

Malaria in South Asia: Eradication and Resurgence during the Second Half of the Twentieth Century. Rais Akhtar, Ashok K. Dutt and Vandana Wadhwa (eds). Springer, Dordrecht, Deutschland GmbH, Tiergartenstrasse 17, 69121 Heidelberg, Germany. 2010. 241 pp. Price: € 99.95.

Malaria, a preventable and curable illness, continues to inflict millions spread over 100 tropical countries with an estimated 250–500 million cases resulting in nearly a million deaths each year. It is a debilitating disease with children and pregnant women at the centre stage and leaving migratory population groups at risk of explosive epidemics. Much of the research and malaria control efforts focus on sub-Saharan Africa as it contributes 90% of the disease burden, with concentration of cases in children below 5 years of age. Outside Africa, the Southeast Asian countries have nearly a billion people living at the risk of contracting malaria, threatening the socio-economic development of the region. The book under review, a part of the series, 'Advances in Asian Human-Environmental Research', focuses on the dynamics of malaria transmission, spatial and temporal disease distribution and determinants, and control strategies particularly in the second half of the 20th century in South Asian countries including India, Nepal, Bangladesh, Sri Lanka and Pakistan.

South Asia is thickly populated, witnessing rapid ecological changes through large scale urbanization, population explosion, developmental projects, industrial growth, changes in land-use patterns and human migration. This lends opportunities for the proliferation of mosquito disease vectors and the spread of drug-

resistant malaria, putting many more millions (in absolute numbers) at risk in the climate change scenario. South Asia is of particular interest for malaria research, dating back to 1898 when Sir Ronald Ross discovered that malaria is transmitted by mosquitoes (India). The region is also known for the origin and spread of drug-resistant malaria and its role as a testing ground for evaluating new technologies/interventions for control of the disease. India alone contributes over 80% of the disease burden.

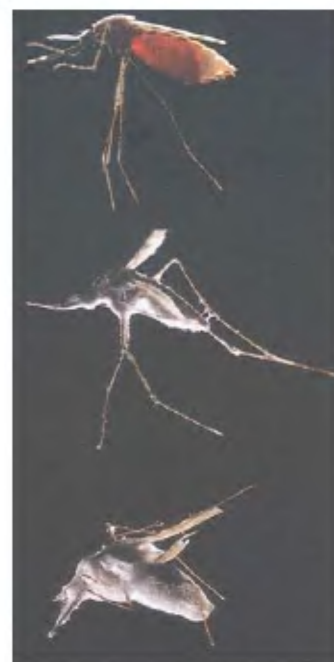
The book under review provides a historical progression of the disease through the second half of the 20th century, with particular reference to malaria control efforts since the advent of DDT (the residual insecticide used against mosquito vector) during the Second World War. The subsequent resurgences, based on case studies, in five countries including India, Pakistan, Bangladesh, Nepal and Sri Lanka have also been discussed. Maldives was declared malaria-free as of 1984.

South Asia is conducive to the emergence and propagation of communicable diseases due to its warm and humid climate, and a vast population living below poverty line, having little access to healthcare services. During the 1960s, there was an overall decline of malaria cases in all these countries and it was thought that malaria was on the verge of eradication; but in the 1970s, it resurged with a vengeance. Factors that were common to the member nations were complacency on the part of malaria workers, economic stringencies, political upheavals, and the phenomena of drug resistance in malaria parasite and insecticide resistance in mosquito vectors. It is the post-resurgence period that is of interest to medical geographers, epidemiologists, researchers, and the programme managers for formulating appropriate policies for averting malaria disasters and ensuring equitable access to healthcare services. It is in this perspective that the book attempts to provide information on the recent history of control efforts in South Asian countries that would help foster a better understanding of the disease epidemiology and lapses that led to resurgences, especially the physical and socio-cultural environs that continue to support transmission and spread of the disease.

The authors have provided a comprehensive space- and time-distribution of

malaria occurrence by country. A case study on disease distribution and stratification in Sri Lanka revealed that this island country was the first in South Asia to achieve great success against malaria during the early part of the 20th century. It served as a role model for India, Bangladesh and Pakistan under the National Malaria Control Programme during 1950–1960s for launching a massive attack against disease vectors using DDT. Following resurgence, even though malaria continued to be present in Sri Lanka, the wet zone was relatively free whereas the dry zone was affected considerably on account of multiple human and environmental factors facilitating malaria transmission.

A chapter on Nepal gives an overview of the malaria situation and vector ecology through the mid-20th century to its resurgence during 1970–1980s. The author highlights the porous nature of the border between India and Nepal, which requires coordinated efforts for effective control along high-risk bordering districts. There are two chapters dedicated to



Anopheles stephensi killed by a fungus (in this case, *Beauveria bassiana*). The mosquito at the top has just had a blood meal, the middle mosquito was killed by the fungus 24 h earlier and the bottom mosquito has been dead from fungal infection for 48 h. Such fungi can act as viable biopesticides, as mentioned in 'Malaria Vaccines and Other Advancements' in the concluding chapter. (Photo credit: Hugh Sturrock, Wellcome Images, <http://medphoto.wellcome.ac.uk/>.)

Bangladesh that focus on the history of malaria from 1940s through resurgences in 1970s to disease distribution in the new post-resurgence period. The authors hypothesized the spread of malaria from east to west by the efficient mosquito vector *Anopheles balabacensis* that breeds in forested and rainy environments. They stratified the country into high, medium and low-risk zones based on epidemiology, vector ecology and infrastructural intervention, and called for a collaborative international effort to strengthen intervention against *Anopheles minimus*-transmitted malaria in high-risk zones that border Northeast India.

A chapter on Pakistan presents an account of malaria resurgence during 1970s and shows that malaria intensity was higher in the better developed districts of Punjab, paradoxically, where the eradication programme provided good coverage. Two other chapters relate to the malaria distribution in urban cities of India, comparing spatio-temporal patterns of malaria incidence between 1978 and 1997. The authors have argued that unplanned developmental activities resulting in deteriorating urban environs have promoted the breeding of the mosquito vector *Anopheles stephensi*, resulting in persistent transmission; but trends were clearly declining. The authors also cautioned that, given the cyclic nature of the disease, it may get a foothold in non-endemic regions of the country in South-west and North India; they have called for proactive vigilance and prevention. The recent spurt of cases in Mumbai, this year qualifies the authors' warning and need for continuous monitoring and control methods that are ecologically sound and community-based.

The concluding chapter summarizes the similarities and variations in South Asian countries in the context of malaria occurrences. It highlights the common challenges such as climate change, cultural practices, socio-economic constraints and political unrest, and updates the malaria situation into the 21st century. It also discusses the successes and failures of new antimalarials like the artemisinin-based combination therapy, and the return of the fallen angel DDT for indoor residual spraying, permitted under the Stockholm Convention on Persistent Organic Pollutants, in selected areas where the disease vectors are still susceptible. With genome sequences of the host, vector and parasite, the authors

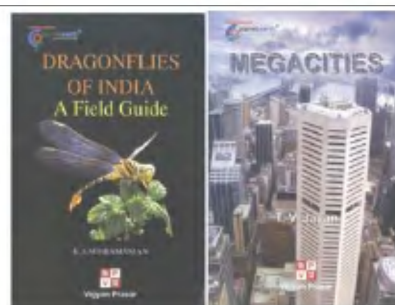
firmly believe that in the 21st century, high-tech molecular approaches to fight malaria will probably be available within 10–20 years. These will be based on potent vaccines, genetically modified mosquitoes that are resistant to parasitic development, new potent antimalarial drugs and insecticides. Till then, the authors have made clear recommendations for political commitment in scaling up the existing tools, sustained surveillance for prevention and control, and strengthened health care systems.

The book under review, would serve as a good source document not only for medical geographers, but also for an interdisciplinary audience including health planners, social scientists, historians, non-governmental organizations, donor agencies and public health specialists. It

would be good addition to the libraries of national and international medical institutions, serving as a reference for aspiring scholars studying South Asia. The editors have done a commendable job in highlighting the need for increased allocation of resources in South Asia (the region that is often overshadowed by the plight of Africa) where millions are at the risk of malaria. They have stressed on continuous monitoring and scaling up of interventions to thwart impending disease outbreaks, and the development and spread of multi-drug resistant malaria.

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Vigyan Prasar, an autonomous body under the Department of Science and Technology, Government of India, has been popularizing science since its inception in 1989. It has brought out a series of books, following the International Year of Planet Earth 2008, and published in the International Year of Astronomy 2009, to spread awareness about the earth. Two publications in the series – *Freshwater Fishes of Central India* (by Nilesh Heda) and *Dragonflies of India* (compiled by K. A. Subramanian; edited by Madhav Gadgil) – are field guides. *Global Warming and Health* by Alok Mukherjee gives an overview of the threats arising from global warming. While focusing on the Indian scenario, however, data on overestimation of the melting of all central and eastern Himalayan glaciers by 2035 have seeped in (possibly from the IPCC 2007 report). *Megacities*, by T. V. Jayan, a science journalist, throws light on how megacities came to exist, the quality of life in megacities, the challenges faced and the expansion of megacities. There is a dedicated chapter on the megacity, Mumbai. The book briefly deals with transport problems, slums and other such issues.

Tools of Astronomy by Biman Basu traces the development of astronomical tools over the years, ranging from the use of gnomon and water clocks to the present-day radio telescopes. *Eyes on the Sky* by the astrophysicist Biman Nath, is a historical account on telescopes and describes the evolution of ancient astronomy and modern astronomy.

Conservationist C. Barooah describes how bamboo – ‘poor man’s timber’ and culture in North East India are related to each other in *Bamboo in the Culture and Economy of Northeast India*. The value of bamboo as a raw material has been highlighted. Besides, a description of around 40 bamboo species that find application in the industry has been provided, with information on their distribution in the world and in the country.

Science Musings is an interesting collection of selected editorials written by Vinay B. Kamble in *Dream 2047*, the bilingual monthly newsletter/science magazine of Vigyan Prasar, over a period of 10 years (2000–09). Such collections are a welcome initiative as they make available articles spread over the years in one place. One of the editorials that caught my attention while going through the index was on Kamble expressing concern over the miniscule number of science writers in India in 2002. Though the situation has certainly improved, the editorial holds equal significance today.

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