

A BRIEF HISTORY OF PEEM

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This is a brief history of the joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control (PEEM), which as a Panel functioned from 1980 to 1996, and whose programmatic activities in environmental management for vector control and health impact assessment of development projects continued until 2009.

This brief history intends to inform the newly established RBM Multisectoral Working Group of past efforts, achievements and failures in the pursuit of intersectoral action for the prevention and control of malaria and other vector-borne diseases.

Summary: lessons learned

Intersectoral approaches to the prevention and control of malaria and other vector-borne diseases have a huge potential, both at the policy and operational level. This potential remains largely untapped. The PEEM experience teaches us that creating a strong evidence base for such approaches through multidisciplinary research is feasible, provided a number of conditions is met. The bottleneck lies in translating the results of such research into policies, programmes and operations. This bottleneck is defined by the narrow focus of professional training and education, compartmentalized governance practice and rigid institutional structures.

“We must all become silo busters” (David Naborro, at the IFPRI Conference Agriculture for Health and Nutrition in Delhi 2011) or “It is only at this stage of my life that I realize the crux of all solutions is multidisciplinary and intersectorality” (Wendell Wallach at the Graduate Institute in Geneva, in his talk “How to keep Artificial Intelligence from slipping beyond our control”, May 2018) are all wonderful, to-the-point statements. The reality on the ground, however, is a host of sectoral boundaries, vested interests and professional prejudices that need to be overcome first before multisectoral action can deliver. Experience shows that for sustained results of multisectoral action, economic benefits for all parties concerned remains the critical motivation.

Intersectoral collaboration: Loved by all, funded by no-one. While the onus of poor intersectoral communications and coordination is usually put on the shoulders of governments, it must be clear that funding agencies are just as compartmentalized as the rest of the world. Each department will focus on its core business, and the cross-cutting issues are considered marginal. As a result, the optimal use of limited resources is hampered because the synergies that can be achieved are never considered.

It is important to be clear about the nature of sectors, as clarified by an Australian group of sociologists led by Degeling in the early 1990s. Government sectors are the result of achieving a critical mass of vested interests around a theme, that lead to a stand-alone institutional structure with its own budget to pursue the theme’s objective. This means that decisionmakers in different sectors will only engage in collaborating if there are clear advantages for the vested interests in each sector from an approach of power-sharing. There have been many pleas for intersectoral action for health in international bodies such as the World Health Assembly, but in the end often the health sector has been its own worst enemy.

¹ Robert Bos joined the Secretariat of the joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control, at WHO Geneva, in August 1983 and became its Executive Secretary in December 1985 – the Panel remained functional until 1996, and his post description was adapted in 1998, eliminating his role as Executive Secretary of the Panel.

A long breath is needed to promote intersectoral approaches to all health issues, including malaria. The TDR initiative to do research on environmental determinants of malaria of the early 1990s soon petered out because the projects went beyond the conventional TDR business model both in terms of financing and in terms of the horizon.

Environmental management does not aim to replace other interventions (indoor residual spraying, mosquito nets (with or without insecticide impregnation, LLINs)), it complements them in an effort to increase impact and efficiency, and to add sustainability and resilience to the results achieved by the health sector. However, the false argument that environmental management interventions (or, in the 1930s, pre-World War II terminology: “naturalistic methods”, or even before that in the 1910s and 1920s: “species sanitation”) cannot achieve what post-World War II chemical and pharmaceutical interventions achieved, keeps coming back. It is false because multisectoral environmental management approaches do not have the intention to replace health sector-confined disease and vector control actions. It is also false because it does not consider the limitation of blanket interventions putting pressures on biological systems: the development of resistance to drugs and pesticides. In the search for a silver bullet solution (instigated by antibiotics and DDT) and in the reality of commercial interests linked to presumed silver bullets, the concepts of integration and synergy are systematically overlooked.

Another David Nabarro quote, in response to a question how the newly established Roll Back Malaria programme would address the intersectoral dimensions of malaria (inaugural session Roll Back Malaria, 1998 in the WHO Executive Board Room): “The core of the health sector is well-defined, but its boundaries are nebulous”

The spirit of the time

As Pepe Nájera, Director of the WHO Malaria Action Programme (MAP) from 1982 to 1992 documents ²:

“ Encouraged by the early success of using dichloro-diphenyl-trichloroethane (DDT) against malaria, the World Health Organization (WHO) embarked on the Global Malaria Eradication Program (GMEP) in 1955. Fourteen years later, the campaign was discontinued when it was recognised that eradication was not achievable with the available means in many areas, although the long-term goal remained unchanged. During the GMEP, malaria was permanently eliminated from many regions. In other areas, however, substantial gains were lost in resurgences, sometimes of epidemic proportions. During the 1970s and 1980s, because of economic and financial crises, international support for malaria control declined rapidly.” The failed global malaria eradication of the 1950s and 1960 – failed because of many technical challenges and for lack of sustained political support, and not global as its name suggests (Africa south of the Sahara was largely excluded from the efforts) – left WHO licking its wounds during the decade of the 1970s.

At the beginning of that decade, the awakening to human-generated environmental problems took on concrete shapes with the United Nations Conference on the Human Environment (Stockholm, June 1972) and the subsequent creation of the United Nations Environment Programme (UNEP) –

² Nájera, J.A., González-Silva, M. and Alonso, P.L. (2011) Some Lessons for the Future from the Global Malaria Eradication Programme (1955–1969). [PLoS Med.](https://doi.org/10.1371/journal.pmed.1000412) 2011 Jan; 8(1): e1000412. Published online 2011 Jan 25. doi: [10.1371/journal.pmed.1000412](https://doi.org/10.1371/journal.pmed.1000412) PMID: [21311585](https://pubmed.ncbi.nlm.nih.gov/21311585/)

ironically, in a sense, the interest in environmental pollution had in part been stimulated by Rachel Carson's book on the damage caused by DDT "*Silent Spring*", the early focus of UNEP's activities was on environmental risks incurred by industrialization: pollution by chemicals including the excessive use of pesticides.

In the cold war context of the time, the Soviet block and the non-aligned countries found themselves in strategies to promote social justice: the Basic Needs approach, and, in the health sector, the 1978 Declaration of Alma Ata, which was the product of the International Conference on Primary Health Care (PHC), organized by WHO and UNICEF, and hosted by the Government of the Soviet Union.

In keeping with the "New International Economic Order", the Declaration re-affirmed the definition of health ("a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"), it recognized health as a socio-economic issue and a human right, and it proposed eight pillars in support of PHC: public education including on health issues, proper nutrition, clean water & sanitation, maternal & child health care, immunization, local disease control, accessible treatment and provision of essential drugs.

Local disease control underlined the need to tackle the prevention and control of diseases in the local context, instead of aiming for blanket silver bullet solutions. Community engagement, involvement and participation were key means of implementation for PHC.

It did not take long for a response from the other side of the iron curtain to materialise: after a Rockefeller-organized meeting in Bellagio, Ken Warren and Julia Walsh published their alternative to Alma Ata's PHC: selective primary health care³ which reined health systems back into sectoral boundaries and focused on medical rather than public health approaches.

In the early 1990s IUCN briefly promoted an environmental variant on PHC: Primary Environmental Care. Potentially, it offered several points of interface with PHC, but the concept never really took off.

In the late 1970s, early 1980s, there was a sombre outlook on agricultural development in Africa – In Asia and in Latin America, the Green Revolution had refuted fears over major famines, but food production in Africa was not taking off, and the lack of water resources development, investment in irrigation infrastructure and poor capacities in managing water resources were seen as root problems. These ideas were reflected in the 1986 FAO report on Irrigation in Africa.⁴ The public health concerns related to irrigation in Africa were considered a serious impediment to agricultural development in that continent.

The broad canvas of concepts and political streams in the 1970s helps to clarify the different motives that brought the three agencies, WHO, FAO and UNEP, together around one theme: promoting environmental management for disease vector control in the context of water resources development.

WHO was phasing out the vector control programme that had defined it for two decades, and was engaging in community-based, contextual approaches to public health. Environmental management for vector control was a good fit for its new paradigms. FAO was concerned over negative health

³ Walsh, J. and Warren, K. (1979). Selective PHC – an interim strategy for disease control in developing countries. *The New England Journal of Medicine* 30 (18): 967-974

⁴ Food and Agriculture Organization of the United Nations (1986). Consultation on Irrigation in Africa. FAO Irrigation & Drainage Paper 42, Rome.

impacts of accelerated irrigation and other water resources development, which could undermine its strategy to increase agricultural production. It needed evidence and tools to build safeguards into irrigation schemes. UNEP's concern was with the use of pesticides, both in agriculture and for public health purposes. Environmental management was an alternative, even though the understanding that it would never control disease vectors as a stand-alone approach had not yet penetrated. The reduction and elimination of first generation pesticides would eventually be regulated internationally by the 2001 Stockholm Convention on Persistent Organic Pollutants.

The original objectives, structure and evolution of the panel

The joint WHO/FAO/UNEP Panel of Experts on Environmental Management for Vector Control (PEEM) was the brainchild of an Iranian Sanitary Engineer working in WHO's Division of Vector Biology and Control in Geneva, Mr Rafatjah. WHO and FAO signed three MoUs in 1980, and in the context of one of these (collaboration in the field of water resources development-related diseases) Arrangements were agreed for the establishment of PEEM – last minute, the United Nations Environment Programme joined and thus the Panel was created as a tri-partite initiative in 1980, with its first meeting, in Geneva in September 1981.

Rafatjah's original intention was to create an expert panel that would advise the agencies on policy issues in direct reporting to the executive bodies of the three organizations: the WHO Executive Board, the FAO Council and the UNEP Governing Council. In reality, this idea never materialized.

At the start challenges for sectoral UN agencies to collaborate were already apparent: it was hard to agree on a name for the group of experts. In WHO, an Expert Committee had a special connotation (expert committees were convened on a regular basis by the Director-General and submitted their report to the Executive Board for approval – this was probably Rafatjah's vision, but there already was an Expert Committee on Vector Biology and Control which had just delivered an Expert Committee report on environmental Management, in 1979); in FAO, the term "Task Force" already had a specific meaning and WHO/FAO/UNEP Task Force on Environmental Management was therefore discarded .. the final agreement was on the name "Joint Panel of Experts".

In its initial years the Panel discussions and reports reflected a general policy focus, often with "motherhood" recommendations, and without a clearly defined audience. The membership of the Panel included several former WHO Executive Board members, not necessarily with a technical background in tropical diseases or disease vector control. The Panel was chaired by the Dutch Senator Dr R.J.H. Kruisinga, who had been vice-Chair of the EB. The FAO designated members did have strong technical backgrounds, drawn from either academia or irrigation practice. UNEP relied on WHO for the designation of Panel members.

There was a clear need to move the Panel from an annual talk-shop to a more operations-oriented entity and the shift to a focus on technical issues started with the 3rd Panel meeting at FAO in Rome, in 1983. The agenda of the five-day meeting included a half-day (!) technical discussion session on forecasting the vector-borne disease implications of water resources development. This technical discussion was the starting point of the Panel's and later WHO's work on Health Impact Assessment of Development Project.

As the technical discussions took on a more important place on the agenda of annual Panel meetings (in the late 1980s 2.5 of the five meeting days), the composition of the Panel gradually changed to more technical levels. This led to the emergence of normative documents, health impact

assessment, agricultural research for health, river basin assessment, education and training activities, and development of policy and institutional strengthening programmes.

The financial basis for the Panel was narrow from the beginning: under the Arrangements each agency contributed in cash USD20,000 annually – the budget of USD60,000 served to organize the annual Panel meeting, the preparation and distribution of meetings report and, starting in 1985, a mid-term meeting of a small Steering Committee. However, as soon as the Panel's focus shifted from policy to practice, ad-hoc funding was provided for recommended activities. In 1983, WHO supported projects in Nigeria and Sri Lanka with USD30,000 each. The development of guidelines was covered under technical service agreements, and by the early 1990s the Panel had an annual budget of almost 1M USD. A major input was provided by IDRC Canada with the governments of Denmark and Norway: a total of nearly 2M USD for the IDRC/WARDA/PEEM Consortium Research Project on the association between irrigated rice production systems and malaria and schistosomiasis in different ecozones of West Africa.

In addition, WHO provided a full-time P4 staff and a G5 secretary, as well as part of the time of a P5 staff; FAO provided a practically full-time P4 staff and part of the time of a P5 staff, and UNEP part of the time of a P4 staff.

In 1990 the UN Centre for Human Settlements UNCHS, also known as UN-Habitat, based in Nairobi, joined the other three agencies, adding the dimension of disease vector control in urbanizing areas and in peri-urban often informal settlements. The frequency of Panel meetings was reduced to once every two years, staggered with a meeting of WHO-designated Collaborating Centres the other year.

In 1995 an independent review of the Panel and its programme was commissioned. This happened at the time when the UN agencies went through series financial constraints. Each agency nominated a consultant and this team investigated the Panel's objectives and outputs, interviewed people at the four agencies, a number of selected panel members and representatives of collaborating centres.

The outcome was highly positive. Relevance of the Panel's objectives scored high against the backdrop of the 1987 Brundtland report (*Our Common Future*), the 1992 UN Conference on Environment and Development, and the trend towards dealing with Persistent Organic Pollutants in a definitive manner. The consultants also observed, however, that the excellent work of the Panel could be significantly enhanced if the four agencies would raise their annual support from what they considered the absolute bare minimum of USD20,000 a year. For FAO, where new leadership of the Water Resources, Development and Management Service had already questioned the use of a health programme in an agricultural organization, this was reason to end its engagement. From the WHO side, where the Division of Vector Biology and Control had been disestablished at the end of 1989 (with the PEEM Secretariat moving to the Community Water Supply and Sanitation unit in the Environmental Health Division) there was no pushback, as priorities in Tropical Disease Control had shifted – in the Declaration of the 1992 Malaria Conference in Amsterdam, vector control had been inserted only last minute.

While the Panel was never formally disestablished by the agencies, the interagency activities gradually wound down and the remnants of its programme continued to be carried out by the WHO.

Main issues addressed by the Panel

Following is a list of technical discussions held at the annual (later biennial) PEEM meetings:

- 1981 Environmental management for vector control in rice fields
- 1982 Environmental management measures for disease vector control
- 1983 Methods of Forecasting the vector-borne disease implications in the development of different types of water resources projects
- 1984 Institutional arrangements to ensure the incorporation of health and environmental safeguards in water resources development projects
- 1985 The environmental impact of population resettlement and its effect on vector-borne diseases
- 1986 Financial and economic aspects of environmental management, and its cost-effectiveness as a vector control measure
- 1987 Effects of agricultural development and changes in agricultural practices on the Transmission of vector-borne diseases
- 1988 Education and training for the planning, design and implementation of environmental Management for vector control
- 1989 Policies and programmes of governments, bilateral and multilateral agencies and development banks in support of environmental management
- 1990 Livestock management and vector-borne disease control
- 1991 Vector-borne disease problems associated with rural and urban water management

Other activities and events

In 1984, the International Irrigation Management Institute (now the International Water Management Institute) was established in Sri Lanka, and the first workshop ever was on Irrigation and Malaria (IIMI, 1985), at its initial premises, Digana Village near Kandy. Policy seminars on public health in water resources development were held in Kenya (1987), Zambia (1995) and Malawi (1996). River-basin studies were performed on the Lower Mekong Basin, the Zambezi River and the Senegal River in the mid-1990s to assess the conditions of vector-borne disease control in basin-wide approaches. In a series of regional workshops (Alexandria, 1991; Bangkok 1991; Tegucigalpa 1992) the options of promoting environmental management for vector control through agricultural extension workers and farmer field schools were explored.

Major and minor research efforts

In March 1987 the International Rice Research Institute (IRRI, part of the CGIAR), PEEM and the USDA Riceland Mosquito Management Program (RMMP) jointly organized a workshop at the IRRI premises in Los Baños, the Philippines. This resulted in a seminal publication and the development of a multi-country research proposal. Donor interest was weak, and the proposal was never funded. Underlying reasons were a change in administration at IRRI and internal resistance in WHO to mobilize funds for health research outside of the health sector research infrastructure.

Work with another CGIAR centre, the West Africa Rice Development Association (WARDA, based in Bouaké, Côte d'Ivoire) was more successful: a multidisciplinary team studied over four years the associations between valley bottom and irrigated rice production systems, and the transmission of malaria and schistosomiasis in three West African ecozones: humid, intermediate and Sahelian zones in Côte d'Ivoire and Mali. It resulted in some ten research papers published in the biomedical literature, but the results were never transformed into policy papers for the agricultural sector.

The initial contact with IWMI resulted in the creation of a Water and Health programme, covering mainly malaria and Japanese encephalitis, later expanded into issues around pesticide use and the safe use of wastewater in agriculture – the latter subject continues to be part of IWMI's research programme. The malaria component at IWMI was revived for some years in 1999 when it hosted the CIAR System-wide Initiative on Malaria (SIMA).

Ad-hoc, less institutionalized research activities took place under the auspices of PEEM in Sri Lanka (malaria impacts of the accelerated Mahaweli Development project), Nigeria (an inventory of small-scale water resources projects and their links to schistosomiasis), South India (environmental management for the control of Japanese encephalitis vector breeding in rice fields) and Indonesia (environmental determinants of malaria in the Menoreh Hills area of central Java).

Capacity development

Out of the eighth Panel meeting with its technical discussion on education and training, a course was developed for health impact assessment of water resources development projects. In a collaborative effort of PEEM with the Danish Bilharziasis Laboratory, the Liverpool School of Tropical Medicine and the Institute of Higher Education Studies of University College London, a three-week problem-based learning course was developed and tested in five countries: Zimbabwe (1992), Ghana (1994), Tanzania (1995), Honduras (1996) and India (1997). Course development and testing was generously supported by the Danish Government.

Post PEEM

Many of the work streams initiated under PEEM continued well after the moment the Panel stopped functioning. The subject of HIA was covered extensively in WHO capacity development efforts in the Mekong countries between 2003 and 2009, and it is now continued by the Asian Development Bank. Work on alternatives to insecticides fed into the negotiations on the Convention for the reduction and elimination of Persistent Organic Pollutants – the agreed Stockholm Convention (2001) included many first-generation residual insecticides used for vector control in the 1950s, with DDT being the most prominent and controversial. In follow up, GEF supported projects on substitution of DDT with alternatives for vector control were carried out in WHO's Eastern Mediterranean and African regions. It spurred discussions over the links between IVM and IPM, and how to promote a combined approach for vector and pest management in agroecosystems.

Environmental management has also become increasingly of interest for urban vector control, with dengue, Chikungunya and Zika viruses surfacing at regular intervals. As the health sector interventions for malaria control (case detecting, drug treatment, LLINs) are faced with stagnancy, because of drug and insecticide resistance, and with regress in areas of civil strife and war, the role of multisectoral approaches applying more durable solutions is again catching the attention. In the period of the SDGs, such an interlinked approach makes sense as part of efforts to achieve

sustainable development. Environmental engineering and manipulation can add the resilience needed to ensure that the achievements (and investments) in malaria control over the past 15 years are not lost.

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