Parasitic diseases in water resources development

The need for intersectoral negotiation

J. M. Hunter
Professor of Geography, Community Health Sciences and African Studies
Michigan State University
East Lansing, MI, USA

L. Rey
Department of Biology
Oswaldo Cruz Foundation
Rio de Janeiro, Brazil

K. Y. Chu
Formerly Biologist, World Health Organization

E. O. Adekolu-John
Professor of Epidemiology and Community Health
University of Ilorin
Ilorin, Kwara State, Nigeria

K. E. Mott
Chief, Schistosomiasis Control
World Health Organization
Geneva, Switzerland

World Health Organization
Geneva
1993
Contents

Preface vii
Acknowledgements ix

1. Introduction 1

2. Parasitic diseases and water resources development 4
   Exacerbation of parasitic diseases 4
   Ecological disruption at project sites 5
   Changes in surrounding areas 6
   Population movement and socioeconomic and demographic change 7
   Nosological and epidemiological changes 8
   Need for water resources development 11
   World population increase 11
   Economic growth and food needs 11
   Rate of construction of dams 13
      Global overview 13
      Dams in Africa 14
      Dams in the Americas 16
      Dams in Asia and the Western Pacific 17
      Agricultural irrigation systems 19
      Fisheries and aquaculture 23

3. Adverse health effects of water development schemes 25
   Demographic and socioeconomic factors 25
   Aggravation of health risks by ecosystem changes 28
   African Region 31
      Burkina Faso 31
      Burundi 31
      Cameroon 31
      Côte d'Ivoire 32
      Ethiopia 33
      Ghana 34
      Kenya 36
      Liberîa 37
      Madagascar 38
Mali 38
Niger 39
Nigeria 39
Senegal 40
Sierra Leone 41
Swaziland 41
United Republic of Tanzania 42
Zambia 42
Zimbabwe 42
Eastern Mediterranean Region 43
  Egypt 43
  Jordan 44
  Oman 44
  Saudi Arabia 44
  Somalia 45
  Sudan 45
  Yemen 46
Region of the Americas 46
  Brazil 46
  Suriname 48
South-East Asia and Western Pacific Regions 49
  India 49
  Philippines 50
  Sri Lanka 50
  Thailand and Lao People’s Democratic Republic 50
European Region 51
  The former USSR 51
  Turkey 52
Need for vigilance in projects currently under development 52
  Angola: Capanda Dam 53
  Brazil: São Francisco Valley 53
  China: Three Gorges Project 54
  Ethiopia 56
  India: Narmada Valley 56
  Kenya: Seven Forks Scheme 57
  Malaysia: Nenggiri Dam 58
  Mauritania: Gorgol Rice Irrigation System 58
  Myanmar: Sedawgyi Multipurpose and Irrigation Project 58
  Niger: Kandadji Dam 58
  Rwanda: Kagara River Basin Development Project 59
  Senegal: Senegal Valley 59
  Somalia: Juba Valley 59
  South Africa 60
  Sudan: Jonglei Canal 60
  Turkey: south-east Anatolian Project 60
4. Health effects of small village dams
   - Disease intensification
   - Cameroon
   - Ghana
   - Kenya
   - Mali
   - Rwanda
   - Zambia
   - Rapid construction rate of small dams
   - Registration of small dams

5. Disease control in water development schemes
   - Experiences in vertical control programmes
   - Schistosomiasis
   - Malaria
   - Lymphatic filariasis
   - An integrated programme: the Blue Nile Health Project
   - Factors militating against prevention and control
     - National level
     - Local level
     - International level
   - Feasible intervention approaches
     - Population groups at risk
     - Integrated control
     - Environmental control of snails and mosquitoes
     - Epidemiological evaluation, monitoring and surveillance
     - Maintenance of control

6. Policy critique of health aspects of water development projects
   - Compartimentalism
   - Economic progress or health?
   - Coordination or sectoralism?
   - Failure to implement international agreements on health protection
     - United Nations Memoranda of Accord
     - World Health Assembly resolutions

7. Steps towards solutions
   - First principle
   - Integrated regional planning
   - Incorporation of health costs
   - Creation of national authorities
   - Impact assessment
Planning for the project area and beyond 103
Monitoring, evaluation and response 103
Integrated development strategies 104
  Multisectoral planning 104
  Guidelines 104
  Intersectoral coordination 104
  Regional coordination 104
  Cost synthesis 105
National standards 105
  National regulations 105
  National registration 105
Use of remote sensing and geographical information systems 106
Financial support 107
  Conditional financing 107
  Debt for health 107
  Infrastructural costs of health care 107

8. Intersectoral negotiating strategies for health authorities 109
  Awareness of disease effects and economic loss 110
  Beyond culpability 110
  Obtaining information on new and proposed water development schemes 110
  The project cycle 111
    Environmental assessment in the project cycle 112
    Health sector involvement in the cycle 113
  Financial support for health protection 113
  Improved intersectoral cooperation 114
  Nongovernmental organizations 114
  The basis of the negotiating strategy in water resources projects 114
  Summary of arguments 114
  Presentation of arguments 115

9. How to develop a health plan for a water resources project 120
  Primary planning goals 120
  Practical steps 120
  Pre-project health risk assessment 121
  Integrated control 122
    Progressively polyvalent control strategies 123
  Conclusions 124

References 126

Annex. Suggested technical components of the project health plan and its implementation 144
Preface

One of the cornerstones of WHO's Global Strategy for Health for All by the Year 2000 is intersectoral collaboration, and various resolutions of the World Health Assembly have encouraged WHO and its Member States to promote such collaboration in order to address the health aspects of development policies.

The increased awareness of the environment, together with the feasibility of controlling parasitic diseases, provides a good opportunity to focus attention on the health impact of development. Several such diseases can be exacerbated by water development projects unless appropriate measures for prevention and control are incorporated from the beginning. The health sector therefore needs to be involved at every stage of such projects in order to ensure that socioeconomic development does not bring about a deterioration in health status.

This book reviews the documented health impact of various water resources development projects and discusses the actions that could have mitigated the adverse effects. The message derived from the analysis is that sound proposals to control parasitic diseases could and should have been included in the development dialogue. For this to occur, the health sector needs to take a much more active role in ensuring that other sectors are aware of the potential health impact of development projects.

The analysis given here is of necessity incomplete and with a bias related to the ease of availability of data. The documentation of negative effects is not intended to be a deterrent to development. Rather it is hoped that it will encourage more complete and systematic monitoring of the health effects of water resources development, and provide a guide to the risks to be considered and the input needed from the health sector.

Readers are invited to send any information, comments or suggestions related to this publication to Chief, Schistosomiasis and other Trematode Infections, Division of Control of Tropical Diseases, World Health Organization, 1211 Geneva 27, Switzerland.
Acknowledgements

Our appreciation and sincere thanks go to Mr R. Bos, Secretary of the FAO/UNEP/WHO Panel of Experts on Environmental Management; Dr R. Goodland, Chief, Department of Environment, World Bank, Washington, DC, USA; Ms Catherine Mulholland, Assistant to the Adviser on Health and Development Policies, Office of the Director-General, WHO; and Dr S. Litsios, Operational Research, Division of Control of Tropical Diseases, WHO, who provided detailed written critiques of the draft document and additional materials without which it would not have been possible to clarify the most difficult issues on contemporary development policy.

We are also grateful for the documentation and expert opinion freely given by the following WHO staff members: Dr P. F. Beales, Chief, Training, Division of Control of Tropical Diseases; Dr A. El Bindari Hammad, Adviser on Health and Development Policies; Dr P. Herath, Scientist, Operational Research, Division of Control of Tropical Diseases; Dr R. Leberre, Chief, Filariasis Control, Division of Control of Tropical Diseases; and Mr H. Dixon, Chief, Epidemiology and Statistical Methodology, Division of Epidemiological Surveillance and Health Situation and Trend Assessment.

Many of the documents prepared for the WHO Informal Meeting on the Global Strategy for the Control of Morbidity due to Schistosomiasis, held in October 1989 and supported by the Edna McConnell Clark Foundation, were useful in the preparation of this document. All the WHO Regional Advisers on Parasitic Diseases commented on and contributed to the draft manuscript.

The following people kindly supplied valuable information, mostly based on field observations:

Dr M. A. Amin, Ministry of Health, Gizan, Saudi Arabia; Professor F. Arfaa, Concord, California, USA; Dr F. S. Barbosa, Dean, National School of Public Health, Rio de Janeiro, Brazil; Dr D. J. Bradley, London School of Hygiene and Tropical Medicine, London, England; Dr C. A. Brown, Bureau of Hygiene and Tropical Disease, London, England;
Dr. J. Cook, Edna McConnell Clark Foundation, New York, USA; Dr. M. Delabaere, "Prince Léopold" Institute, Antwerp, Belgium; Dr. A. Gani, Ministry of Health, Depok, Indonesia; Professor E. G. Garcia, School of Public Health, University of the Philippines, Manila, Philippines; Dr. P. L. Gigase, Laboratory of Histopathology and Schistosomiasis, "Prince Léopold" Institute, Antwerp, Belgium; Dr. S. M. El Hak, Ministry of Health, Cairo, Egypt; Dr. L. Jarotski, Martinosky Institute of Medical Parasitology, Moscow, Russian Federation; Dr. W. R. Jobin, Blue Nile Associates, Foxboro, Massachusetts, USA; Dr. P. Jordan, Ware, England; Professor M. Le Bras, Department of Health and Development, University of Bordeaux II, Bordeaux, France; Professor Mya Pheng Kan Chua, Department of Parasitology, Faculty of Medicine, Kuala Lumpur, Malaysia; Dr. E. A. Malek, Director, Laboratory of Schistosomiasis, Medical Center, New Orleans, USA; Professor S. P. Mao, Director, Institute of Parasitic Diseases, Chinese Academy of Preventive Medicine, Shanghai, China; Dr. D. A. Muir, Geneva, Switzerland; Dr. A. S. Muller, Director, Department of Tropical Hygiene, Royal Tropical Institute, Amsterdam, Netherlands; Dr. M. Odei, Institute of Aquatic Biology, Accra, Ghana; Dr. J. L. Rey, Department of Epidemiology, French Institute for Cooperative Scientific Research for Development (ORSTOM), Abidjan, Côte d'Ivoire; Dr. H. P. Striebel, Ciba-Geigy, Basel, Switzerland; Dr. T. I. Socwarso, Ministry of Health, Jakarta, Indonesia; Dr. V. R. Southgate, Experimental Taxonomy Unit, Department of Zoology, British Museum, London, England; Dr. R. F. Sturrock, Department of Medical Helminthology, London School of Hygiene and Tropical Medicine, St Albans, England; Professor H. Tanaka, Public Health Laboratory of Chiba Prefecture, Chiba, Japan; Dr. P. G. Waiyaki, Kenya Medical Research Institute, Nairobi, Kenya; Dr. K. S. Warren, Maxwell Communications, New York, USA; Professor G. Webbe, Winches Farm, London School of Hygiene and Tropical Medicine, St Albans, England; and Dr. F. Wurapa, WHO Regional Office for Africa, Brazzaville, Congo.

We are grateful to Miss J. Salm and Miss J. Mercado for typing the manuscript under pressure of tight deadlines.
1.
Introduction

The development of water resources is essential for a wide range of human activities. In particular it is needed so that demands for energy and food can be met. However, during the past ten years, certain adverse effects of water resources development have received considerable attention. The rate of population growth in developing countries continues to outstrip their capacity to meet the demands for food and basic services amid increasing poverty. The prospect of environmental degradation in the face of development was examined by the World Commission on Environment and Development (1987). The health impact of this degradation was emphasized in the report of the WHO Commission on Health and Environment, Our planet, our health (WHO, 1992a). This report contributed significantly to the debate on the impact of development on the environment and health at the Earth Summit, the United Nations Conference on Environment and Development, held in Rio de Janeiro in June 1992.

Development policies designed to improve the economic conditions and living standards of communities often have unintended effects on health (Cooper Weil et al., 1990). Thus, health policy is not a matter solely for the health sector, and it is now accepted that there should be health objectives in water resources development. Furthermore, the identification of vulnerable groups and their health risks is necessary so that adverse socioeconomic factors can be combated.

Awareness of the negative health effects of development, particularly in respect of parasitic diseases, has not led to consistent action either in the planning stages of projects or at the first signs of unfavourable consequences. During the 1970s, the public began to appreciate that economic development could produce adverse effects on human health, as pointed out by Hughes & Hunter (1970). Since then the epidemiological factors contributing to the introduction, spread or aggravation of parasitic diseases have become more fully understood. There have been advances in diagnosis and treatment, and options for community-based health care delivery have become available. Moreover, the connections between health, environment and development have become clearer. The inadequacy of data on the link between economic
considerations and environmental events cannot excuse a failure to reckon with the available health data. The underlying causes of poor health may be activities that seem remote from the observed effects. The focus of this book is justified by the significant amount of data available, the impact of parasitic diseases on people involved in or living near water resources projects, and the feasibility of mitigating, preventing and controlling these diseases.

It is now recognized that measures of mitigation and prevention should be a shared responsibility in the development process. Donors and entrepreneurs in developed countries can no longer claim ignorance of the potential negative health outcomes, nor can governments of developing countries justify the ecological changes inherent in water resources development on purely economic grounds. More importantly, the political will of developing countries to address these problems is now a matter of public record. The incidence and prevalence of parasitic diseases and certain other communicable diseases remain the most dramatic and reliable indicators of the negative health impacts of development in Africa, Asia and the Americas.

In earlier reviews, evidence was assembled to show the adverse disease impact caused by water resources development (Ackermann et al., 1973; Stanley & Alpers, 1975; Hunter et al., 1980, 1982). Action without consultation by different sectors was identified as the main factor engendering disregard and neglect of human health. A policy of integrated project development was offered, with carefully planned support for health maintenance in and around large reservoirs and irrigation systems.

Today, with a population doubling time of 34 years in the developing world, the need for dams and irrigation schemes is greater than ever before. In the 1970s the economic justification for constructing reservoirs began to be questioned (UNEP, 1982). The economic and nutritional justifications for expanding agriculture and irrigation remain paramount (Lipton & de Kadt, 1988), while there has been a public and political awakening to environmental problems (UNEP, 1987a, 1988, 1989, 1990). Aside from visible degradation, disease in exposed populations may be the first consequence that provokes public reaction. Despite this, adverse health effects of water resources development continue unabated (Service, 1989a,b).

Health officials in developing countries need to enter the development dialogue to place health on the national development agenda. The obvious arguments for entering the dialogue may be the impetus required to induce action at the higher levels of government. While it may appear that intersectoral dialogue in the international or multilateral arenas can be achieved, its success in practice and the impact on health are questioned by the studies documented in this book. The lack of dialogue and its inevitable outcome—lack of action—are predictable.
Those who understand health problems and, as the case in point, parasitic diseases, those who assess the results of intervention, and those who propose solutions move independently of those who decide and implement water resources development projects. Lack of foresight, the adverse consequences, and their late recognition are the fruit of this continuing lack of communication.

The global agenda on environmental issues now includes health (UNEP, 1986, 1990; WHO, 1992a; World Bank/International Monetary Fund, 1989). The international development finance community endorses environmental impact assessment through more integrated and health-conscious planning. Speedier change and more resolute commitment to health protection are needed. The present analysis is intended to promote the movement towards more integrated development activities, incorporating health protection and promotion measures along with economic advancement. Evidence concerning water-related parasitic diseases is reviewed in a broad policy context. Detailed information on other communicable diseases or health problems that may affect specific regions, such as dengue and Japanese encephalitis, may be found elsewhere. An exposition of associations between disease and environment is followed by an outline of the adverse health effects of dams and irrigation systems. The need is emphasized for continuing vigilance as water-related development proceeds on a massive scale. Small dams are presented as a special case in Chapter 4. The current status of technical measures for disease control is summarized in Chapter 5.

A policy critique (Chapter 6) is followed by proposed practical steps towards solutions. If the tools described are used, the best possible terms for health should be obtainable. Intersectoral negotiating strategies for health officials are considered in Chapter 8, and finally, the preparation of a health plan for a water resources project is outlined.