regards to malaria and other vector borne diseases, a recommendation was made to include bioenvironmental methods in the control programmes.

Occupational health: Workers involved in agriculture, sericulture, poultry farming, industry, stone cutting, asbestos, agarbatti industry, tea plantations, and beedi rolling were mentioned explicitly. A call was made for a) improved preventive services especially for the unorganised occupations, b) occupational health services in large industries, and c) improvement in access to healthcare through insurance schemes.

Tobacco: The situation of tobacco consumption and control in Karnataka and the dangers of passive smoking were discussed. Measures for tobacco control like education, awareness, taxes, legal measures on advertising, control of production and supporting the Framework Convention for Tobacco Control (FCTC) were suggested. A recommendation was made to ban consumption of tobacco in public places, sale to minors, and sale near educational institutions. It was additionally recommended that incentives could be provided for farmers who change from tobacco cultivation to other crops and measures be laid for compulsory compensatory reforestation by tobacco companies. High pollution levels were mentioned as a cause of concern, and that impact assessments were necessary for proper developmental planning.

The VISION 2020 document had set targets that Karnataka should aspire to achieve by the year 2020 which included: the supply of potable water to 100 percent population, sanitation services to 80%, and improved waste management in cities and industrial areas. The right to live and work in a healthy environment was emphasised, with additional emphasis on the condition of slum dwellers. Expert bodies are to be setup for pressing environmental problems like global warming, ozone depletion, air water and soil pollution.

The Karnataka Integrated Health Policy - 2003 (87)

The health department discussed and reflected on the Task Force Report and eventually brought out a health policy for Karnataka to address "the specific health needs of the state". This document contained several components, including intersectoral coordination (section 5.5), environmental health (section 5.10), communicable and infectious diseases (section 6.1) and occupational health and safety (section 6.7). Community participation and role of panchayat institutions (section 7.2) was classified as a cross cutting policy issue. It was stated that linkages between various boards and departments will be strengthened. Medical waste management and hygiene promotion were mentioned as a priority issue, along with reduction in community exposure to sources of pollution. Bioenvironmental methods were emphasised and dengue was recognised as a public health problem. The need for greater occupational health support for agricultural and unorganised sector was recognised. The need for developing mechanisms for implementation of these action points through involvement of community based organisations was also mentioned.

Box.24: Orissa Vision 2010 – A Health Strategy (Medium Term Strategies and Action Points) (88)

Integrated Orissa State Health Policy – 2002 states that inter-sectoral coordination and linkages with the departments of Urban Development, Rural Development, Environment, Mines, Water Supply and Sewerage Boards and Pollution Control Boards is a must for attaining a good standard of public health.

Importance was given to provision of safe potable drinking water, and occupational health of those exposed to mining areas, water pollution and pesticides. More emphasis would now be given to ensure safer workplaces and improvement in situation of toxic hotspots. Due mention was given to the importance of impact assessments in development projects. Deforestation, 'developmental' activities and lack of access to forest resources were implicated in seriously affecting the health of tribal populations.

Workshops

CHC encouraged the bringing of environmental health to the forefront of discussion within the People's Health Movement (PHM) and hosted a workshop on this theme during the 2nd People's Health Assembly. They also coordinated the Environmental and Occupational Health sub-group of the Indian Chapter of PHM (62). SOCHARA, along with other organisations such as Hesparian and Global Greengrants Fund, made efforts to improve the comprehensiveness of the environmental health section of the Peoples Charter for Health (6) during the second Peoples Health Assembly at Cuenca, Equador (89). Box.25 contains the 'Environmental Challenges' section of the People's Charter for Health (90).

A group initiated by SOCHARA, 'Community Health Forum' met during the year to discuss the 'Environment Summit at Rio'; which was led by Dr. Vanaja Ramprasad of Green Foundation (91). Inputs were also given on EOH including environmental impact assessment at the Gujarat Public Health Act consultation meeting in 2007 (62).

The Asian Social Forum (92) was held in Hyderabad in January 2003 in which SOCHARA along with the Jan Swasthya Abhiyan organised four workshops, including one on "Environment and Health – A Peoples Campaign" with Nityanand Jayaraman and Kavitha of Greenpeace. The banner carried the slogan "A toxic free world is possible" (93). During the four-hour session, twelve testimonies were shared by groups from pollution impacted communities from all over India, to experts like Dr Quijano (University of

Box.25: 'Environmental challenges' from the People's Charter for Health (90)

Water and air pollution, rapid climate change, ozone layer depletion, nuclear energy and waste, toxic chemicals and pesticides, loss of biodiversity, deforestation and soil erosion have far-reaching effects on people's health. The root causes of this destruction include the unsustainable exploitation of natural resources, the absence of a long-term holistic vision, the spread of individualistic and profit-maximising behaviours, and over-consumption by the rich. This destruction must be confronted and reversed immediately and effectively.

This Charter calls on people of the world to:

- Hold transnational and national corporations, public institutions and the military accountable for their destructive and hazardous activities that impact on the environment and people's health.
- Demand that all development projects be evaluated against health and environmental criteria and that caution and restraint be applied whenever technologies or policies pose potential threats to health and the environment (the precautionary principle).
- Demand that governments rapidly commit themselves to reductions of greenhouse gases from their own territories far stricter than those set out in the international climate change agreement, without resorting to hazardous or inappropriate technologies and practices.
- Oppose the shifting of hazardous industries and toxic and radioactive waste to poorer countries and marginalized communities and encourage solutions that minimize waste production.
- Reduce over-consumption and non-sustainable lifestyles - both in the North and the South. Pressure wealthy industrialised countries to reduce their consumption and pollution by 90 per cent.
- Demand measures to ensure occupational health and safety, including worker-centred monitoring of working conditions.
- Demand measures to prevent accidents and injuries in the workplace, the community and in homes.
- Reject patents on life and oppose bio-piracy of traditional and indigenous knowledge and resources.
- Develop people-centred, community-based indicators of environmental and social progress, and to press for the development and adoption of regular audits that measure environmental degradation and the health status of the population.

Philippines) and Dr Mira Shiva. The regions represented were: Eloor (industrial pollution), Doddaballapur (industrial pollution), Cuddalore (industrial pollution), Vellore (industrial pollution), Patamcheru (industrial pollution), Bhopal (industrial accident), Jadugoda (uranium mining), Nellore (mica mining), Angul (mining/ power plants), Sukhinda (Stone crushing), Sukhinda (Chromite mining) and Warangal (Pesticides).

A collective statement of concerns and demands (94) drafted by the groups at the end of the session stated that: governments and companies are responsible for their situation of ill health and toxic exposure. The act of toxic pollution was called a violation of basic human rights where many communities are made to suffer for profit of a few. The common demand was for informed decision making through precautionary principle, immediate application of regulations against polluting industries, and compensation to be given to communities which have been affected by toxics. Demands were also made for medical support for workers in dangerous jobs, special courts for settling such issues, and thorough surveying and reporting prior to setting up new projects. Emphasis was made on participatory decision making with communities that may get affected by acts of development.

A workshop on 'environmental justice' was also organised by SOCHARA at the International Health Forum, prior to the World Social Forum in Mumbai in January, 2004 (95)(96). This forum was attended by participants from forty four countries (96) including local CHESS partners and Global Greengrants Fund members (6). The participants together drafted 'the Mumbai Declaration' (97), which among other things, highlighted the need for "reversing environmental destruction". The declaration called for health activists to monitor environmental degradation and link with organisations working on environmental justice. It also demanded that legislations are passed by governments to make corporations more accountable for environmental damages (97).

The SOCHARA team also helped facilitate a three-day workshop on occupational health in May 2007 in Chennai, which was attended by 25 members from eight workers unions (62). On various other occasions, sessions were also conducted on environmental health and disaster preparedness for women's groups, slum dwellers associations, farmers groups and district health officers.

SOCHARA team members have therefore provided much needed inputs in policy reports and capacity building workshops in India and abroad on several aspects of environmental and occupational health.

Chapter 6: ENVIRONMENTAL HEALTH SOLIDARITY EFFORTS

Anti tobacco campaign

World Health Organisation (WHO) and the Framework Convention for Tobacco Control (FCTC) took on the tobacco industry in a strong manner under the leadership of Gro Bruntlandt. India and China were seen as targets by the tobacco industry for future business due to large young population and so these regions became priority for the FCTC to plan interventions. As Bangalore is a tobacco hub, SOCHARA was convinced to take part in this campaign (6).

SOCHARA's tobacco control activities began in the year 2000-01 with an informal review of the tobacco situation in the state. SOCHARA also joined the Global Alliance for the Framework Convention for Tobacco Control (FCTC) of the Tobacco Free Initiative of the WHO. A visit was organizing for WHO officials to a beedi rolling unit in Channapatna (43).

Consortium for Tobacco Free Karnataka (CFTFK) was set up to coordinate and expand the campaign. Many innovative approaches were used during the campaign against tobacco in Bangalore, especially involving children and youth (e.g.: anti tobacco education, networking with the NIMHANS de-addiction centre). Between 2000 and 2007, over 1400 college students, 7000 schools students and hundreds of governmental officials were training on the topic of harms of tobacco (32,43,51,71,95,98,99). Sensitization activities were conducted for over 500 street children with the help of Association for Promotion Social Action, Bangalore Oniyavara Seva Coota, Mythiri and Ragpickers Education and Development Scheme, to facilitate giving up the habit of chewing tobacco (71,95,98). Tobacco cessation workshops were also held with the help of NIMHANS for these children.

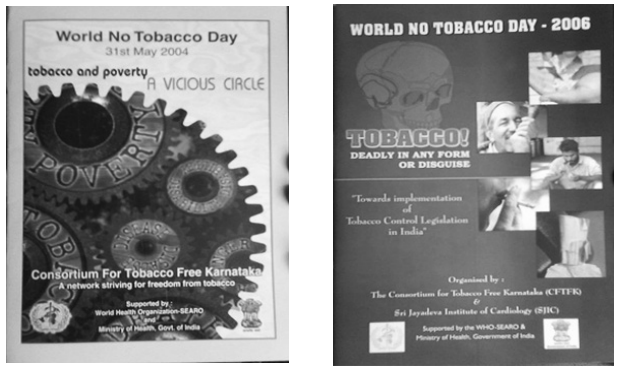

Figure 18: Covers of booklets released by CTFK on World No Tobacco Day in 2004 and 2006

A poster competition called “Tobacco-free campus” was conducted for students at Chitrakala Parishad. These posters, which portrayed the dangers of tobacco use, were then exhibited at various colleges to spread awareness. Over 10,000 students visited an exhibition organised in January, 2002 (32). Students groups were also created in several colleges.

Student rallies were conducted on the occasions of World No Tobacco Day (celebrated on the 31st of May each year) and Independence Day (15th of August) each year between 2002 and 2006 in which over 3000 students participated (51,71,95,98). At the announcement of stricter tobacco advertisement laws, the CFTFK performed a mock funeral representing the “death of tobacco” in front of the Vidhan Soudha. A similar rally with 2000 individuals was also conducted at Mysore Railway Station to improve tobacco control policies in Karnataka’s transport services (71).

A Workshop on the implementation of the Cigarettes and Other Tobacco Products Act, 2003 was conducted for the general public and health professionals, and was followed up with officials from state health department (99). It was demanded that the following aspects of the implementation of the Act be strengthened:

- Ban on smoking in public places,
- Ban on sale of tobacco products to minors,
- Ban tobacco advertisements including surrogate advertisements
- Ban on sale of tobacco products around educational institutions

At the Asian Social Forum, the Jana Swasthya Abhyan hosted a workshop on Tobacco and Health as a part of this campaign. A section was also included in the Karnataka task force report on health for the control of tobacco products (6).

Media was used effectively during these events, especially around the World No Tobacco Day, where interviews were given at print, radio and television platforms. SOCHARA members also participated in a media awareness workshop conducted by Press Information Bureau of India (98). Factsheets on tobacco harms was prepared in English and Kannada with the help of WHO (71). Three issues of Health Action and one issue of Christian Medical Journal of India were dedicated to the issue of tobacco control (71).

Other Campaigns

SOCHARA has supported campaigns which address the wider social determinants of health. These include local, national and international campaigns. The organisation

hypothesises that health could be a common banner under which all campaigns and movements could come together.

Using evidence based advocacy, SOCHARA supported the Right to Food (RTF) campaign and the campaign against the introduction of genetically modified crops in India. A formal letter to Mr Jairam Ramesh, Minister for Environment and Forests, was co-drafted with other health professionals highlighting the lack of conclusive evidence of safety of genetically modified foods. SOCHARA fellows have also directly participated in the RTF campaign providing administrative, communications and research support.

In Karnataka, the local chapter of the Peoples Health Movement has actively focused on advocacy against child malnutrition. Surveys were conducted in most districts and case studies were prepared to highlight the nutritional situation of children in the state.

SOCHARA also networks and supports several other people's campaigns and movements such as human right campaigns, community led total sanitation campaign, trade union movements, Narmada Bachao Andholan and the National Alliance of People's Movements.

Chapter 7: CAPACITY BUILDING IN ENVIRONMENTAL HEALTH

Environmental health training in the fellowship programmes

SOCHARA's fellowship programme has evolved over the years. From a more informal beginning during the 1990s, where fellows were given a space to explore their particular area of interest at CHC Bangalore, the programmes are now more formalized with the admission of a fixed number of full-time fellows each academic year. Two programmes are currently run:

- a two year Community Health Fellowship Programme at CPHE Bhopal
- a one year Community Health Learning Programme at CHC Bangalore (the third phase of this fellowship was just completed)

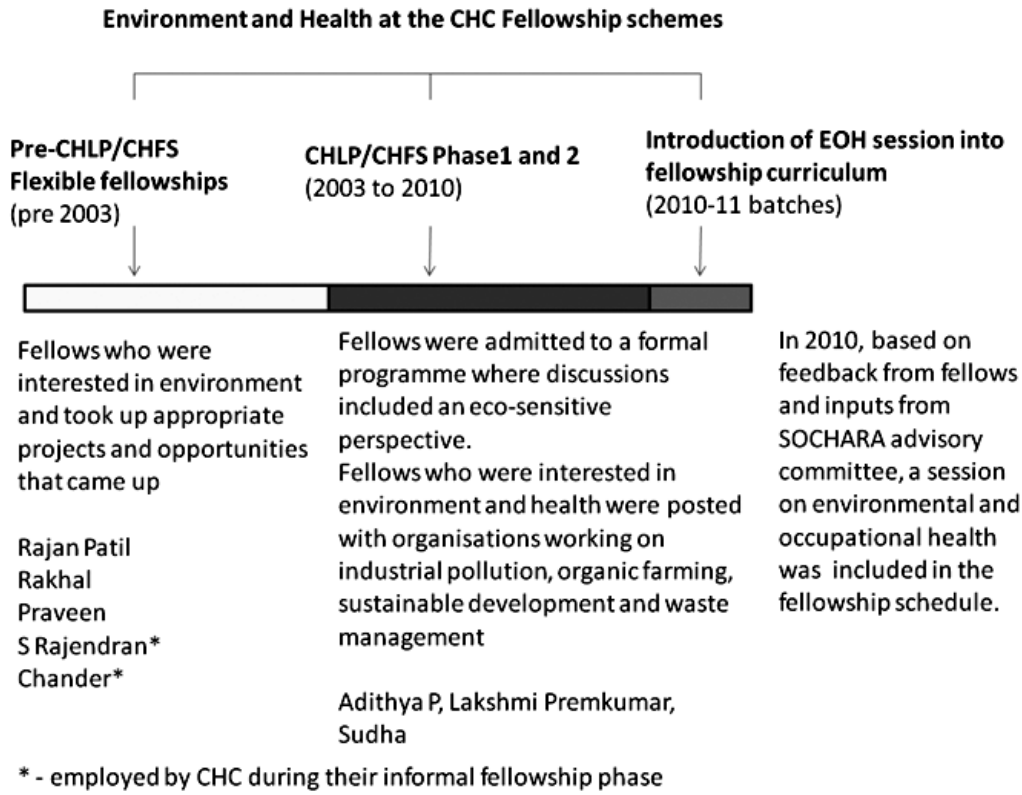

Figure 19: Environment and Health in the fellowship programme

It is not uncommon to find fellows who are interested in Environment and Health, as Figure 19 shows. Some of them have taken up Environmental and Occupational Health as their profession.

Based on inputs from fellows and the advisory committee, a dedicated session on EOH was included in the orientation schedule of the 2010 fellowship programme. The session was aimed at sensitising the fellows on environmental issues and how health and disease is intrinsically connected to the environment and its degradation. Several case studies from SOCHARA's experience and those of other community based struggles are used for these discussions. This session was conducted at the fellowship programmes at Bangalore (in English and Kannada, for which learning material was translated in Kannada) and Madhya Pradesh (in Hindi, for which resource materials were translated into Hindi). Fellows with specific interest on this subject have been encouraged to get placed with groups working on relevant issues to learn more about the research, policy, advocacy and field work in this area.

Other capacity building activities

CHESS is an effort in capacity building in lay-epidemiology in pollution affected communities. In an effort to improve engagement with environmental health policy and practice, several training manuals have been created and workshops have been conducted for various sections of the society.

Capacity building activities have focused on marginalised communities. Innovative methods are used for communication in such situations, for example: *Hamari Sehat Hamari Ladai*, an illustrated manual for building capacity of the Bhopal victims and local medical practitioners, and CHESS workshops for pollution impacted communities.

SOCHARA team members have also been involved in conducting the module on Occupational Health for the Masters in Public Health programme at Christian Medical College, Vellore.

Figure 20: Health workers from various districts of Karnataka at a capacity building workshop in Bangalore

Chapter 8: CONCLUSION – EVOLVING THE WAY AHEAD

This chapter presents the consolidation, analysis and interpretation of the SOCHARA's work in Environmental and Occupational Health (EOH) over the years. All the major projects have first been listed, followed by an analysis of the work done in those projects. A basic framework for future action in this field built on past experience is also proposed, along with an initial draft of a comprehensive definition of environmental health.

List of EOH projects with SOCHARA involvement

The important EOH projects are listed here to facilitate the reading of the analysis and interpretation that follows.

Bhopal: Research and advocacy following the Bhopal Gas Tragedy

CHESS: Community Health Environment Survey Skill-share network and workshops

ROHC: Regional Occupational Health Centre, Bangalore (ICMR institute)

Malaria Control: Work with VHAI, and in Mangalore, Tumkur and Bangalore

Anti- tobacco campaign: Nodal centre for FCTC (WHO), founding member of Consortium for Tobacco Free Karnataka (CFTFK)

Kasargod: Environmental contamination by aerially sprayed endosulfan

Kodaikanal: Mercury exposure at HLL thermometer factory

Warangal: Death of farmers by pesticide exposure

Eloor: Pollution of air and Periyar River by Industrial units

Kolar: Cyanide pollution due to gold mining

Medak: Industrially polluted district of Andhra Pradesh

Cuddalore: Industrially polluted town in Tamil Nadu

Mettur: Contamination of Kaveri River and Mettur by Sanmar Chemplast

Chitradurga: Work with Jeeva for the health and rights of manual scavengers

Radiation and Health: Radioactive pollution in Kerala and Karnataka

Harihar: Contamination of Tungabhadra River, Dharwad by Harihar Polyfabrics

Figure 21 shows the timeframes of involvement with each of these projects.

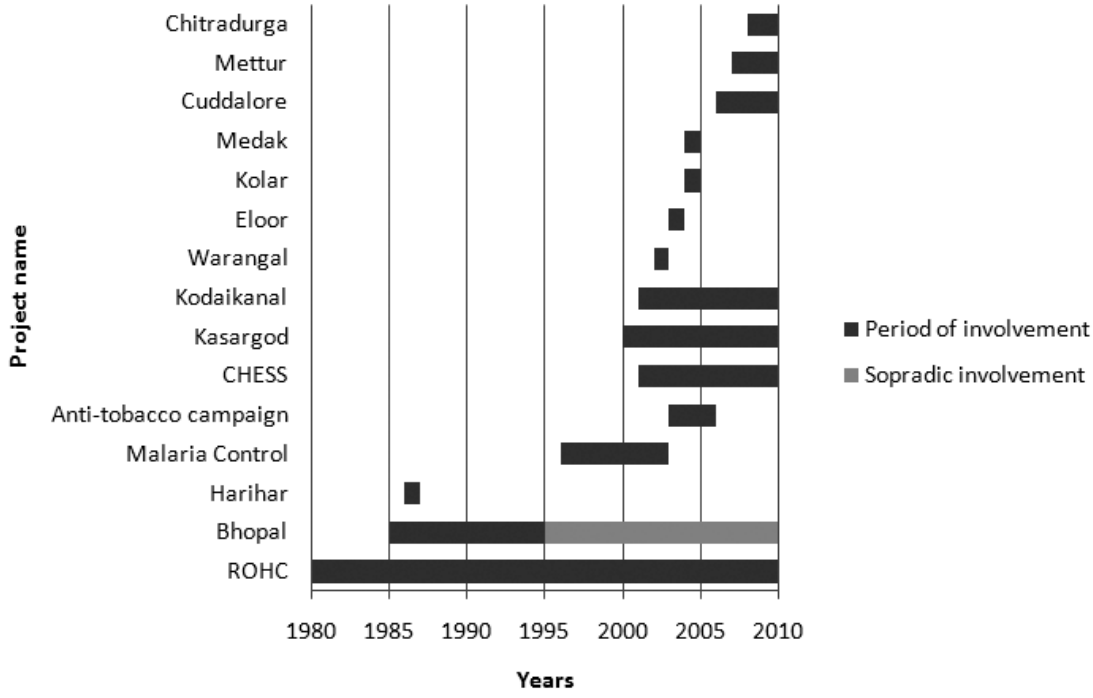

Figure 21: EOH projects (with period of involvement)

Roles that have been played

SOCHARA has played various roles in the above listed projects. A framework created by Rowson (100) on the 'roles of civil society organisations in Global Health' was used to categorise the various involvements in each project. Table 1 represents the result of this categorisation exercise. Based on the table, the major roles played by SOCHARA in EOH were as follows:

- **Research and Policy analysis:** This is the most common role played. Expertise in designing, guiding, evaluating and critiquing studies was lent to various groups and communities. Government agencies too have sought SOCHARA's consultation for various state level task force reports.
- **Communication:** Review articles and findings from primary research were published for the scientific community; newspaper articles and magazines were used to de-mystify scientific information for the society at large; and cartoons, pamphlets, resource books and documentary movies were used to communicate with affected communities.

- **Capacity building of civil society organisations:** Workshops and trainings were organised and manuals were produced to empower communities affected by pollution. SOCHARA's fellowship programmes also admitted those interested in EOH, and placed them appropriately.
- **Networking:** This core agenda of SOCHARA has been exemplified through the formation and involvement with the CHESS network. Networking has gone beyond just health organisations, to also include environmental groups, trade unions, farmers and womens groups, and citizens forums.

While Rowson's framework provided a template for the above analysis, it also provided an opportunity for two additional things:

- To assess the framework for its adequacy and suitability in the Indian context
- To assess if SOCHARA has played any role outside the scope of the current framework

The framework was useful for the analysis in the Indian context. There were aspects of SOCHARA's work, however, that were not classifiable in the existing framework. These have been listed in the section below.

SOCHARA's environmental health work paradigm

- *Responding to research pleas from the community:* While most research groups have their own research agenda, SOCHARA's work on environmental health research has only stemmed from requests by affected communities and activist groups.
- *Communication with the community:* SOCHARA's communication has been 'with' the relevant stakeholders, including the affected communities rather than 'to' the stakeholders.
- *Empowering communities:* SOCHARA's primary aim through the CHESS workshops was to empower communities, thereby enabling their own voices to be heard (rather than becoming the people's voice themselves). Community capacity building activities have been carried out following the Bhopal tragedy, in Tumkur for malaria control, and in Bangalore for tobacco control through the CFTFK.
- *Building a cadre of young EOH scholars:* Through the fellowship programmes, CHC-SOCHARA has nurtured young fellows interested in the field of EOH by placing them in relevant community based organisations and with impacted communities. A module on EOH is also being developed for the same.

Table 1: Roles played by CHC/SOCHARA in various EOH ventures (1984-2010)

Role/s played* by SOCHARA	Bhopal	Harihar	CHESS	Kasargod	Kodai	Warangal, Eloor, Medak (3)	Kolar	Cuddalore	Others	Role SCORE (of 11)
Representing the voice of the people	■		■		■				■	3
Advocacy and Lobbying	■		■		■			■	■	5
Research and Policy Analysis	■	■	■	■	■	■	■	■	■	11
Watchdog role	■		■		■					2
Communications to										
a) Scientific audience	■		■		■			■	■	5
b) Society	■		■	■	■				■	4
c) Affected community	■		■		■			■	■	5
d) Documentation	■		■	■			■		■	5
Involvement in Horizontal Governance Mechanisms	■		■		■				■	4
Involvement in Multilevel Governance			■							0
Horizontal and Vertical Networking	■		■	■			■		■	5
Building Capacity of Civil Society Organisations	■		■		■			■	■	5
Collaboration with Global Health Institutions			■						■	1
Project SCORE (of 13)	11	1	11	4	6	1	3	5	11	

*Source: (100); ■ The role has been played in that particular project process; ■ Role not played during that project process. ■ Not applicable; CHESS: workshop and network; Green text: Project associated with or following a CHESS workshop.

Evolving the community health approach to studying environmental health

Community health problems should be assessed at the various levels of causation, as interventions can and should be made at each of these levels. *The biomedical, public health* and *larger societal* challenges in EOH have been shown in Figure 22. The examples of mercury poisoning at Kodaikanal and the endosulfan tragedy at Kasargod have been used. This figure is based on a framework created at SOCHARA to explain various levels of challenges to public health problems such as tuberculosis and vector-borne diseases.

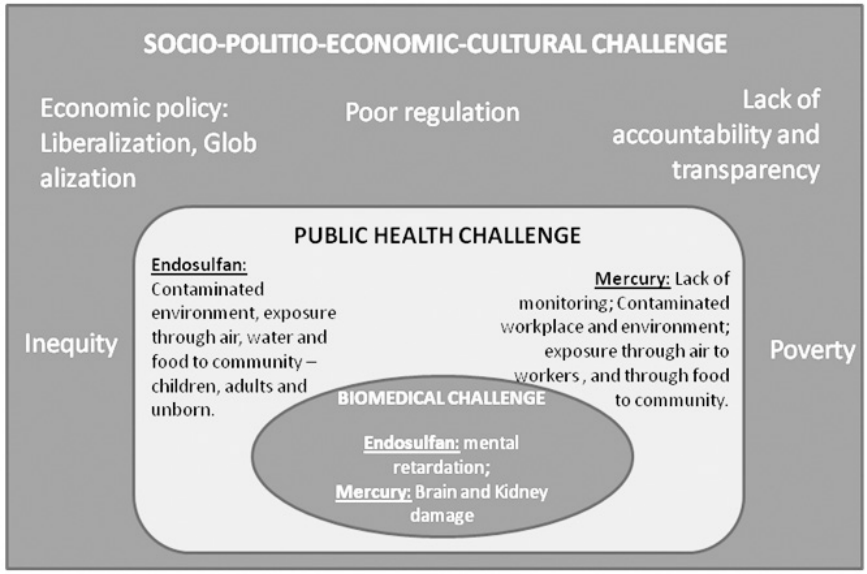

Figure 22: Levels of causation in Environmental Health

Challenges at each level need different interventions. The elimination of these problems requires work on the larger determinants of health. The larger socio-political-economic challenges are common for most environmental health issues and mainly stem from inequity and the mainstream approach to development.

The content of this report was further reviewed and analyzed to answer two more questions through a thematic analysis approach:

- *Why environmental problems occur?* (101)
- *What can be done about it?* (101)

SOCHARA has developed and used this analysis framework previously to study other community health problems, like antibiotic resistance (74). “Immediate causes” for environmental health problems were identified through a process of reviewing. These

points were further analyzed to understand which "systemic problems" led to these, and finally the "larger societal and global problems" causing these systemic problems were arrived at. Figure 23 represents the results of the analysis.

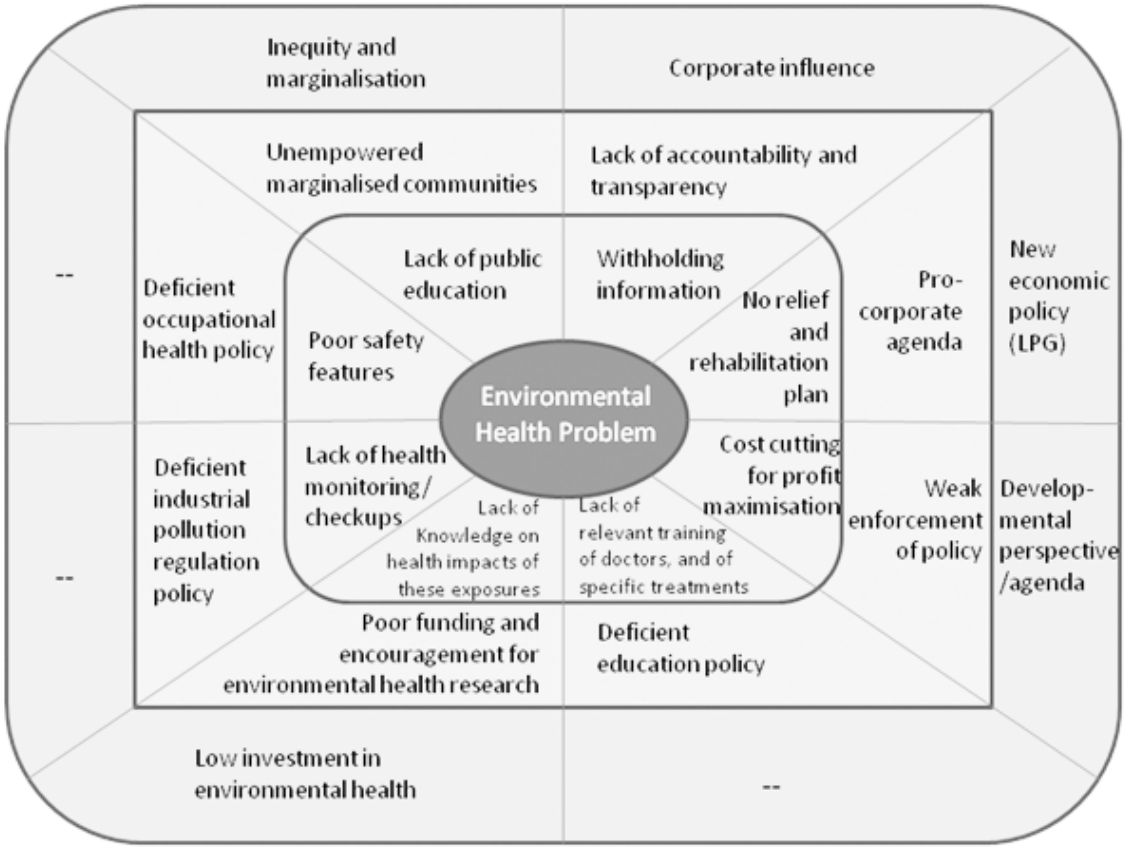

Figure 23: *"Understanding why"* of environmental health problems

The reviewing process also provided some "action/policy options" for addressing the "immediate causes". From these, potential solutions to address "systemic problems", and eventually the "larger societal and global problems" were derived (Figure 24).

Taking forward the learning from past experiences

The SOCHARA experience has been different in many ways from that of departments of environmental health. While there are components of research, policy analysis and communication, a unique point which emerged strongly is the effort towards empowering communities struggling for environmental justice. Based on reflections

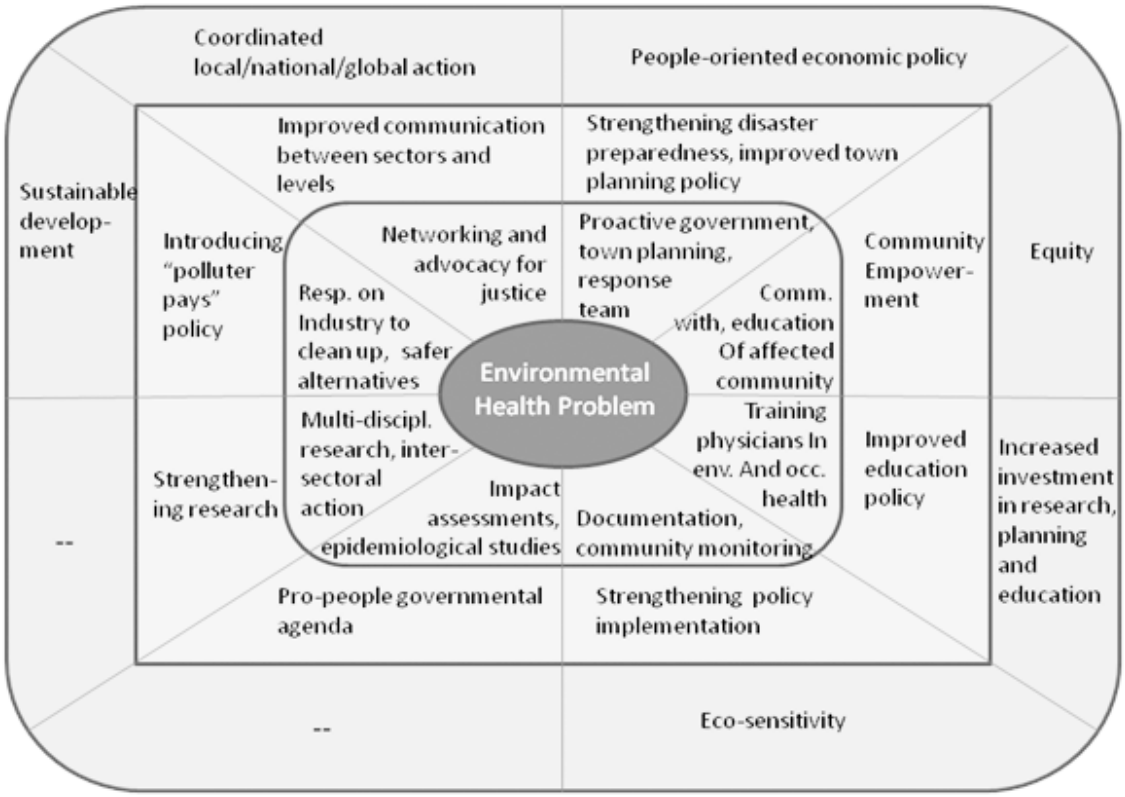

Figure 24: What can be done

on all the SOCHARA experiences, a tentative framework was evolved for community environmental health work:

Identifying the problem

- Violation of environmental health rights usually occurs at the level of community or workplace. Such a community may be approached and supported for rehabilitation, research, communication and empowerment.
- The CHESS workshops help in the identification of EOH problems, as they provide a platform for communities to share their grievances and case studies with researchers and health professionals.
- Community monitoring exercises, qualitative research and participatory techniques also help identify gaps in ongoing campaigns.
- Solidarity with other campaigns relevant to community health (such as the right to food) and movements (such as farmers' movements and trade unions) are also useful in identifying health related needs.

Research components

- The need for research varies between situations. It would be important to recognize the stage of the campaign cycle and the need for relevant research at that stage. In some situations, basic health research is adequate to irk the government into conducting more robust long term studies. It is after all, not the responsibility of citizens to invest time and money in expensive studies to prove their ill health.
- It is also useful to identify the documentation process till date and review it for concrete action that may be taken based on it, and to weave all available evidence into a legitimate starting point.
- In situations where information is not being made available by the guilty parties, it is useful to conduct literature reviews on the topic, and plan epidemiological studies with the participation of local people.
- Qualitative and quantitative questions both help in generating evidence. The relevance of each approach should be considered in different cases.
- Sound scientific grounding should not be compromised even with lay epidemiological methods. The best possible evidence in the situation should be gathered.
- Community level monitoring and surveys through participatory methods help in education and empowerment of the communities, and in generating evidence in the struggle for justice, and should be encouraged if relevant.
- Locally relevant frameworks and tools for research could also be innovated based on the need
- Three questions would need to be answered through the process:
    - What type of research is required at what point in the campaign cycle?
    - What concrete action can be taken based on the available documentation now?
    - How to weave ALL available evidence into a legitimate starting point?

Communicating the problem

Communication is a two-way or even a multi-way process with the appropriate stake-holders in the situation. It occurs within levels and between levels, with differing purposes as listed below.

- **With the affected community:** In the case of toxic exposure, the community is usually aware of some of the effects on their health and livelihood, but may not be

in a position to quantify or 'prove' these effects. In such a situation, it is important that information is de-mystified to empower the community with knowledge about the hazardous exposure. This can spur advocacy at local level. This was exemplified following the Bhopal Gas Tragedy where information was being withheld by the State. Various methods, including information pamphlets and creatively made illustrated manuals, were used in that situation to explain the relevant health concerns to the confused community. There is a need to maintain a more sustained communication with the affected community.

- **With the scientific community:** public health research and action is interdisciplinary, and all relevant competencies may not be available within one organisation. It is therefore important to network. Secondly, research findings should be shared, critiqued and discussed between groups. There are several journals available for communicating these findings to a wider scientific audience inside the country and outside. Avenues like mfc meetings are also good forums to initiate planning, research, discussion and action. More such avenues should be created.
- **With the policy community:**

  Two forms of actions can be distinguished:

  Communication for policy advocacy (that includes letters to respective ministries and departments, public interest litigations, critiquing policy and reports), and

  Engagement with policy development (that includes participation in policy drafting exercises and creation of memoranda)
- **With the larger society:**

  Creating a movement needs an informed public with access to reliable sources of news. There is a need for activist scholars to communicate findings, critiques and concerns to the media through newspapers, magazines and public discussions.

With newer types of environmental health problems emerging, like the health impacts of climate change, there is a need to assess the usefulness of such a framework for those areas. There is a need for SOCHARA to address these newer and allegedly greater environmental health problems. Climate change presents a unique problem as most of its effects, though experienced, is not easily recognised as such at community level. The identification, research and communication of the impacts of climate change may require an innovative adaptation of strategies used in the past and also new strategies.

A unit of Environmental and Occupational Health at SOCHARA

Having conducted informal and semiformal fellowships for many years now, SOCHARA is poised to move to the next level of capacity building. The School of Public Health, Equity and Action (SOPHEA) was launched during 2011 as a twentieth year commitment of the organisation. An Academic and Research Council (ARC) was also set up in 2012 to guide and support the teaching and research work of the team. SOPHEA, besides introducing participants to the community health perspective, will also aim to inculcate knowledge and skills for practice in community health. An Environmental and Occupational Health unit in SOPHEA is also being considered to develop this thematic area as younger team members are showing interest and commitment. Such a step would require renewed focus on both research and training in EOH. The interested staff would need the necessary support, guidance and training to evolve in the field and apply their knowledge to practice. Based on the current and prospective capacity development among technical staff at SOCHARA, the areas to consider for the Unit's activities and in the fellowship programme may be as follows:

Proposed activity of the unit:

- Problem identification
- Research
- Policy engagement and communication
- Advocacy
- Training and empowerment
- Collaboration with other sectors for projects and advocacy

Thematic areas:

- Pollution
- Sanitation and waste management
- Agriculture
- Climate change
- Occupational health
- Industrial accidents
- Sustainable development

Capacity building for enrolled fellows:

- Basic understanding of environment and health

- Recognition of environmental health problems in the community
- Recognition of occupational health problems
- Lay epidemiological techniques for health and environmental surveying
- Communication and empowerment with affected communities
- Working knowledge on water and sanitation infrastructure, and waste management
- Community capacity building for EOH

To build these capacities, SOCHARA would need inputs from a multidisciplinary team of experienced practitioners, along with the appropriate study material and field study areas. Past experiences need to be kept in mind and strengthened. Good library support with access to journals would also be required.

Definition of Environmental Health - a work in progress

Based on a review of published definitions of environmental health and reflections from this report, the following definition for environmental health was evolved:

Environmental health is a trans-disciplinary branch of public health which aims at assessing and protecting against harmful external physical, chemical and biological factors to prevent disease and create health supportive environment at the personal, family, occupational, community and global level, and working towards the wellbeing of people and communities by enabling them to manage and improve their own community environment through an eco-sensitive perspective, and empowering them to demand eco-justice through action directed by evidence based on socio-political-economic-cultural analysis with an equity, rights and social determinants perspective.

The SOCHARA team looks forward to collaboration and support from organisations and individuals to move forward in these areas.

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APPENDIX

SOCHARA team members (current and former) involved in Environmental and Occupational Health

- Ravi Narayan – (Public Health Physician) occupational health in tea plantations, member on Regional Occupational Health Centre's Scientific Advisory committee, research in malaria and vector control, CHESS consultations and trainings including work on health impact of pesticides and industrial pollution
- Thelma Narayan – (Public Health Physician) research, documentation and advocacy on health impacts of Bhopal Gas tragedy and tobacco control activities, state level policy process and CHESS consultations and trainings including Karnataka's taskforce for health
- Rakhal Gaitonde – (Public Health Physician) research, documentation, training and advocacy in occupational and environmental health as part of CHESS, including the campaigns in Kodaikanal, Cuddalore, Mettur and Chennai
- Mohan Isaac – (Psychiatrist) participated in medical consultation and documentation in the case of mercury pollution at Kodaikanal
- Rajan Patil – (Public Health Homeopath) research, documentation and training in malaria and vector control, and sericulture
- Praveen A – (Doctor) research and documentation in the case of endosulfan poisoning in Kasargod
- Raj Kumar – (Dentist) video documentation of health impact of endosulfan poisoning in Kasargod
- S D Rajendran – (Development Worker) research, documentation and advocacy on the environmental health situation with communities at Kolar Gold Fields, advocacy and training in tobacco control as part of CFTFK
- S Chander – (Sociologist, Community Health) advocacy and training in tobacco control as part of CFTFK
- Sukanya Rangamani – (Public Health Physician) research, advocacy and training in occupational health of unorganised sector, especially for women of garment sector and pourakarmikas, and CHESS trainings in Karnataka and Tamil Nadu
- Shirdi Prasad Tekur – (Paediatrician) training in environmental health for slum community and women's groups

- ❖ Prahlad Gowda – (Environmental Science) resource person for community-led total sanitation campaign activities in Karnataka
- ❖ Adithya Pradyumna – (Public Health Physician) research, documentation, training and advocacy in pollution impacted communities, urban development, sanitation, agriculture and climate change

List of abbreviations

CHC – Community Health Cell (a functional unit of SOCHARA focusing on community empowerment and right to health advocacy and training)

CFTFK – Consortium for Tobacco Free Karnataka

CPHE – Centre for Public Health and Equity (a functional unit of SOCHARA that focuses on policy research and training)

CHESS – Community Health Environment Survey Skill-share

EOH – Environmental and Occupational Health

ICMR – Indian Council of Medical Research

mfc – medico friend circle

NIMHANS – National Institute of Mental Health and Neurosciences, Bangalore

PHM – Peoples Health Movement

SOCHARA – Society for Community Health Awareness, Research and Action (the registered society under which the units operate)

SOPHEA – School of Public Health, Equity and Action

WHO – World Health Organization

SOCIETY FOR COMMUNITY HEALTH AWARENESS RESEARCH AND ACTION (SOCHARA)

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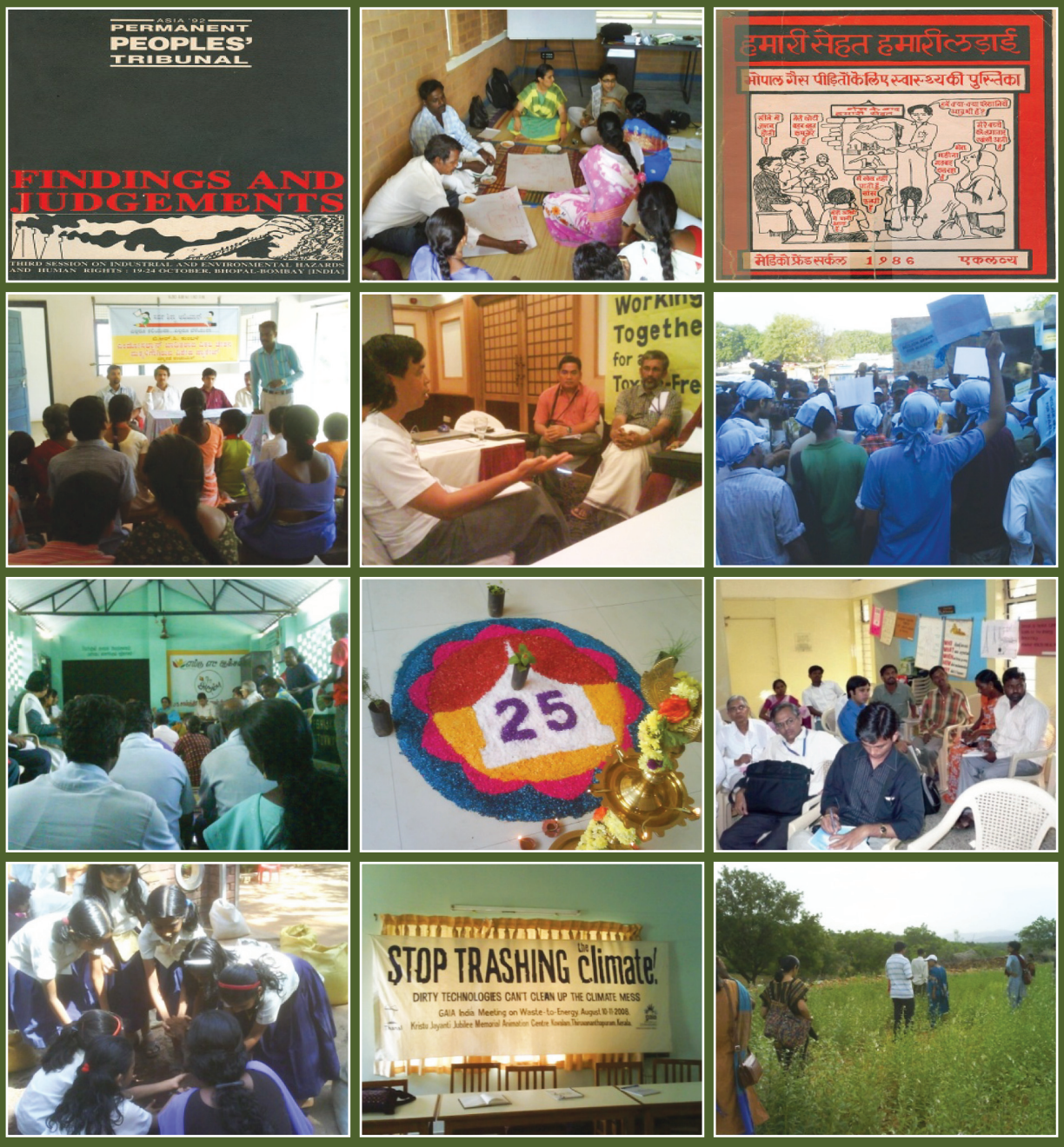
Objectives of SOCHARA

- To create awareness of the principles and practice of community health among all people involved and interested in health and related sectors.
- To promote and support community health action through voluntary as well as governmental initiatives.
- To undertake research in community health policy issues, including strategies in community health care, health personnel training, integration of medical and health systems.
- To evolve educational strategies that enhance the knowledge, skill and attitudes of persons involved in community health and development.
- To dialogue and participate with health planners, decision-makers and implementers to enable the formulation and implementation of community oriented health policies.
- To establish a library, documentation and interactive information centre in community health.

Printed at National Printing Press, Bangalore. Ph: 080-25710658



"Improving environmental health often begins when people notice that a health problem is affecting not just one person or group, but is a problem for the whole community. When a problem is shared, people are more likely to work together to bring about change."

Jeff Conant and Pam Faden
A Community Guide to Environmental Health, Hesparian

Celebrating 20 years of SOCHARA 1991 - 2011