

## 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<sup>18</sup>, 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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<sup>18.</sup> 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)**

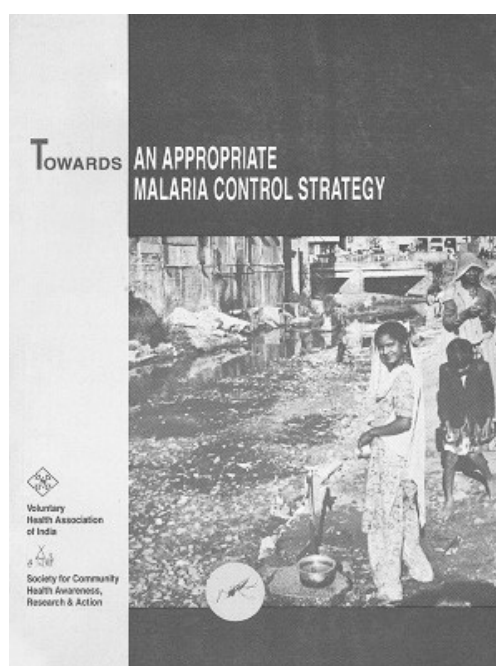
It was recommended that the malaria programme allow flexibility and diversity of response to diverse local situations, it being a focal phenomena governed by presence of parasite, vector, susceptible host and suitable environmental conditions in the community. Also, the "mosquitogenic" potential of large 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.

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).



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

## 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.

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



**Figure 8: Kalajatha as a communication medium**

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   |
|--|---|---|
| <b>Bio-medical</b>                                   |   |   |
| (Vector borne disease)<br>(Agent-vector Environment) | Diagnosis<br>Treatment<br>Drug Resistance<br>Insecticide Resistance<br>Healthcare system failures | New diagnostic techniques<br>New drugs<br>New vaccines<br>New insecticides<br>Operational research (focus on technical and managerial problems) |

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

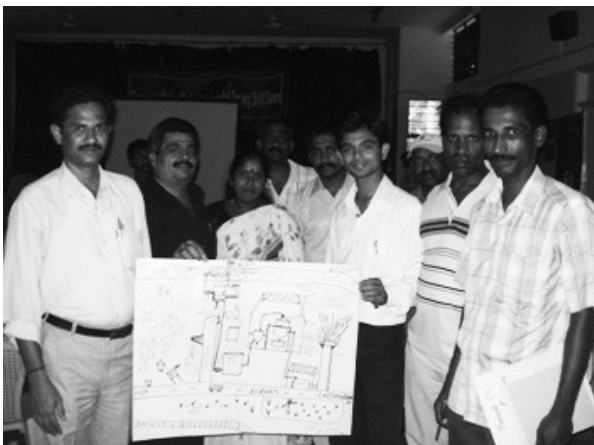
### Capacity building efforts

Chapters in training manuals on malaria control were written by CHC-SOCHARA for women's 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.