



Development  
Progress

## Case Study Report

*Health*



# NEGLECTED TROPICAL DISEASES The case of Cambodia

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## Acknowledgements

This report was authored by Romina Rodríguez Pose (independent consultant). Oversight was provided by Fiona Samuels and Susan Nicolai of the Overseas Development Institute (ODI).

The author would like to acknowledge the helpful support on the ground provided by the local partner in Cambodia, Dr Vanny Peng and the inputs from the more than 30 key stakeholders interviewed.

The author would also like to acknowledge, with gratitude, the detailed comments on drafts from the three external peer reviewers: David Molyneux (Liverpool School of Tropical Medicine), Vicente Jr Belizario (World Health Organization, Western Pacific Region) and Lesong Conteh

(School of Public Health, Imperial College London).

Extensive comments were also provided by ODI colleagues: Katy Harris, Amanda Lenhardt, Andrew Rogerson and Susan Nicolai. Aaron Griffiths provided editing support.

The case study report was funded by the Bill & Melinda Gates Foundation as part of 'Development Progress', a four-year research project that aims to better understand, measure and communicate what has worked in development and why. The findings and conclusions contained within are those of the author and do not necessarily reflect the positions or policies of the Bill & Melinda Gates Foundation.

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## Abbreviations and acronyms

<b>CLTS</b>	Community-Led Total Sanitation	<b>MoH</b>	Ministry of Health
<b>CNM</b>	National Center for Parasitology Entomology and Malaria Control	<b>MRD</b>	Ministry of Rural Development
<b>CWW</b>	Children Without Worms	<b>MSF</b>	Médecins Sans Frontières
<b>DALYs</b>	Disability-adjusted life years	<b>NTD</b>	Neglected tropical disease
<b>FBT</b>	Food-borne trematodiasis	<b>ODI</b>	Overseas Development Institute
<b>HEF</b>	Health Equity Fund	<b>PCT</b>	Preventative chemotherapy
<b>HKI</b>	Helen Keller International	<b>PDR</b>	People's Democratic Republic (Lao)
<b>HSU</b>	Helminths Sub-Unit	<b>SCH</b>	Schistosomiasis
<b>LF</b>	Lymphatic filariasis	<b>STH</b>	Soil-transmitted helminth
<b>MDA</b>	Mass drug administration	<b>TAS</b>	Transmission assessment survey
<b>MDG</b>	Millennium Development Goal	<b>WASH</b>	Water, sanitation and hygiene
<b>MoEYS</b>	Ministry of Education, Youth and Sport	<b>WHO</b>	World Health Organization
		<b>WSP</b>	Water and Sanitation Program

# Abstract

Neglected tropical diseases (NTDs) represent the most common infections affecting the world’s million poorest people. In Cambodia, soil-transmitted helminths are endemic throughout the country, while lymphatic filariasis and schistosomiasis affect many people in parts of the country. Yet in barely more than a decade Cambodia has made tremendous progress in tackling these three NTDs. The country has complemented the distribution of drugs with health education and prevention strategies to improve hygiene and sanitation practices.

Cambodia’s progress provides a working model of how NTDs can be controlled with minimal resources. The report explores five factors that have driven change: (1) strong collaboration between two key ministries; (2) the cost-effective integration of NTD interventions into existing health structures; (3) the support and capacity building provided to the programme through external partnerships; (4) the mobilisation of resources, including how continuous multiple outreach efforts have helped to secure funding and drug donations; and (5) broader progress in the health, education and water, sanitation and hygiene (WASH) sectors.

A number of challenges remain: continuing dependence on external assistance; persistent inequalities in access to health services; the need for further progress in the WASH sector to achieve lasting behavioural change; and limited inter-sectoral collaboration with other important ministries.



Senior health worker in Preah Vihear, Cambodia. Photo: © Chhor Sokunthea/World Bank



# Cambodia

On the road to elimination of neglected tropical diseases (NTDs)

## INTESTINAL WORMS

(Soil-transmitted helminthiasis)

1<sup>st</sup>

FIRST  
COUNTRY

Cambodia is the first country to surpass the World Health Organization's (WHO) goal of providing...

**75%** of school-aged children with regular anti-worm treatment...



**...6 years**  
ahead of schedule<sup>1</sup>...



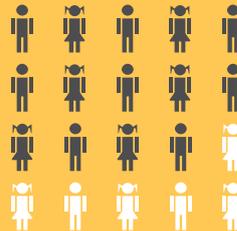
...covering **85%** of school-aged children in 2011.

## SNAIL FEVER

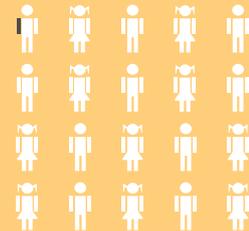
(Schistosomiasis)

VIRTUALLY  
ELIMINATED

Snail fever is virtually eliminated due to Cambodia's effective program.



**70%** of school-aged children were infected in 1995...



... but only **0.5%** in 2003<sup>2</sup>.

## ELEPHANTIASIS

(Lymphatic filarasis)

CERTIFIED FOR  
ELIMINATION

Elephantiasis is in the process of being certified for elimination by the WHO.



**5 years** of successful treatment



Sources: 1. World Health Organization & Asian Development Bank, 2014 | 2. Sinoun et al., 2007; Croce et al., 2009 | 3. WHO – World Health Organization – [ONLINE] Available at: <http://www.who.int>. [Accessed 29 May 2014]

# 1. Introduction



Children and parents waiting to be registered for a medical screening. Photo: © Natasha Graham/Global Partnership for Education

Neglected tropical diseases (NTDs) are a group of 17 chronic disabling infections<sup>1</sup> affecting the poorest people in the world, mainly in Africa, Asia and some parts of Latin America and the Caribbean. More than a billion people are thought to be infected by NTDs, with an additional two billion at risk of infection. The deaths of approximately half a million people each year are attributable to NTDs (WHO, 2010; Jannin and Savioli, 2011).<sup>2</sup> NTDs are the most common infections of the world's poorest people and

cause a number of debilitating health conditions, chronic illnesses and pain, severe disability, disfigurement and malnutrition. They almost exclusively affect those living in remote rural areas, urban slums, or conflict zones.<sup>3</sup> Although they are seldom fatal,<sup>4</sup> they 'are the fourth most devastating group of communicable diseases behind lower respiratory infections, HIV, and diarrhoeal diseases – ranking higher than either malaria or tuberculosis' (Henry J Kaiser Family Foundation, 2014). They prevent

- 1 Helminth infections: soil-transmitted helminths (including ascariasis, trichuriasis and hookworm), lymphatic filariasis, onchocerciasis, schistosomiasis, dracunculiasis (guinea-worm disease), cysticercosis, echinococcosis, food-borne trematodes infections and other 'neglected zoonotic diseases'. Viral infections: dengue and rabies. Protozoan infections: leishmaniasis, human African trypanosomiasis and Chagas disease. Bacterial infections: leprosy, trachoma, buruli ulcer and endemic treponematoses (WHO, 2010).
- 2 Determining their disease burden has been controversial, with many NTD experts claiming that it has usually been underestimated, putting their combined global burden at 56.6 disability-adjusted life years (DALYs) compared with malaria at 46.5 and tuberculosis at 34.7 (Fenwick, 2012). The recent Global Burden of Disease study reduced the estimated burden from earlier calculations. There remains considerable dispute about both the burden itself and the Disability Weights attributed to some NTDs and there is a need for more detailed appraisal of the true burden of NTDs (Murray et al., 2012).
- 3 NTDs cluster and flourish in conditions of poverty where communities have low access to water and sanitation, poor hygiene conditions and/or weak health systems (WHO, 2010).
- 4 While most of the burden of disease is associated with morbidity, some NTDs are directly fatal or the pathological sequelae cause death (David Molyneux, personal conversation).

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people from living healthy lives or from working, leading to a vicious cycle of poverty and illness that blocks their economic potential and their opportunities to contribute to the broader development of their countries (WHO, 2010; Wilsher, 2011; Samuels and Rodríguez Pose, 2013). A recent *Lancet* (2014) editorial emphasised the importance of including NTD control/elimination in the post-2015 sustainable development targets.

In spite of this, they received little attention from policymakers and/or researchers until about a decade ago (Chagas, 2012; Ogden, 2012) remaining low on national and international health agendas.<sup>5</sup> There has since been growing recognition of the burden of NTDs and they are beginning to take their place on the international agenda (UN, 2013). This has led to: (1) the emergence of drug donation programmes as pharmaceutical companies have pledged to donate drugs for as long as needed to eliminate some key diseases,<sup>6</sup> (2) the development of inexpensive control strategies for administering the drugs, and (3) a growing number of donors allocating funding for integrated NTD control.<sup>7</sup>

These three breakthrough developments have presented resource-constrained countries with an opportunity to start fighting this silent threat. Preventive chemotherapy, which implies the distribution via large-scale mass drug administration (MDA) of one dose of medication once or twice a year in affected communities, became the main strategy to control or even eliminate the five NTDs that account for up to 90% of the global NTD burden (WHO, 2007):<sup>8</sup>

- soil-transmitted helminths (STHs) including hookworm, ascariasis and trichuriasis
- schistosomiasis (SCH), also known as snail fever or bilharzia
- lymphatic filariasis (LF), also known as elephantiasis
- onchocerciasis, also known as river blindness
- trachoma, the leading cause worldwide of infectious blindness.

This case study comes at a time of substantial interest in reviewing the achievements of the Millennium Development Goals (MDGs) and debating the post-2015 agenda. It aims to contribute towards giving greater visibility to NTDs and to help raise awareness of the importance of eliminating these diseases. Not only would the elimination of these diseases accelerate progress in health in many countries, it would also impact on other areas of development (see Molyneux, 2008; Smith and Taylor, 2013; Samuels and Rodríguez Pose, 2013). Taking advantage of the drugs, funds and strategies available, several countries have launched NTD programmes; the degree of progress of these programmes has varied according to the national willingness to deal with these diseases and the extent to which countries have managed to adapt implementation strategies to local contexts.

So why focus on Cambodia? While many countries in the region have made significant advances in fighting the main endemic NTDs, Cambodia has advanced faster than the rest of the region: hookworms (one of the three types of worms included in STH) went from the 7th position in the rankings of 'years lived with disability' among children between 5 and 14 years old down to 53rd (a drop of 93%) and ascariasis (also a worm included in STH) from the 9th to the 111th in the same period (100% reduction) (IHME, 2010).<sup>9</sup> Cambodia is also one of the few countries in the region where five out of the region's eight priority NTDs are endemic<sup>10</sup> (WHO-WPRO, 2011); it has characteristics that make it particularly vulnerable for the spread of NTDs (Box 1); and it represents a very good example of how progress can be achieved with minimum resources and despite adverse circumstances.

It is important to address the impact of the conflict, since it significantly affected the country's health trajectory (Box 2, page 13). After the fall of the Khmer Rouge in 1979, little of Cambodia's health system remained in place: much of the infrastructure had been destroyed, and

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5 Efforts to achieve Millennium Development Goal 6 on combating disease have focused on HIV and AIDS, tuberculosis and malaria, with NTDs receiving just 0.6% of official development assistance compared with 37% for HIV and AIDS (Liese and Schubert, 2009).

6 By 2012, the treatment of NTDs globally involved the largest drug donations in history, equivalent in value to over \$1billion (Global Network Neglected Tropical Diseases website: [www.globalnetwork.org/why-ntds](http://www.globalnetwork.org/why-ntds)). Pharmaceutical companies have also played a key role in NTD research and development activities. According to the International Federation of Pharmaceutical Manufacturers & Associations the pharmaceutical industry is the third largest global investor in NTD research and development, behind the United States' National Institutes of Health and the Bill & Melinda Gates Foundation (International Federation of Pharmaceutical Manufacturers & Associations website: [www.ifpma.org/global-health/neglected-tropical-diseases.html](http://www.ifpma.org/global-health/neglected-tropical-diseases.html)).

7 Though still low when compared with other areas of health, in recent years, key multilateral and bilateral organisations and funders have pledged more funds to tackle NTDs. Apart from the WHO, key actors are the US and British governments, the World Bank, the Inter-American Development Bank, the Bill and Melinda Gates Foundation, Médecins Sans Frontières (MSF) and a few European governments (Institute of Medicine, 2011).

8 The WHO recommends a combination of five strategies for the prevention and control of NTDs that will be applied according to epidemiology of the specific NTD. Apart from preventive chemotherapy (PCT), the other four strategies are: Intensified case-management; Vector control; Safe water, sanitation and hygiene; and Veterinary public health (WHO, 2010).

9 Data from the Institute of Health Metric and Evaluation, GBD 2010 Arrow Diagram: <http://vizhub.healthdata.org/irank/arrow.php>. Across the region, hookworms and ascariasis (two of the STH infections) ranked 3rd and 5th as causes of years lived with disability among children aged 5 to 14 in 1990; while the situation of ascariasis improved significantly by 2010, moving down to the 51st position (a reduction of 97%), hookworm infections remain a major issue, going down only to the 5th position (decreasing 34%). The most significant risk of hookworm infections is anaemia and loss of iron (and protein) in the gut, which are the leading causes of maternal and child morbidity in developing countries located in the tropics and subtropics. Iron-deficiency anaemia is the third cause of years lived with disability at a global level, both in 1990 and 2010, while it decreased from the first position to the third one in developing countries in the same period.

10 The priority NTDs in the region are LF, SCH, blinding trachoma, leprosy, yaws, STHs and food-borne trematodiasis (WHO-WPRO, 2011).

### Box 1: Country characteristics that make Cambodia particularly vulnerable to the spread of NTDs

Geographical, environmental and population characteristics intersect in Cambodia to make the country particularly vulnerable to the spread of NTDs (MoH and WHO, 2012):

- The country's recent history of conflict, displacement and resettlement of people coupled with its geographical location makes it a major point of origin, destination and transit for internal and cross-border migrants in search of employment. This represents a challenge in terms of communicable disease transmission, including NTDs (Stern, 1998; Prothero, 2002).
- About 80% of the population of 14.3 million (2011) live in rural areas, with some provinces being isolated and mountainous (Rattanakiri) and others being populated and fertile (Battambang). This means that Cambodians' health care needs and access to services vary greatly (McGrew, 1990).
- The economic activities practised by the majority of the rural population expose people to environments where vectors live (traditional wet rice cultivation and other forms of agriculture and fishing).
- Certain unhygienic practices are common (e.g. open defecation is a common practice for around 70% of the rural population and the use of public latrines is often misunderstood or limited to adults) and access to sanitation and improved sources of water is still limited.
- Cambodia lies completely within the tropics, with about three quarters of its territory consisting of the Tonle Sap (Great Lake) Basin, the Mekong Lowlands and tropical rainforest (Couwenberg, n/d). Its monsoonal climate makes the country prone to suffer from recurrent floods during the rainy season (June to November), which limits the impact of latrines and favours breeding sites for vector-borne diseases.

fewer than 50 of the 600 doctors practising before 1975 remained in the country (Volkmar-André, 1986).<sup>11</sup> Khmer regime rule resulted in the death of about a quarter of the population and also had devastating consequences for the health status of the survivors. The significant efforts the country has made in the last decades puts Cambodia's health indicators in a better position than those of many low-income countries but it still lags behind its neighbours in the South East Asia and Pacific region (Health Systems 20/20, 2012). In particular, the health and nutritional status of Cambodia's children and women, although having improved in the last decades, are still among the poorest in the region. Much has been achieved in controlling malaria (the malaria mortality rate per 100,000 people reduced from 5.29 in 2000 to 0.32 in 2012 – CNM, 2013), however, vaccine preventable diseases, diarrhoea,

and respiratory infections are among the leading causes of childhood death.<sup>12</sup>

Malnutrition affects most Cambodian children (Figure 1, overleaf) and by 2010 still 40% of under-five-year-olds were stunted (compared to almost 50% in 2000),<sup>13</sup> 28% were underweight and 11% were wasted.<sup>14</sup> In addition, 44% of Cambodian women (aged 15-49), 52.7% of pregnant women<sup>15</sup> and 55% of under-five-year-olds were reported to be anaemic (National Institute of Statistics et al., 2011).<sup>16</sup> Both the poor nutritional background and the high prevalence of anaemia makes STH a silent but significant health problem in the country.<sup>17</sup>

The two most salient health-related problems linked to poverty in Cambodia are access to health care and malnutrition (MoH and WHO, 2012), the latter of which is strongly correlated with the spread of NTDs. STH (particularly hookworm infections) is highly endemic

11 Development assistance was almost non-existent before the peace accords were signed in Paris in 1991 (Godfrey et al., 2000) and only started arriving towards the middle of the decade. Efforts mainly focused on the rehabilitation of provincial hospitals and programmes providing maternal and child health care; with disease control being confined to those places where government troops could provide security (Desbarats, 1995).

12 See the UNICEF website: [www.unicef.org/infobycountry/cambodia\\_2190.html](http://www.unicef.org/infobycountry/cambodia_2190.html).

13 42% of rural children are stunted, as compared with 28% of urban children (National Institute of Statistics et al., 2011). Stunting is low height for age and is caused by long-term insufficient nutrient intake and frequent infections. It represents chronic malnutrition and its effects are largely irreversible.

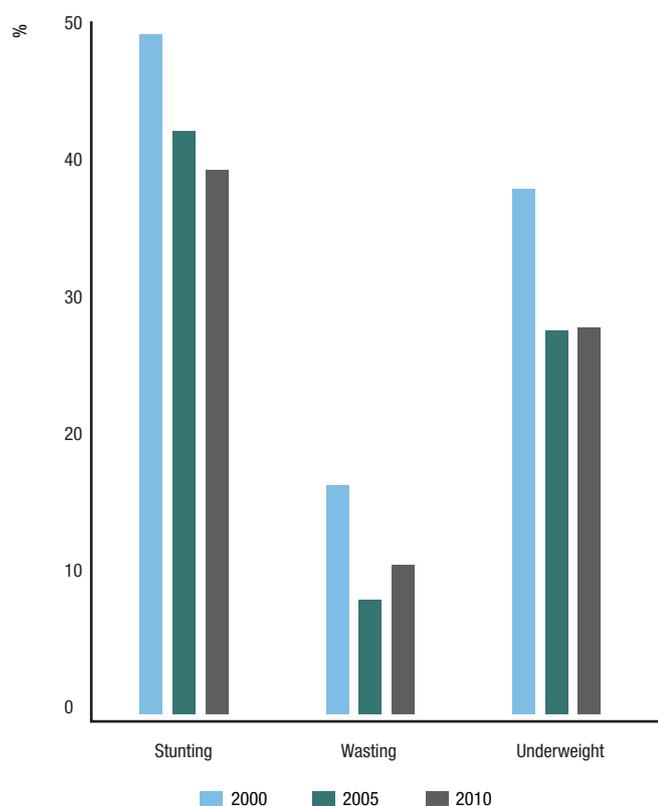
14 Underweight is low weight for age, while wasting is low weight for height: both are strong predictors of mortality among children under five and are usually caused by acute weight loss or significant food shortage and/or disease.

15 A woman who has poor nutritional status, as indicated by a low body mass index, short stature, anaemia, or other micronutrient deficiency, has a greater risk of obstructed labour, of having a baby with a low birth weight, of producing lower quality breast milk, of mortality due to postpartum haemorrhage, and of morbidity for both herself and her baby (National Institute of Statistics et al., 2011: 147).

16 This breaks down as 28% mildly anaemic, 26% moderately anaemic and 1% severely anaemic. Also, rural children are more likely (57%) to be anaemic than urban children (45%) (National Institute of Statistics et al., 2011).

17 Anaemia and malnutrition are very common side effects of several NTDs (Mistry, 2012). On the one hand, NTDs have a direct impact on nutrition because parasites, particularly STH infections, consume key nutrients from the food that a person needs to be healthy, thus considerably reducing the impact of food aid and other forms of food and nutritional transfer in cases of extreme hunger (GNNTD, website: [www.globalnetwork.org/why-ntds](http://www.globalnetwork.org/why-ntds)).

**Figure 1: Trends in nutritional status of children under five years old**



Source: National Institute of Statistics et al., 2011

throughout the country, with an estimated 8.4 million people being at risk of infection (about half of the country’s population).<sup>18</sup> Additionally, SCH, while only affecting about 80,000 people, had high prevalence rates in two provinces along Mekong river (Kratie and Stung Treng). LF, on the other hand, had low prevalence levels but affected about 500,000 people distributed in 18 endemic districts in 4 provinces (Rattanakiri, Stung Treng, Preah Vihear and Siem Reap) (See Figure 2, page 14). While trachoma, food-borne trematodes and strongyloidiasis are recognised to be endemic in Cambodia, only scattered studies have been done so far; thus, the true level of endemicity is still unknown (See Figure 3, page 15) (key informant interview).

Within this context, and while still lagging behind neighbouring and regional countries in many areas of development including health, Cambodia has made tremendous progress in just over a decade. In 2004 it became the first country in the world to reach the World Health Organization (WHO) target for 2010 of providing

75% of school-aged children with regular anti-worm treatment for STHs (six years ahead of schedule) (WHO and ADB, 2014). Furthermore, the country is making efforts to maintain its gains so far and it is moving to complement the distribution of drugs with health education and prevention strategies to improve hygiene and sanitation practices (key informant interviews with donor community).

SCH has been virtually eliminated, going from prevalence levels of around 70% among school-aged children and 50% for the general population with more than 12,000 severe cases and 25 deaths estimated to occur annually in the mid-1990s, to prevalence rates of 0.5% in 2003 (it maintained itself below 5% from 2002 onwards) with no severe cases detected in the country since then. Additionally, LF has been successfully treated for five years and the country is now in the process of obtaining WHO certification on LF elimination.<sup>19</sup>

### 1.1 Methodology and structure of the report

This case study aims to provide evidence on the strategies Cambodia has put in place to tackle the burden of NTDs. It aims to answer a number of key questions including: What are the key factors driving progress in Cambodia? Have those have been internal or external to the programme/health system? And what has the role of financing been in this process?

The progress made by Cambodia in tackling NTDs provides a working model of how, with minimal resources, NTDs can be controlled and even eliminated. This can serve as an example for what other countries can hope to achieve through their national plans to control NTDs. The cross-cutting linkages that NTDs have with many other areas of development (See Molyneux, 2008; Smith and Taylor, 2013; Samuels and Rodríguez Pose, 2013), particularly with poverty, makes this case study a useful contribution to understanding a recently ignored area of health that can be key in accelerating progress towards the 2015 MDGs as well as to help put NTDs on the post-2015 agenda.

This review highlights not only good practices and successes but also proposes how challenges may be addressed in the course of programme implementation.

This case study builds on the review of key documents, including government policies, surveys and the literature available on NTDs globally and for Cambodia. This was a desk study complemented by phone interviews supported by a local consultant, who made a number of in-country key informant interviews with a range of key stakeholders in the field of NTDs.

<sup>18</sup> This number might be even underestimated as it only takes into account the three at risk groups targeted to receive drugs for STH: pre-school children (aged 12-59 months), school-aged children (aged 6-14 years) and women in reproductive age (15-49 years).

<sup>19</sup> WHO, through its governing body, the World Health Assembly, is the institution that officially sanctions targeting of any disease for elimination or eradication and it is the only international organisation that can legally declare a disease eradicated or eliminated. Certification is usually done at least three years after interruption of disease transmission (Hopkins, 2011).

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## Box 2: Cambodian historical and economic context

Cambodia's modern history has been characterised by civil war, genocide and occupation. In the early 1970s the country suffered intense bombing by the United States on its western border with Vietnam. The fall of Phnom Penh to the Khmer Rouge marked the beginning of four years of genocide under the rule of Pol Pot, whose radical vision transformed the country into a Marxist agrarian society closed to the outside world, emptied the cities and destroyed everything that could be identified with the west, including advances in health and education, setting 1975 as 'year zero'. Cambodia became a 'killing field' and up to two million people died as the result of violence, starvation and disease. In 1979 the Khmer regime was overthrown by Vietnamese troops, who installed a hard-line socialist regime that lasted for ten years. In the years that followed low intensity warfare existed between Vietnamese troops and Khmer Rouge guerrillas. Despite the Paris Peace Accords in 1991 and general elections in 1993, a fragile political stability was not reached until the death of Pol Pot in 1998.

Since then Cambodia has made remarkable progress. In the 1990s the transition to an open market economy spurred the rapid rise of the garment industry, tourism and construction and further integration with regional and world markets. In 2001 it attained lower-middle-income status (Hak et al., 2011; Felipe, 2012). In the decade that followed (2001-2010), the annual average GDP growth of 7.7% was one of the world's top ten, although it was hit by the global financial crisis in 2009 (Keane et al., 2010). The poverty rate in Cambodia has improved over the period 1994-2007, going from 47% in 1994 to 30% in 2007 (Virayuth, 2009). The annual report of the Commune Data Base for 2010 estimated that the poverty rate ranged between 21% and 36% in different areas of the country (Royal Government of Cambodia, 2011).

Note: The database includes village statistics and data collected by the village chief every year in December from all villages in the country (Ministry of Planning, 2010).

Source: World Without Genocide website: <http://worldwithoutgenocide.org/genocides-and-conflicts/cambodian-genocide>.

The report is structured as follows: Section 2 sets out the progress that has been made by Cambodia on preventing and treating NTD infections. Section 3 presents an overview of the main factors that have driven this

progress, while Section 4 outlines the future challenges and, when possible, how these may be addressed. Section 5 highlights the key lessons to be learnt from this case study.

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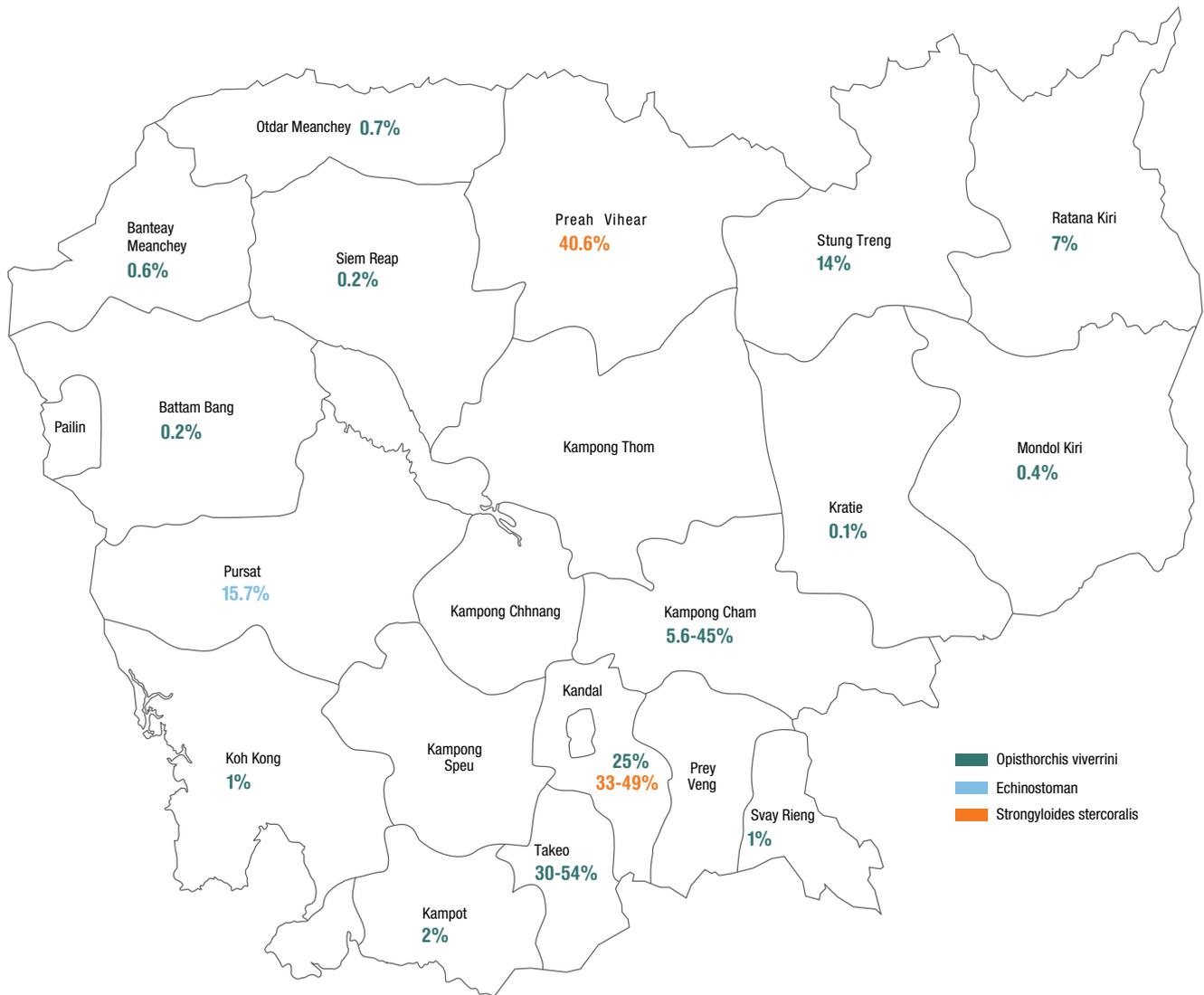
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**Figure 2: NTD endemicity map of Cambodia**



*Source: Huch, 2013*

**Figure 3: Endemicity levels of opisthorchiasis, strongyloidiasis and echinostomiasis in Cambodia**



Source: MoH, 2010



# Cambodia

A leader on neglected tropical diseases (NTDs) despite the odds

## SCARCE RESOURCES



Cambodia is a country with scarce resources and a recent history marked by conflict, bringing serious health challenges.

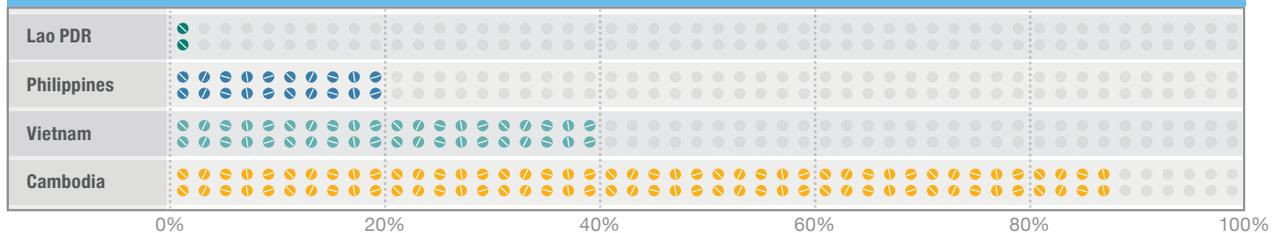
## EFFICIENT HANDLING OF NTDs



Cambodia has followed the World Health Organization's guidelines to fight NTDs, outperforming its neighbours.

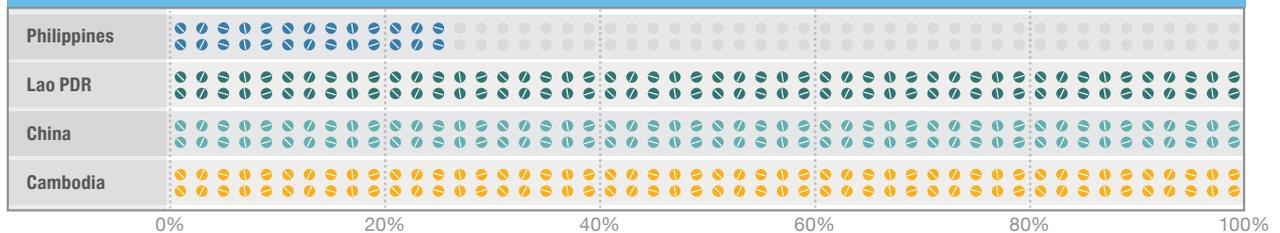
### DRUG ADMINISTRATION – INTESTINAL WORMS (Soil-transmitted helminthiasis)

National coverage for mass drug administration in Cambodia and neighbouring countries (data from 2012)



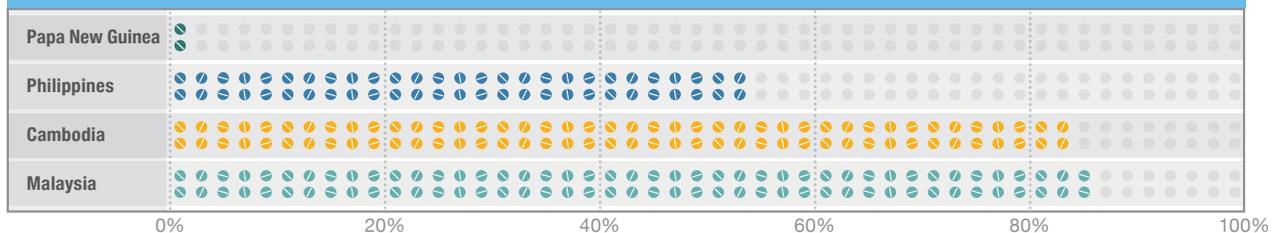
### DRUG ADMINISTRATION – SNAIL FEVER (Schistosomiasis)

National coverage for mass drug administration in Cambodia and neighbouring countries (data from 2011)



### DRUG ADMINISTRATION – ELEPHANTIASIS (Lymphatic filariasis)

National coverage for mass drug administration in Cambodia and neighbouring countries (data from 2008–2010)



Source: WHO – World Health Organization – [ONLINE] Available at: <http://www.who.int>. [Accessed 29 May 2014]

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## 2. What progress has been achieved?



Rural Siem Reap Province, Cambodia. Photo: © Austin King

This section looks at Cambodia's achievements in its efforts to combat the 'tool-ready'<sup>20</sup> NTDs endemic in the country. It examines:

- The progress on the three NTDs that have been actively fought in Cambodia: STHs, LF and SCH.
- The situation of trachoma, food-borne trematodiasis (FBT) and strongyloidiasis, for which the control strategies are still at an incipient stage.
- Cambodia's experience as a regional performer against the odds.
- The progress achieved in terms of behavioural change in water, sanitation and hygiene (WASH).
- Progress in the broader health context since the civil war.

### 2.1 Progress on STH, SCH and LF

For each of these NTDs, a regional situation is presented at the beginning of each sub-section to help contextualise Cambodia's progress within the region. This is followed by Cambodia-specific achievements, where evidence of progress is presented through exploring: prevalence (outcomes), MDA coverage (outputs) and, when data is available, reduction of the intensity of infection and morbidity management. Some thoughts in terms of the steps ahead are also presented.

#### 2.1.1 Soil-transmitted helminths

STHs are intestinal worms transmitted by eggs in human faeces, which, in turn, contaminate areas where sanitation

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<sup>20</sup> The aforementioned five NTDs are the major 'tool-ready' ones for which control, prevention strategies and drugs are available making the goal of elimination more likely than ever before. The remaining 12 NTDs are known as 'tool-deficient' as the current control strategies available are generally costly and/or difficult-to-manage (WHO and Carter Center, 2008).

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is poor. STHs that infect people include ascariasis, trichuriasis and hookworms. Eggs are deposited on soil when infected people defecate in the open or if their faeces are used as fertiliser. People are infected with STH when eggs are ingested, usually when they touch contaminated soil, when their hands are not properly washed, when they eat vegetables and fruit that are not properly cooked, washed or peeled or that are contaminated with eggs, or when they walk barefoot on contaminated soil.

WHO recommends the periodic administration of anthelmintic medicines to pre-school and school-aged children, women of reproductive age, and adults who are particularly exposed (e.g. farmers and miners), backed by improved sanitation and health education. WHO also recommends annual treatment in areas where the STH prevalence rate is 20-50%, and biannual treatment in areas with prevalence over 50%, to protect individuals from morbidity. A proper sanitation infrastructure would interrupt transmission of STH, but few endemic countries have the resources to sustain such infrastructure and the elimination of morbidity remains the most feasible strategy at present.

### **Regional situation**

STH infections are highly prevalent in the WHO Western Pacific Region with approximately 230 million people at risk (Montresor et al., 2008). According to the WHO regional director's report (WPRO, 2013), programmes have been put in place but many still need to be scaled up. Twelve countries in the region carried out school deworming programmes, and three of them met the global target of 75% coverage: Cambodia, the Lao People's Democratic Republic (PDR) and Vietnam reached national coverage in 2004, 2007 and 2008, respectively (WPRO, 2013; Montresor et al., 2008).<sup>21</sup>

### **Cambodia's achievements**

STH infections are highly endemic throughout the country. The target groups qualifying to get treatment twice a year with mebendazole are: school-aged children (6-14 years), pre-school-aged children (12-59 months) and women of child-bearing age (15-49 years), which leads to an estimated 8.4 million people being most at risk of infection. MDA is complemented with health education activities.

From 1997 a pilot MDA for STH was launched in Kratie and Stung Treng provinces by adding the simultaneous

administration of mebendazole to all the individuals already treated for SCH. However, the path towards scaling up MDA to national level was gradual, both geographically and in terms of target groups, until 2003 when the STH MDA achieved nationwide coverage and its administration started being implemented in collaboration with the Ministry of Education, Youth and Sport (MoEYS) primarily through a school-deworming strategy.

### **Prevalence**

Baseline prevalence surveys on STH were conducted among school children in different provinces and at different times between 1997 and 2002. These surveys found that STHs were highly prevalent in both urban and rural settings of Cambodia. Pilot studies were carried out in different districts to understand the prevalence and intensity of the STHs, the impact of the MDA with mebendazole and the period of reinfection before scaling up to national level in 2005.

Figure 4 (see page 20) presents results of the pilot MDA campaigns in selected villages. It shows how prevalence for ascaris and trichuris declined to levels close to zero while hookworm prevalence, which is the most severe STH infection in Cambodia, saw a three-fold to nine-fold decrease depending on the endemic area.

The severe morbidity that was found among the communities (e.g. the presence of blood in the stool, abdominal pain and chronic diarrhoea, worms in the faeces and anaemia) during the baseline surveys has also significantly reduced, suggesting that the intensity of the infections has reduced considerably.<sup>22</sup>

### **Programme coverage**

From 2005 to the present, preventive chemotherapy through deworming at school has become a routine programme and has been gradually expanded to reach all primary schools in Cambodia, as well as pre-school children and women of child-bearing age (Sinoun et al., 2007). Reductions in prevalence are the direct consequence of the good performance of the National Center for Parasitology, Entomology and Malaria Control Helminths Sub-Unit programme (henceforth the CNM/HSU or NTD Programme). The deworming coverage has been acceptably high from the outset of the programme, standing between 80% and 90% for most rounds (Figure 4). This made Cambodia the first country to achieve the 2010 WHO target of deworming at least 75% of school-aged children, six years ahead of time.

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21 Estimate coverage rates vary by source owing to different population samples (hence figures cited here differ to those incorporated in the infographic on page 16, which uses WHO data). However, Cambodia's progress is evidenced in all samples referenced. This compares favourably with other countries in the region. China has significantly reduced the number of individuals infected with STH, but in 2008 there were still 11 provinces in which MDA had not started. Since 2002, the Mekong countries, including Cambodia, have undergone a rapid scale-up of programmes targeting STH in primary schoolchildren. In 2004, pilot control activities (with albendazole) started in another five counties in the region, with an additional eight countries included in 2007. In the Philippines, approximately 10 million children are dewormed every year; however, in order to reach the global target, an additional 11 million children would need to be treated in areas still not covered in 2008 (Montresor et al., 2008).

22 Interview CNM/HSU staff.

**Table 1: STH prevalence in villages (%)**

	1997			2005		
	<i>Ascaris lumbricoides</i>	<i>Trichuris trichiura</i>	Hookworms	<i>Ascaris lumbricoides</i>	<i>Trichuris trichiura</i>	Hookworms
Achen	25	1.6	54.7	0	0	14.3
Chartnol	9.5	2.4	46.4	0.9	0	6.1
Sambok	16.2	2.1	45.1	0	0	9
Srekhoeun	13.8	3.4	50	0	0	5.7
Sdau	51.3	9.5	86	0	0.7	18.4
Koh Sneng	34	2.1	55.3	5.4	2	15.6
K. Chanh Tuk	69.6	2.2	67.4	0	0	26

Note: includes villages for which data for both 1997 and 2005 is available.

Source: Simoun et al., 2007

### Reduced burden of STH

The burden of STH (measured in years lived with disability) has been remarkably reduced in just two decades. While in 1990 hookworms and ascaris were the 7th and 9th reasons for years lived with disability, by 2010 they ranked 53rd and 111th, which represents a decrease of 93% and 100%, respectively (Figure 5, overleaf).

### 2.1.2 Schistosomiasis

SCH is a chronic, parasitic disease caused by blood flukes. People become infected by larval forms of the parasite that penetrate the skin when they come in contact with water that has been contaminated by eggs in the urine or faeces of people already infected. The eggs hatch and the parasites multiply inside particular freshwater snails. They then enter the water, surviving for about 48 hours, penetrating human skin and becoming adult worms that live in blood vessels, where the females lay their eggs. Some eggs pass from the body in faeces or urine: others are trapped in body tissues, causing an immune reaction and progressive damage to organs. There are two major forms of SCH – intestinal and urogenital.

The WHO strategy aims to reduce SCH through periodic, targeted treatment with praziquantel. The frequency of treatment is determined by the prevalence of infection in school-aged children. Periodic treatment of at-risk populations will cure mild symptoms and prevent infected people from developing severe, late-stage chronic disease. While reinfection may occur after treatment, the risk of severe disease is diminished and

even reversed if treatment is initiated and repeated in childhood. Mosquito control can also be used to suppress transmission, with long-lasting insecticide-treated nets or indoor residual spraying helping to protect people in endemic regions.

### Regional situation

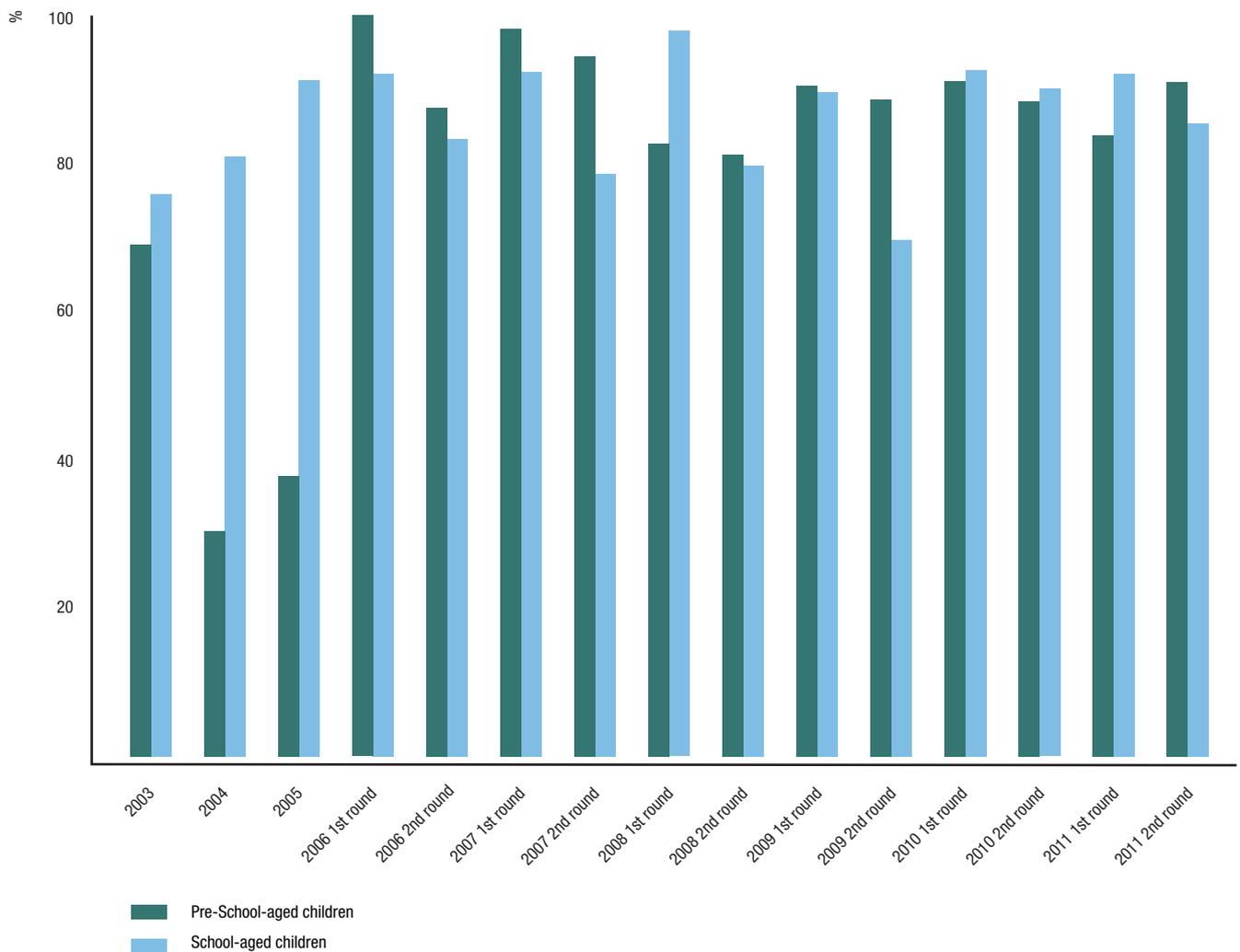
Within the Western Pacific region, SCH due to *S. mekongi* and *S. japonicum* is endemic in Cambodia, China, the Lao PDR and the Philippines. Available evidence suggests that SCH due to *S. mekongi* may soon be eliminated in Cambodia and probably in the Lao PDR, where there are still remaining endemic districts though with low prevalence levels. SCH in the Philippines is due to *S. japonicum*, which is a zoonosis parasite different from *S. mekongi*, and remains a major public health problem.<sup>23</sup> Other countries (i.e. Solomon Islands and Papua New Guinea) are still assessing their evolving burden of disease so as to develop national NTD strategies (WPRO, 2013). China, on the other hand, has declared SCH a public health problem with the Ministry of Health (MoH) embarking on a 10-year (2004-2015) project for SCH control with significant progress being achieved (Montresor et al., 2008; WPRO, 2013).

### Cambodia's achievements

Schistosomiasis is only endemic in two provinces along the Mekong river (Kratie and Stung Treng). The target group for treatment with praziquantel comprises everyone above two years old except pregnant women, which adds up to approximately 80,000 people. After 1995 MDA

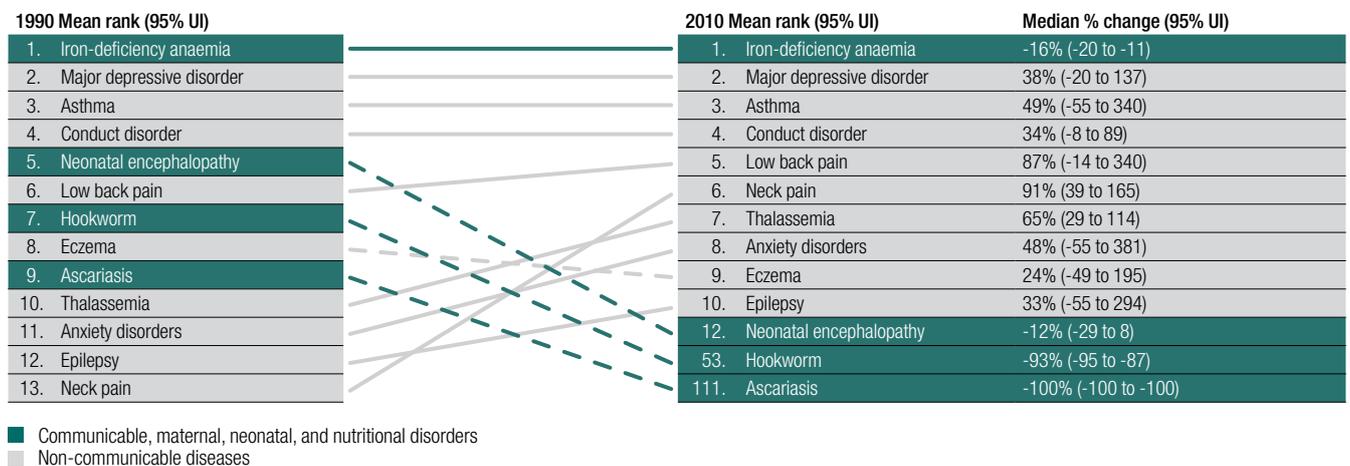
23 PCT was only used on a case-by-case basis (Montresor et al., 2008), though some papers claim that after 1995 the control programme shifted from case finding and treatment to MDA. A recent (2011) epidemiological survey showed that the overall human prevalence was 26.4%, while a subsequent study (2012) found it to be in a range from 5% to 48% (Olveda et al., 2014). Advanced SCH cases and deaths have been reported recently suggesting that SCH remains a major public health problem in the country while 'compliance to MDA has decreased over time as people living in endemic villages in the Philippines prefer case finding and treatment to MDA' (Olveda et al., 2014: 55).

**Figure 4: STH programme coverage, 2003-2011**



Source: unpublished CNM data

**Figure 5: Top ten causes, years lived with disability, children 5 to 14 years old, Cambodia**



Source: Institute of Health Metric and Evaluation, GBD 2010 Arrow Diagram (<http://bit.ly/1sRnjff>)

campaigns for SCH progressively expanded following the identification of endemic villages and from 2001 to date they have been implemented once a year between February and April, targeting the entire population of the two endemic provinces (Sinoun et al., 2007; Croce et al., 2009). However, at the beginning of the programme, the CNM/HSU was providing treatment twice or four times a year in some high prevalence areas (key informant interview).

### Prevalence

After nine years of MDA, prevalence rates of SCH dropped from figures as high as 70% in 1995 to 0.5% in 2003, after which the programme went into a maintenance phase (Sinoun et al., 2007; Croce et al., 2009). Figure 6 shows

the drop in prevalence in some sentinel villages in Kratie province (one of the two endemic provinces for SCH).

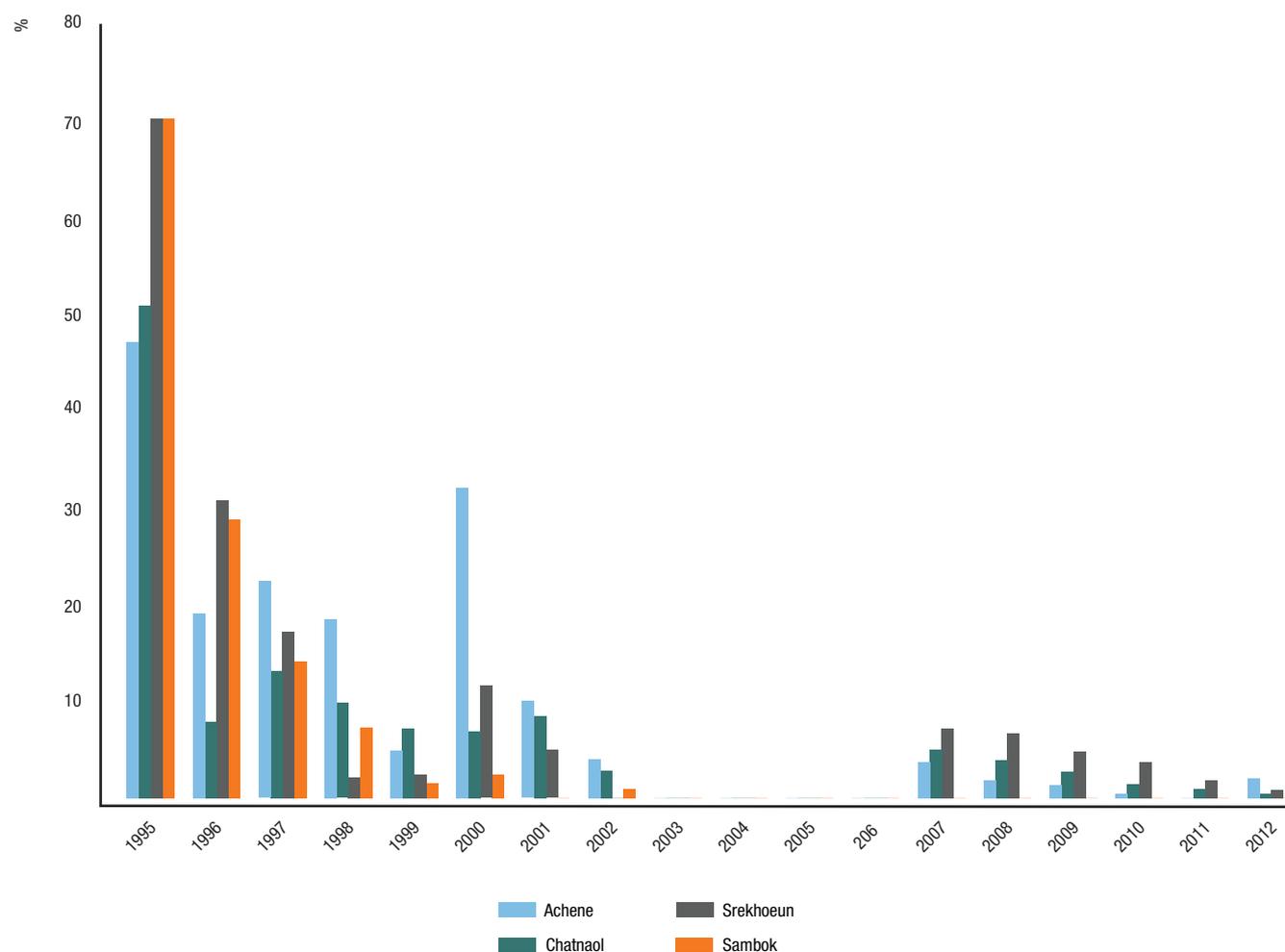
### Coverage

The coverage (people treated over people targeted) of mass treatment ranged between 62% and 74% in the period 1996-2006, with the exception of 1998 when the MDA campaign was not conducted because of a lack of funds. From 2006 onwards the programme coverage maintained itself around 90% (unpublished CNM data).

### Reduced intensity of infection

Progress in combating SCH can be also seen by looking at the intensity of the disease, which evolves into different degrees of severity categorised as light, moderate or high

**Figure 6: Schistosomiasis prevalence in the four sentinel villages in Kratie province, 1995-2012**



Note: The resurgence of new cases from 2007 was interpreted as a result from contamination by vector reservoirs and/or immigrants from Lao PDR or infected people that were not covered by the control programme.

Source: Huch, 2013

intensity of the infection. Figure 7 shows that after nine years of MDA campaigns the few individual cases of SCH were of light intensity.

### Morbidity management

Apart from the reduction of morbidity achieved through the distribution of drugs, there was also an active search and follow-up of cases of severe morbidity due to SCH. According to Biays et al., 1999 (quoted in Sinoun et al., 2007), before 1994, cases of severe SCH morbidity and mortality were reported every year. In 1999, the number of cases identified as severe SCH reached 124 in Kratie Province, of which 101 improved with the administration of MDA with praziquantel to the point of allowing the patients to return to work. Eight cases remained severe and four patients died. Eleven patients received surgical treatment between 2000 and 2002 at the National Calmette Hospital, of whom ten recovered and one died. Since 2003 no new symptomatic cases have been observed in the provinces' health facilities (Sinoun et al., 2007).

### Prospect for complete elimination

While SCH has been virtually eliminated in Cambodia, government stakeholders interviewed say that complete elimination is unlikely because the chemicals needed to eliminate the vectors (snails) in the Mekong river would have negative environmental impacts, particularly for the protection of the Mekong River Irrawaddy Dolphins.<sup>24</sup> Scaling down MDA for SCH is therefore not possible, at least in the short to medium term.

### 2.1.3 Lymphatic filariasis

LF is transmitted by mosquitoes, which pass microscopic, thread-like nematode worms (roundworms) into a person's skin. The larvae then migrate to the lymphatic vessels, where they develop as adult worms that live only in the human lymphatic system. Adult worms live six to eight years, producing millions of microfilaria that circulate in the blood, reaching their peak numbers at night when mosquitoes bite. Infection usually occurs during childhood, but its painful and disfiguring manifestations emerge later in life. WHO recommends treating the entire at-risk population with an annual dose of two medicines: albendazole plus either ivermectin (in areas with onchocerciasis) or diethylcarbamazine citrate (where only LF is endemic). These clear microfilaria from the bloodstream, reducing the chances of transmission. With consistent treatment, the disease can be eliminated eventually: the cycle of infection is broken when the adult worms in the entire population die (WHO Factsheet 102: [www.who.int/mediacentre/factsheets](http://www.who.int/mediacentre/factsheets)).

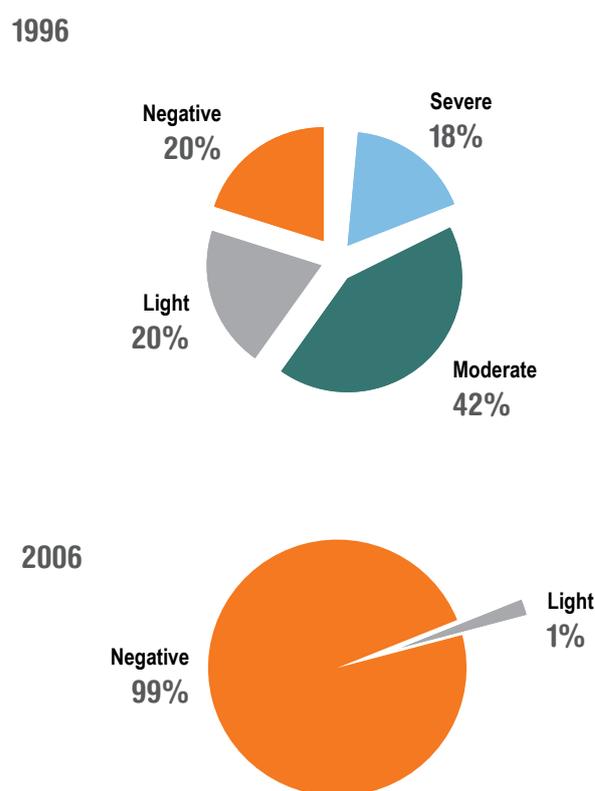
### Regional situation

Over 38 million people in 22 countries in the Western Pacific region are at risk of LF.<sup>25</sup> China was first to launch large-scale control activities in 1956, and by 2006 WHO declared China as one of the first countries where LF was eliminated as a public health problem. Among the remaining endemic countries in the region, eight are currently implementing MDA programmes, and 'over the next three years, verification that lymphatic filariasis has been eliminated is expected in American Samoa, Cambodia, Cook Islands, the Federated States of Micronesia, the Marshall Islands, Tuvalu, Vanuatu, Viet Nam, and Wallis and Futuna' (WPRO, 2013: 20).

### Cambodia's achievements

LF is endemic in about 18 districts in four north-eastern provinces of Cambodia (Rattanakiri, Stung Treng, Preah Vihear and Siem Reap), with an at-risk population of about

Figure 7: Schistosomiasis: intensity of infection, 1996 and 2006



Source: Montresor et al., 2008

24 The Irrawaddy dolphin population in the Mekong river of Cambodia and the Lao People's Democratic Republic is red-listed as critically endangered (CSG, 2013).

25 WHO lymphatic filariasis factsheet: [www.wpro.who.int/mvp/topics/ntd/20120308/en](http://www.wpro.who.int/mvp/topics/ntd/20120308/en).

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500,000. Treatment with albendazole is given once a year to the entire population above two years old. Activities for the control and elimination of LF started in 1999. Mapping was completed in 2002. MDA started in 2004 and after five rounds it moved to the surveillance phase in 2009.

### **Prevalence**

The mapping of the endemic areas was completed in 2004; LF was found to be endemic in 18 districts from four provinces with relatively low prevalence levels: 2.75% in Rattanakiri, 0.8% in Stung Treng, 0.4%-0.8% in Siem Reap, and 0.4% in Preas Vihea province. In spite of this, the country received external support to roll out an MDA campaign, which was facilitated by the fact that LF endemic areas coincided with areas endemic for SCH and STH. Thus, Cambodia integrated the MDA for LF in those four provinces in 2005, targeting an estimated population of about 500,000 (MoH, 2010).

### **MDA coverage**

Five rounds of MDA were completed by 2009. MDA achieved high coverage levels from the start as it built on the MDA already rolled out for STH and SCH: 71.3% in 2005; 78.5% in 2006; 81.9% in 2007 and 2008; 84.6% in 2009 (CNM data). The result was that by 2010 the prevalence rate was almost zero.

### **Morbidity management**

In terms of disability alleviation, in its first years the programme trained doctors in the endemic areas on how to treat LF cases. There are now about 50 cases of severely advanced LF symptoms identified, all of which are patients above the age of 50; importantly no new clinical cases among young people have been detected. The majority of these patients are under the general health care system (MoH, 2010).

### **WHO certification for LF elimination**

Following WHO protocol, the first Transmission Assessment Survey (TAS) was conducted to evaluate the impact of MDA and ensure that there is no active transmission of LF in the intervention areas in 2010 in all 18 districts in the four provinces. LF transmission has been reduced below critical levels (0.1-0.6%), which has enabled Cambodia to stop MDA and pass into a post-intervention surveillance phase (Sinoun and Tep, 2010). The second TAS took place in 2013 and found no positive cases, confirming zero prevalence levels for LF. A third TAS will be undertaken in 2015, and if earlier results confirm this trend, the WHO may officially recognise Cambodia as having eliminated LF in 2015 or 2016.<sup>26</sup>

## **2.2 Incipient progress in controlling trachoma, FBT and strongyloidiasis**

### **2.2.1 Trachoma**

Trachoma is the world's leading cause of preventable blindness and occurs where people live in overcrowded conditions with limited access to water and poor sanitation and health care. It is caused by the bacterium *Chlamydia trachomatis*. The infection causes a roughening of the inner surface of the eyelids, which can lead to pain in the eyes, breakdown of the outer surface or cornea of the eyes, and, if left untreated, to blindness. The bacteria that cause the disease can be spread by both direct and indirect contact with an affected person's eyes or nose. Indirect contact includes through clothing, by hands or flies that land on the face of the infected child. Children spread the disease more often than adults. The trachoma infection usually starts in childhood and develops into trichomatous trichiasis in adulthood, going from active to blinding trachoma.

FBT infections are parasitic diseases, caused by liver, lung, and intestinal parasitic fluke infections that are acquired through ingestion of food contaminated with the larval stages of the parasite. They are related to producing, processing and preparing foods patterns, particularly people's habit of eating raw food, which is still common in many localities in Cambodia. The food-borne NTDs endemic in the country are opisthorchiasis and echinostomiasis. In Cambodia the most common one is liver flukes (*Opisthorchis*) and intestinal flukes (*Echinostoma*). Infection in humans causes hepatobiliary disease with the subsequent development, in most cases, of cholangiocarcinoma (Saijuntha et al., 2007).

Strongyloidiasis is an infection caused by *Strongyloides stercoralis* (and rarely *S. filleborni*), a helminth present mainly in tropical and subtropical regions but also in temperate climates. It is soil-transmitted but, unlike STH, it is a parasitic infection and has different transmission modes including auto infection. An estimated 30-100 million people are infected worldwide, but there is no precise data on prevalence from endemic countries. Diagnosis of strongyloidiasis is not standardised and no public health strategy has been developed to control it. It may cause intermittent symptoms that mostly affect the intestine (abdominal pain and intermittent or persistent diarrhoea), the lungs (cough, wheezing, chronic bronchitis) or skin (pruritus, urticaria). Asymptomatic cases may host the parasites for years, unaware of the infection. Although strongyloidiasis usually has mild manifestations, the infection may be severe and life-threatening in cases of immunodeficiency ([www.who.int](http://www.who.int)).

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26 According to key informants from the WPRO, this process is still under discussion.



Tnol Baek village in Kampong Thom province, Cambodia. Health Change Agent Sngoun Chanty chats about hygiene issues to Yeat Yet. Photo: © Philip Sen/Oxfam GB

According to key government officials interviewed, the endemicity and number of cases of trachoma is unknown. Data is scattered and mainly based on hospital records, community outreach screenings and some rapid assessment surveys conducted. Endemicity levels for all provinces have not yet been mapped. A rapid assessment survey conducted in 2004 showed an overall prevalence of active trachoma in under-10-year-olds of between 1% and 15% with pockets of high endemicity (as high as 20% in some places). It also showed that 61% and 93% of the 41 villages surveyed had cases of active and blinding trachoma, respectively, with trachoma being endemic in 19 communes in 11 districts in three provinces. The number of patients needing surgery is estimated to be more than 84,000 (CNM, 2013b).

Interventions to tackle trachoma so far have been intermittent and focused on patients' surgery and antibiotic treatment using tetracycline eye ointment only. Resource constraints have limited focal control activities,<sup>27</sup> and MDA using oral azithromycin has not yet started. In spite of this, according to hospital records, trachoma seems to have reduced and no new cases have been reported in recent years. The Director of the National Eye Health Programme attributes this to the improvements made in access to clean sources of water. However, with no outreach screenings being undertaken since 2007, it is possible that people with trachoma have simply not approached hospitals.

Since the incorporation of Cambodia in USAID's NTD Control Programme, teams have been trained to undertake nationwide mapping after which MDA will be applied in the areas identified as endemic.

### 2.2.2 FBT and strongyloidiasis

Interventions to tackle FBT and strongyloidiasis have been scattered and tied to the ability to secure funding. Between 2007 and 2010, mapping of FBT and strongyloidiasis showed that FBT is mainly present in the southern and northern districts of the country, with prevalence levels ranging from 1% to 54% for opisthorchiasis and 0.3% to 16.5% for echinostomiasis.<sup>28</sup> Passive case detection and treatment has been in place in a few places but MDA strategies have not been widely implemented for many

reasons, including the need to complete the endemicity mapping and a lack of funds. In 2009 and 2010, WHO Cambodia and CNM/HSU, supported by the WHO's Regional Office for the Western Pacific (WPRO), selected some endemic areas (where liver fluke infection rates were higher than 20%) and treated a total of 16 villages for opisthorchiasis, targeting 9,600 people (MoH, 2010).

The first intervention to tackle strongyloidiasis occurred in 2009/2010 when baseline assessment surveys were conducted in Preah Vihea and Takeo provinces with support from the Swiss Tropical and Public Health Institute. The survey found the disease to be a significant health problem with infection rates ranging from 40% to 60% in the districts of two provinces surveyed. While few people were treated with ivermectin in those provinces, endemicity levels still need to be assessed in all the remaining provinces in Cambodia in order to start control activities (MoH, 2010).<sup>29</sup>

### 2.3 A regional performer against the odds

In 1997, the Cambodian MoH, supported by the WHO country office, launched the HSU under the CNM.<sup>30</sup> This provided an institutional status to what so far had been scattered, ad hoc interventions carried out by a collaborative programme between the Cambodian Government, Médecins Sans Frontières (MSF) and the WHO since the end of 1994.<sup>31</sup> This dedicated institutional structure within the MoH has been skilled in taking advantage of a growing global focus on NTDs and building on the support and guidance from WHO. It has put in place the necessary policy framework that would provide long-lasting sustainability to CNM/HSU activities: in 2003 the government created the National Taskforce for Helminths Control, and the National Policy and Guideline for Helminths Control was developed in 2004. Since then, annual working plans have been developed each year to set goals and guide activities and MDA campaigns for SCH, STH and LF, for which different strategies have been progressively piloted and integrated in government structures.

All this occurred in the context of an under-resourced health ministry embarking on comprehensive health sector

27 HKI supported the programme between 1993 and 2007, but since then no specific activities have been put in place.

28 The echinostomiasis clinical spectrum in Cambodia is still not completely understood, but this infection is not known to cause serious clinical outcomes in other parts of the world.

29 The Mectizan Donation Programme (which donates the drug ivermectin) does not cover Cambodia. In Cambodia LF is treated with diethylcarbamazine plus albendazole. For the pilot project on strongyloidiasis in Takeo and Preah Vihear provinces, MDA was provided in the villages surveilled with ivermectin acquired from different sources: some was bought in the markets by the MoH, and some was donated from Korean Association of Health Promotion and the Swiss Tropical and Public Health Institute. The CNM/HSU is asking the WHO to support this component of the programme (interview with CNM/HSU staff).

30 The CNM is charged with the control of communicable diseases in Cambodia. It has three main sub-units: the Malaria Sub-Unit, the Dengue Hemorrhage Fever Sub-Unit and the Helminths Sub-Unit.

31 The first activities related to NTDs took place after the first case of SCH was diagnosed in 1968, but those incipient activities, mainly related to the collection of data, were interrupted with the arrival of the Khmer Rouge regime. The Cambodia-MSF-WHO collaboration carried out several surveys and identified high infection rates for SCH, STH and a number of cases of LF in some villages of Kratie and Stung Treng provinces. Parallel to this incipient 'mapping', during 1994/95, the collaborative programme rolled out the first pilot MDA campaigns for SCH in some villages in the north-east provinces of Cambodia (key informant interview).

reforms (Heng and Key, 1995), in a country that was still being rebuilt and dealing with serious health and human rights issues. Yet Cambodia managed to establish an NTD programme that efficiently implemented the WHO recommendations and guidelines to control and eliminate STHs, SCH and LF using MDA and which, against all odds, progressed further and faster than expected, outperforming almost every other country in the region in terms of its MDA coverage. Figure 8 compares progress on MDA coverage for STH, SCH and LF with that of the average WHO-Western Pacific Region, revealing stark differences (see also Montresor et al., 2008).

## 2.4 Achievements in behavioural change: the role of WASH

Among the five strategies for the prevention and control of NTDs recommended by the WHO is access to safe water, sanitation and hygiene (WASH). NTDs and many other communicable diseases will not be eliminated in the longer term without serious improvements in the WASH sector.<sup>32</sup> The global targets set under MDG 7 on safe drinking-water and access to appropriate sanitation are far from being met, especially in the African and South-East Asia and Pacific regions – and Cambodia is no exception. However, while much remains to be achieved in terms of access to water and sanitation, according to key informants working on this field of health, Cambodia is one of the few countries that has gone beyond preventative chemotherapy (PCT) MDA and initiated behavioural change approaches, essential even when access to improved water sources and sanitation facilities has been achieved.

CNM/HSU's analysis of the effects of repeated treatment every six months showed that even though STH prevalence significantly dropped after the distribution of drugs, reinfection frequently occurred (MoEYS and HKI, 2010). Routine deworming treatment keeps STH controlled with low prevalence and light intensity of infection (Sinoun et al., 2003), but the elimination of STH would only be made possible by change in the hygiene practices and sanitation conditions prevalent in the country, particularly in rural areas.

In order to promote healthy practices to prevent reinfection and maintain the gains achieved through the MDA campaigns, the School Health Department of the MoEYS in collaboration with Helen Keller International

(HKI) and with support from Children Without Worms (CWW), embarked on a participatory process to revise Cambodia's school curriculum in 2009 (Wannak et al., 2010). An initial situational analysis showed that STH was only indirectly mentioned in schools. A technical committee consisting of teachers, school directors, health workers, and NGO representatives was set up to revise the curriculum. School directors, teachers, and students and parents were asked about the kind of school health activities that were taking place in order to assess existing knowledge about worm control and prevention. The revised curriculum, which resulted in a policy change that improved the previous national primary school curricula on health and hygiene (Wannak et al., 2010), specifically includes knowledge about preventing and controlling STH. This was piloted and rolled out in four primary schools in Takeo and Kampong Speu provinces in 2009 and 2010 (CWW, 2011). By the time of this research (August 2013) it had been progressively implemented in all primary schools throughout Cambodia.

An impact evaluation was recently released by the MoEYS and HKI.<sup>33</sup> Results from comparing the baseline and endline surveys<sup>34</sup> provided evidence on the improved knowledge and practices related to the transmission, prevention, symptoms and long-term consequences of STH among the primary target group (primary school students, see Table 2) and also among the people around them (Table 3, page 28). Prior to the new curriculum only students in Grade 5 received any formal STH lessons and these amounted to two hours in the year. Students currently receive at least one hour per month of STH education.<sup>35</sup> The new curriculum seems to have had a great impact on the

**Table 2: Percentage of students with knowledge of each domain at baseline and endline**

	Baseline survey (2009)	Endline survey (2013)
Transmission	48.4	100
Prevention	35.8	99.8
Signs and symptoms	52.6	100
Long-term consequences	18.0	92.5

Source: HKI, 2013

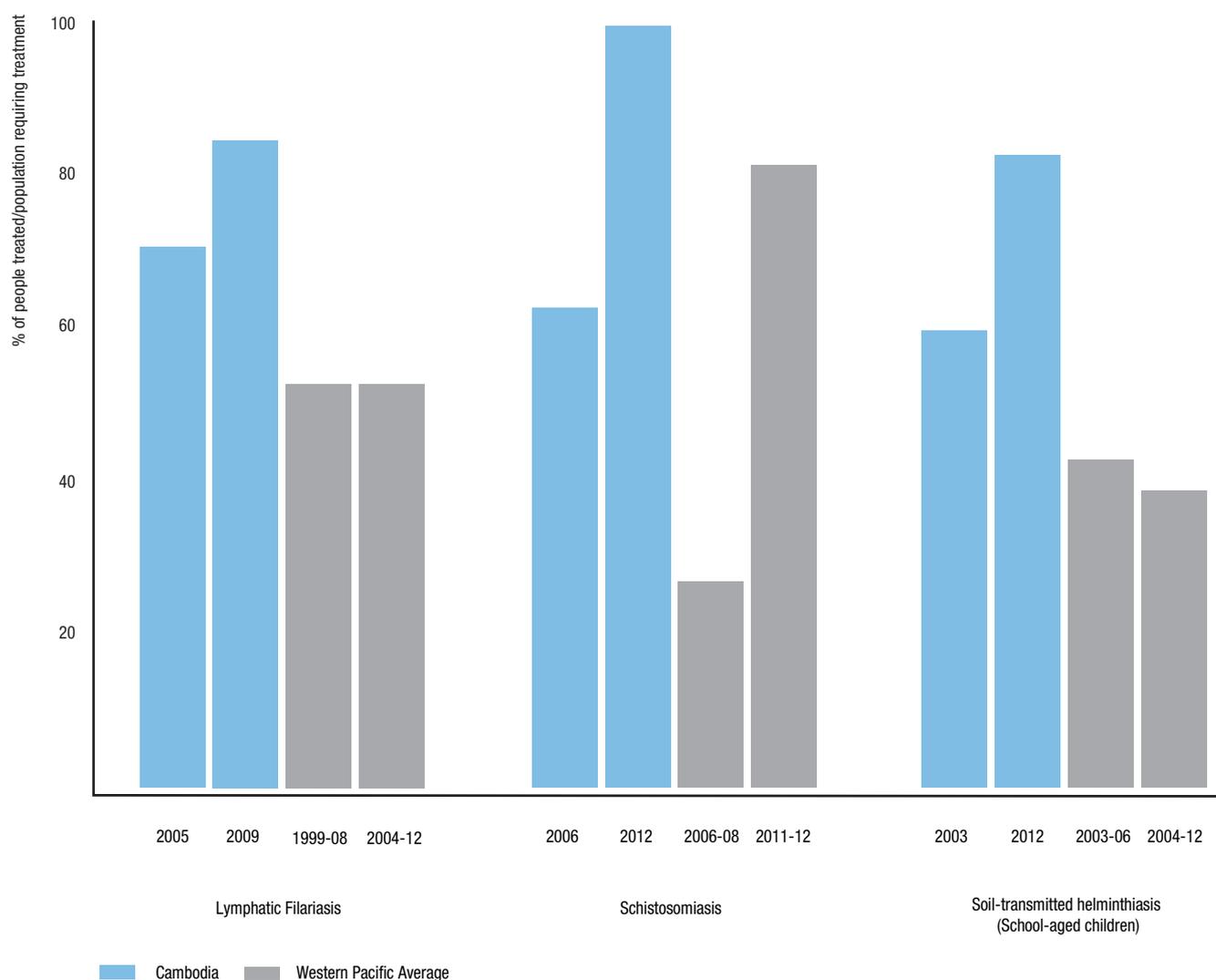
32 Improvements in WASH achieved in developed countries are greatly responsible for the disappearance of these diseases in the industrialised world (WHO, 2010).

33 It included the collection and analysis of baseline data, the development and distribution of the behavioural change communication and training materials, the training of school directors and teachers on the new curriculum, the collection and analysis of endpoint data and the dissemination of the project results (HKI, 2013).

34 At baseline only 618 students were interviewed due to the random selection of two clusters that had fewer than 17 students. At endline 627 students were interviewed. 222 students' parents and 37 teachers were interviewed at both baseline and endline surveys (HKI, 2013).

35 According to the results obtained by HKI (2013), the time allotment has been met or exceeded in all the schools (within a range of 1 to 8 hours).

**Figure 8: MDA national coverage for NTDs in Cambodia compared to the Western Pacific region average**



Source: WHO Global Health Observatory Data Repository (<http://apps.who.int/gbo/data/node.main.A1629?lang=en>).

Note: Average includes: For LF: American Samoa (2000 & 2006); Cambodia (2005 & 2009); Cook Islands (2000 & 2007); Fiji (2002 & 2012); French Polynesia (2000 & 2012); Kiribati (2001 & 2012); Lao People's Democratic Republic (2008 & 2012); Malaysia (2003 & 2012); Marshall Islands (2003 & 2006); Micronesia (Federated States of) (2003 & 2007); Niue (2000 & 2004); Papua New Guinea (2005 & 2011); Philippines (2000 & 2012); Samoa (1999 & 2008); Tonga (2001 & 2006); Tuvalu (2001 & 2011); Vanuatu (2000 & 2004); Viet Nam (2002 & 2007) and Wallis & Futuna (2002 & 2007). For SCH: Cambodia (2006 & 2012); China (2006 & 2012); Lao People's Democratic Republic (2006 & 2011) and Philippines (2008 & 2012). For STH: Kiribati (2003 & 2012); Tuvalu (2003 & 2012); Niue (2003 & 2004); Cambodia (2003 & 2012); Samoa (2003 & 2006); Cook Islands (2003 & 2006); Vanuatu (2003 & 2012); Viet Nam (2003 & 2012); American Samoa (2003 & 2006); Wallis & Futuna (2003 & 2007); Lao People's Democratic Republic (2003 & 2012); Fiji (2003 & 2012); Philippines (2003 & 2012); French Polynesia (2005 & 2007); Malaysia (2006 & 2008); China (2006 & 2007); Marshall Islands (2003 & 2006); Papua New Guinea (2005 & 2011); Tonga (2003 & 2006) and Micronesia (Federated States of) (2003 & 2007).

behaviour of school-aged children and their close relatives and community members. Survey results show that parents and caretakers increased their hand washing considerably. Similarly, a significant proportion of them reported increasingly using safe water sources such as rainwater,

while the percentage of those using unsafe water sources (such as ponds, rivers, canals and open ring wells) decreased (HKI, 2013). These improvements suggest that the new curriculum has a positive impact on children's knowledge, which trickles down to the household behaviours.

While significant improvements have been achieved, there is still much to be done. For instance, the post-intervention survey showed that sewage disposal continues to be a problem, with the majority of teachers reporting that sewage is not always emptied before the latrines and septic tanks were full to overflowing, which can lead to contamination and STH transmission. This suggests that improvements in sanitation and hygiene practices might be more difficult to tackle and that messages need to put a stronger focus on this area of WASH.

## 2.5 Progress in the health sector since the civil war

Following the departure of the Vietnamese-backed government<sup>36</sup> and the signing of the 1991 Peace Accords,<sup>37</sup> western financial and technical support started flowing into the country, allowing for the reform of the health system in the mid-1990s. The main challenge was to ensure a more equitable distribution of resources from the capital and its surrounding provinces to the whole of the country and to rectify the poor distribution of health personnel and facilities.<sup>38</sup> To address these weaknesses, the MoH launched the Health Coverage Plan in 1995, which focused on extending primary health services through the decentralisation of health service delivery to districts (MoH, 1995, quoted in Hill and Eang, 2007).<sup>39</sup>

**Table 3: Knowledge of STH among school-aged children**

Exhibited knowledge of STH/had heard of STH	Baseline survey	Endline survey
Students in Grades 1-6,	58%	100%
Students in Grades 1-3*	51%	100%
Students in Grades 4-6*	72%	100%
Students reporting sharing STH knowledge with their parents and relatives in community	12%	98.2%
Parents and caregivers reporting children in their household shared STH knowledge	10%	96.4%
Teacher knowledge and understanding of STH**	91.9%	100%
Students reporting washing their hands with soap at school and at home	50%	95.2%
Students reporting washing their hands after defecating at school	10%	75%
Students reporting washing their hands after defecating at home	12%	73.8%
Households that treat their water before drinking	87%	95%
Schools having separate hand washing facilities	none	100%

\* Students in Grades 4-6 showed higher knowledge of prevention and control of STH, transmission, prevention, signs and symptoms of infection and long-term health consequences of infection, than students in Grades 1-3.

\*\* Teacher knowledge and understanding is necessary for the success of the new curriculum because if the teachers do not understand the material they cannot properly teach the students.

Source: HKI, 2013

36 This government had started to reconstruct the health system, emphasising the construction and rehabilitation of infrastructure and the training of a new generation of health professionals. A certain amount of external support was received from the communist and non-aligned world. United Nations support – with the exception of UNICEF – was limited, bilateral assistance from developed countries was nonexistent, and the community of non-governmental organisations was largely absent since the country remained under US sanctions (Lanjouw et al., 1999).

37 Despite the peace accords, Khmer Rouge activity persisted until 1997, and unmapped land mines and poor infrastructure initially limited the districts that could be assisted (Benson, 1993).

38 After the end of Khmer Rouge regime in 1979 almost nothing of Cambodia's previous health system remained in place, and fewer than 50 doctors of the 600 practising before 1975 remained in the country (Volkmar-André, 1986).

39 As part of the implementation of the Health Coverage Plan, the government not only built new health facilities but upgraded existing ones. About 121 existing district hospitals were upgraded and almost 800 commune clinics were converted into health centres (Eldon and Gunby, 2009 in Asante et al., 2011).

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Since then, health care delivery has been structured as follows:

- Central level: MoH departments, national programmes, national institutes, national hospitals and training institutions have a role in policy development, strategy, legislation, resource allocation, and supporting implementation at provincial and district level.
- Provincial level: managed by the Provincial Health Departments which translate central level policies into district level implementation.
- District level: Operational Health Districts oversee health centres and health posts (located in the most remote areas), which in turn are in charge of delivering primary health services or the ‘minimum package of activities’. Referral hospitals were built to provide a ‘complementary package of activities’ that are not available at Health Centres.

By the end of 2007, there were 77 Operational Health Districts, 69 referral hospitals, 972 health centres and 69 health posts (Veasnakiry and Sovanratnak, 2007: 10).

While the government is the main provider of the health care infrastructure, the use of private medical and non-medical providers appears widespread in both urban and rural areas. Only about 20% of treatments take place in government facilities, with approximately 50% of treatments reportedly done by the private sector (private hospitals, clinics, pharmacies and private consultations with trained health workers). A variety of providers (including drug vendors, traditional and religious healers and traditional birth attendants) attract about 21% of patients. There are concerns about the quality of health care delivered by these private unregulated providers, although quality issues cut across the entire health sector – public, private and non-medical (Government of Cambodia, 2008 and Land, 2008 quoted in Asante et al., 2011).

Development partners were vital in supporting Cambodia’s recovery and rehabilitation, but their financial contributions seem to have had less weight when compared with other post-conflict countries such as Rwanda, Mozambique and Sierra Leone. According to the WHO global health expenditure database, external resources for health have never exceeded 25% of total health expenditure.<sup>40</sup>

Budget and administrative reforms were also put in place to address the constraints of the state health budget, the main source of funding for public health facilities.<sup>41</sup> With this purpose, in 1997 a Financing Charter introduced user fees and moved away from the official policy of ‘free’ health services, to which, in practice, the population had limited access (Soeters and Griffiths, 2003). Because unofficial fees were common, the introduction of user fees did not have a major impact on household health expenditure but was an important step towards improving the quality of care, enhancing staff motivation and improving access to priority public health services for the majority of the population (Thavary et al. 2000 quoted in Soeters and Griffiths, 2003). Since then various financing schemes have been put in place by the MoH and its partners, and a strategic framework for health financing (2008-2015) was developed in 2008 (MoH, 2008b). A number of other health financing mechanisms have emerged independently: donor funding, the donor funded pools the Health Sector Support Project and Sector-Wide Management,<sup>42</sup> user fees at public facilities, fee exemptions for the poor, contracting of public service delivery,<sup>43</sup> health equity funds, community-based health insurance, and different social health insurance schemes.<sup>44</sup>

As shown in Table 4 overleaf, the reforms brought substantial progress and resulted in the improvement of all health indicators. However, in spite of the major achievements in improving the health status of its population, Cambodia still lags behind other countries in the region.

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40 The highest levels were 25% in 1996 and 24% in 2006 and 2007, with the lowest levels in 2002 (8%) and 2003 (9%). General Government Expenditure on health ranged between 17% and 32% of Total Health Expenditure during the 1995-2012 period, stabilising around 25% in recent years. Households are the main source of out-of-pocket expenditure on health, ranging between 55% and 73% of Total Health Expenditure over the same period. In 2009, for example, expenditures on health services were paid for by the government (21.27%), mainly from general taxation revenues including support from external development partners, and out-of-pocket payments (73.1%). Despite this, the total health expenditure on health (US dollars constant 2005) has seen more than a threefold increase from 1995 to 2012 (WHO global health expenditure database).

41 Hospitals and health centres still rely heavily on their national budget allocation and there is a commitment from the government to sustain and even increase tax-funded support to health service delivery.

42 Sector-Wide Management (SWiM) is a programme for the government, donors and NGOs to work together in partnership to build a common vision for the health sector in Cambodia. The SWiM process was initiated in 1998 as part of the health sector reform programme (CDC/CRDB, 2004).

43 As part of the health reform plan, in 1998 the Cambodian government, with a loan from the Asian Development Bank, piloted a contractual approach in eight districts in which district health management was sub-contracted to private sector operators. It also introduced a performance-based staff incentive structure to replace the traditional fixed salary and per diem system and abandoned the fee exemption system and replaced it with an equity fund.

44 Health Equity Funds (HEFs) represent the biggest scheme covering about 75% of total Operational Health Districts applying this scheme. ‘To fund exemptions and address the problem of access for the poor, decentralized HEFs emerged in 2000 as third-party payers for impoverished patients in which a fund is managed at district level by a local agent. Identified poor patients receive reimbursement for transport and food costs and free care at government health facilities. Facilities are reimbursed monthly by the HEF scheme for foregone user fees [...] In practice, HEF schemes use subsidies pooled at district level to purchase public health services for the poor. Today, these subsidies come from both donor and government funds’ (Bigdeli and Annear, 2009:560). The community-based health insurance and voucher scheme have been introduced as other mechanisms of health care financing to improve equitable access to health services in Cambodia (MoH and WHO, 2012).

**Table 4: Selected health indicators, comparison between Cambodia and East Asia & Pacific**

Indicator	Country/ region	1990	1995	2000	2005	2010
Births attended by skilled health staff (% of total)	Cambodia	-	-	31.8	43.8	71.0
	East Asia & Pacific	84.8	-	85.1	-	92.4
Contraceptive prevalence (% of women aged 15-49)	Cambodia	-	12.6	23.8	40.0	50.5
	East Asia & Pacific	73.6	-	75.1	-	80.4
Immunisation, measles (% of children aged 12-23 months)	Cambodia	34.0	62.0	65.0	79.0	93.0
	East Asia & Pacific	89.6	78.9	83.5	85.8	92.5
Life expectancy at birth, total (years)	Cambodia	54.8	57.8	61.9	67.0	70.6
	East Asia & Pacific	69.2	70.2	71.8	73.5	74.4
Maternal mortality ratio (modelled estimate, per 100,000 live births)	Cambodia	830.0	750.0	510.0	340.0	250.0
	East Asia & Pacific	210.0	150.0	120.0	97.0	78.0
Mortality rate, infant (per 1,000 live births)	Cambodia	85.0	87.6	81.6	51.9	37.3
	East Asia & Pacific	43.2	38.0	31.2	23.2	17.7
Mortality rate, under-5 (per 1,000)	Cambodia	116.4	121.4	110.5	63.4	43.8
	East Asia & Pacific	56.7	48.9	39.2	28.4	21.5
Physicians (per 1,000 people)	Cambodia	-	-	0.2	-	0.2
	East Asia & Pacific	1.2	-	1.3	-	1.6
Nurses and midwives (per 1,000 people)	Cambodia	-	-	0.9	-	0.9
	East Asia & Pacific	-	-	1.5	-	2.6
Pregnant women receiving prenatal care (%)	Cambodia	-	-	37.7	69.3	89.1
	East Asia & Pacific	70.9	-	86.4	-	-
Prevalence of anaemia among children (% of children under 5)	Cambodia	-	-	63.4	-	55.0
	East Asia & Pacific	-	-	22.2	-	-
Tuberculosis prevalence rate (per 100,000 population, WHO)	Cambodia	1,667	1,667	1,619	1,231	875
	East Asia & Pacific	295	280	257	212	171
Malaria cases reported	Cambodia	123,796	76,923	62,439	-	49,356
	East Asia & Pacific	-	-	-	-	-

Source: World DataBank (<http://databank.worldbank.org/data/home.aspx>)

# 3. What are the factors driving change?



A family seeks treatment in Preah Vihear province, Cambodia. Photo: © Photo World Bank Chhor Sokunthea

This section looks at five factors that have worked in combination to drive Cambodia's progress on the control of NTDs:

- Strong collaboration between the MoH and the MoEYS.
- The cost-effective integration of NTD interventions into existing government health structures.
- Nurturing the programme: support and capacity building through bilateral, regional and global partnerships.
- Resource mobilisation for the programme: drug donations, external and domestic funding.
- Broader progress in the health, WASH and education sectors that has facilitated progress on NTDs.

## 3.1 Strong collaboration between the MoH and the MoEYS

### 3.1.1 Integration of NTD health interventions into the education system

Strategies for the regular administration of drugs evolved over time following mapping of NTD distribution and were designed according to the target groups of the different diseases.<sup>45</sup> Eventually it reached the point where drug administration was fully integrated in the existing structures of both the MoH and the MoEYS.

Perhaps the most interesting aspect of the fight against NTDs in Cambodia is that the main strategy and the only

<sup>45</sup> In early years (1996-1998) the CNM provided MDA of praziquantel 2-3 times a year in affected areas, plus special treatment to approximately 150 SHC cases found. From 1999-2002 MDA frequency went down to once a year. Since 2002 the CNM-provided MDA has included mebendazole for school children. Stung Treng Province (affected by SCH, LF and STH) received special attention with MDA being provided to different target groups on multi-medicine according to CNM treatment guidelines: praziquantel for SCH once a year, diethylcarbamazine citrate for LF once a year, and mebendazole to pre-school children (12-59 months) and school children (6-14 years) twice a year.

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countrywide NTD intervention is school deworming. This is not only because STH is highly endemic throughout the country but because its implementation involves the integration of a health intervention within the structures of the MoEYS, which was not necessarily prepared for such an activity.

### **‘Children go to their homes and teach their parents what they learned at school’ – Government official**

Because the main target group for STH is school-aged children, the natural place to reach them is through the existing education system. Schools can offer the infrastructure and personnel to support simple health interventions alongside health and hygiene education (Mascie-Taylor et al., 2003). Working in collaboration with the CNM/HSU, the School Health Department prepared schools to rollout a nationwide campaign that effectively turned teachers into doctors or pharmacists twice a year.

As well as distributing the drugs to students they are also able to turn the intervention into an opportunity for health education on, for example, the importance of using proper sanitation facilities, regular hand-washing and not playing in bare feet. According to the key informants interviewed, this strategy has a multiplicative effect as children go back home and tell their families what they have learned at school, becoming an effective channel to reach mothers, families and the broader community.

The School Health Department has also worked with sub-national level structures to conduct health education activities in schools, particularly on sanitation and hygiene. This collaboration has resulted in the department taking the lead in changing the school curriculum to explicitly include STH as a health education subject.

#### **3.1.2 Inter-sectoral collaboration and high level government commitment**

The programme’s integration into government structures has been key to its performance. Integrating different health interventions that belong to different programmes within the MoH is a difficult task in itself (see next section) – even more so when it involves two different ministries with different mandates, institutional structures and hierarchies. Integrating a health intervention into the educational system has been possible thanks to the strong collaboration achieved between the MoH and the MoEYS, which has been essential for implementing a country-wide campaign that involves teachers as drugs distributors.

A high level of government commitment has been crucial to enforce the collaboration since the MoEYS has been required to take on a new role outside its mandate and staff members have had to take on additional responsibilities without extra incentives. The MoH, through CNM/HSU, has overall responsibility for the programme, but implementation strategies are developed together with the School Health Department of the MoEYS, which takes responsibility at school level (Chu, 2011). The MoEYS provides technical and logistical support so that teachers have the resources they need to distribute drugs and teach children about preventing reinfection.

As shown in Figure 9, both ministries coordinate activities at all institutional levels, starting from the CNM/HSU working in close collaboration with the School Health Department at national level, Provincial Health Departments and Provincial Educational Departments, Operational Health Districts and District Education Departments, but most importantly health centres and schools. Additionally, activities need to be tightly coordinated with the Central Medical Store since the NTD drugs have been integrated into the same distribution channels as any other medicine provided by the public sector.<sup>46</sup>

A successful MDA deworming campaign requires tight coordination and the capacity to deliver at different administrative levels, since a wide range of activities and steps need to be effectively taken to ensure that drugs arriving from overseas reach the target groups at the appropriate time. In the case of deworming, these activities are implemented collectively by a number of actors from both sectors who work through a coordinated and increasingly sophisticated process to deliver them:

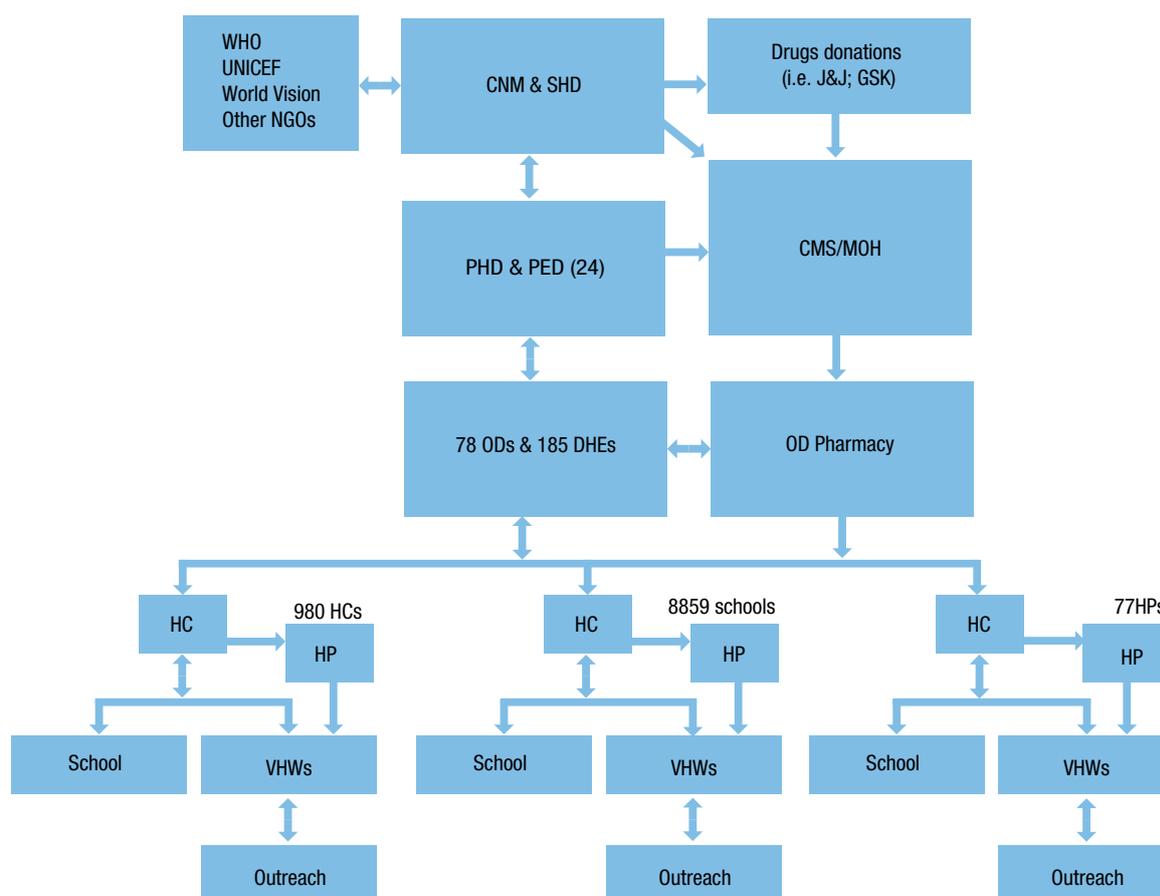
- Provincial Health Departments and Provincial Education Departments supervise Operational Health Districts and District Education Departments, who in turn supervise health centres and schools.
- Provincial Education Departments are in charge of reminding schools that they need to report to health centres the number of children for whom tablets are needed. They do so by sending signed reminder letters to the District Education Departments who disseminate them to schools.
- Once the drugs arrive at health centres, they contact all directors of schools in their catchment areas for collection.
- Finally, Provincial Health Departments and Provincial Education Departments share the reports received from health centres and schools to check the availability of drugs at Operational Health Districts and whether any school has not received them.<sup>47</sup>

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<sup>46</sup> Drugs go directly from the Central Medical Store to the Operational Districts that distribute them to the health centres. A proportion of the drugs remain there to be distributed through community outreach and other health interventions, while the rest are collected by school personnel.

<sup>47</sup> No formal channels have been put in place for the two ministries working together at provincial level. This happens mainly by informal mobile communication between Provincial Health and Education Departments.

**Figure 9: MDA/Deworming organisational structure**



Notes: CNM/HSU: Helminths Sub-Unit within the National Center for Parasitology Entomology and Malaria Control; SHD: School Health Department; CMS: Central Medical Store; J&J: Johnson & Johnson; PHD: Provincial Health Department; PED: Provincial Education Department; ODs: Health Operational Districts; DHE: Department of Health Education; HC: Health Centre; HP: Health Post; VHWs: Village Health Workers.

Source: Huch (2013)

The collaborative and effectively coordinated efforts have helped Cambodia to conduct one of the largest deworming programmes in the region at very low cost.<sup>48</sup> Sinoun et al. (2005) calculated the cost of the deworming programme for school-aged children (then about 2.8 million), showing that it cost 12 cents (\$0.12) to treat each child during the pilot phase and 6 cents when the activity was extended to cover all schools. In areas where the treatment was imparted for a second time the cost was as low as 3 cents.<sup>49</sup>

### 3.2 Cost-effective integration of NTD interventions into government health structures

The integration of a completely new programme within government structures, and the way in which it was done, has been crucial for the progress achieved in fighting NTDs. The regular treatment of the population at-risk for STH, SCH and LF has been done separately or in combination according to the geographical overlap of the diseases.

While the expansion of the school network and high school attendance achieved in the last decades have minimised the number of children missing the distribution

48 Key interview with donors' representatives.

49 The pilot phase ran from December 2002 to March 2003 and targeted more than one million school children in 11 provinces. The second phase ran from July 2003 to January 2004.

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of drugs (see Section 3.5), other strategies were introduced simultaneously to complement the intervention in schools and reach other target groups. To reach those few children not attending school plus the other STH risk groups – pre-school-aged children and women of child-bearing age – NTD interventions have been integrated throughout the health system, mainly through routine outreach activities delivered by health centre staff in collaboration with village health volunteers.<sup>50</sup> From 2002 onwards NTD tablets and vitamin A supplements have been provided through this channel. It is important to note the importance of the intra-sectoral (and inter-programmatic) collaboration needed in order to offer multiple health products together and coordinate different activities. In doing so, the CNM/HSU liaised efficiently with the managers of other health programmes: the National Immunisation Programme (the measles immunisation campaign), the National Nutrition Programme (vitamin A distribution for children), the Mother and Child programme (interventions covering women in reproductive age and pre-school-aged children), and the National Malaria Programme (insecticide-treated bed net distribution).

**‘It is not an isolated programme but it’s already embedded in the system. Without this, we could not have achieved the results we had’ – Government official**

Complementing the routine outreach activities, special village health meetings take place once a year with village health volunteers<sup>51</sup> in charge of gathering the community at one place in time for health centre staff to distribute the NTD drugs alongside other health interventions. These village meetings have been the key strategy for SCH and LF.

Similarities between these interventions, both in terms of programme logistics and target groups, make it logical to deliver them at the same time. Also, because vitamin A and immunisation campaigns were already in place, adding deworming presented a clear advantage in terms of the coverage offered by these programmes (WHO, 2004; WHO, 2013).

Health centres and health posts stock NTD drugs to reach all those who might have missed previous

interventions. Mothers are asked to show the health cards on which their children’s vaccinations, vitamin A and deworming interventions are recorded. If the specific intervention is not recorded on the health card, the mother is asked to recall whether that particular drug had been given. A similar procedure is in place for pregnant women attending antenatal care and the general population targeted to receive SCH and LF drugs. Table 5 summarises the different strategies put in place to reach all populations at risk.

Integrating MDA and deworming into existing channels has made the most of limited resources while reaching the maximum number of people and reducing the burden on households. It is efficient in terms of staff time and training, while the logistics already in place contribute to the cost-effectiveness of the programme, particularly for reaching remote communities. It also contributes to achieving higher coverage because communities see a greater value in attending (WHO, 2004).<sup>52</sup> Integration has also reduced the cost of providing deworming (minimal marginal cost) because the logistics and the personnel are already in place. This has contributed to the cost-effectiveness of the programme while at the same time promoting sustainability and the strengthening of the health system (Box 3).

The integration of NTD activities within the health system in an efficient way involves coordinating many health actors at different administrative levels, including community members, to support their delivery:

- The CNM/HSU central team works in close coordination with the Central Medical Store on making sure that sufficient drug supplies are in place at the right time. This also involves coordination between the Central Medical Store and Provincial Health Departments.
- Provincial Health Department and Operational Health District managers are involved in planning and organising MDA activities at village level with assistance from health centre staff and the village health volunteers.
- Village health volunteers are in charge of gathering the community in one place for the outreach activities and at the special village meetings and have a role in building awareness in their communities. Additionally, mass media announcements on television and radio

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50 Since the mid-1990s Cambodia has instituted monthly outreach activities (once every two months for very remote areas) from its health centres. These outreach services deliver a minimum package of activities, mostly preventive and some curative health services, that include immunisation, antenatal care, distribution of oral rehydration salts, family planning, health education, postpartum vitamin A supplementation, and tuberculosis and leprosy follow-up.

51 Village health volunteers do not usually receive incentives. From time to time though, they have received per diems to attend meetings. Their commitment very much depends on encouragement from health centre staff. They cannot distribute drugs themselves, but convene village meetings and encourage people to participate on outreach campaigns.

52 Deworming can benefit those interventions as it became extremely popular with parents owing to its immediate and highly visible effect: the worms are expelled in faeces and children feel better in just a few days. This contributes to gaining communities’ trust in its health personnel.

### Box 3: Cost-effectiveness: the case of schistosomiasis

A study by Croce et al. (2009) analysed the cost-effectiveness of the intervention for SCH control in Cambodia. While SCH is the smallest intervention of the CNM/HSU programme, the results of this study can serve as a basis for understanding STH, LF and other tool-ready NTDs.

The total cost of the programme for the implementation phase (1995-2003) was \$737,982. From 2004 to 2006 the annual cost of the maintenance phase was on average \$76,827. The annual cost of the programme has gradually decreased over time, from \$99,754 in 1997 to \$72,511 in 2006, which suggests efficiency gains. The annual cost per treated person was \$1.02 in the implementation phase and \$0.96 in the maintenance phase. With an effectiveness of almost 100% (prevalence declined from 77% to 0.5%), the cost-effectiveness value was \$9.29 per treated person.

The programme brought 6,479 severely infected individuals back to full productivity at a cost of \$114 per person. This resulted in about \$2.8 million in increased productivity (due to reduced disability and averted deaths) for the cost of less than \$750,000 over the nine years of implementation. The necessary investment within the programme to increase societal productivity by \$1 is \$0.26, which means a return of \$3.84 for each dollar invested. According to Andre et al. (2008)<sup>†</sup>, this represents a return of investment greater than obtained even by vaccination programmes.

†: Quoted in Croce et al. (2009).

Note: Financial support from development partners was included in the cost evaluation though the monetary value of the technical assistance provided by partners was not included. The time spent by village health workers was valued at the same level as the government salary.

are meant to complement the work of the village health workers by broadcasting messages before each distribution round to encourage families to attend the outreach sessions during the vitamin A and deworming months.

- Collaboration between health centre staff and local authorities is necessary to ensure community attendance in outreach activities and special health meetings. For example, the chief of village is involved in asking community members to stay in the village on the day of MDA; monks, priests and school teachers also are involved in mobilising communities during MDA campaigns.

### 3.3 Nurturing the programme: support and capacity building through partnerships

Confronting the issue of NTDs in Cambodia meant building a completely new knowledge base. Integrating NTD programmes into the health system required strategies and plans, management capacity, human resources, staff training and supply chain management. The data collection systems, monitoring and evaluation, surveillance, and the technical capacity to put programmes into practice also needed to be developed. This transfer of knowledge and capacity strengthening

**Table 5: MDA distribution strategies**

Strategy / activity	Deworming at schools	Monthly outreach activities / vitamin A supplementation	Special village meeting	At health facilities
<b>Institutional structure used</b>	MoEYS and MoH	MoH	MoH	MoH
<b>Target group</b>	School-aged children (6-14 years old)	Under 5, plus school-aged children missing cases, women of child-bearing age Everyone excluding those reached in other activities	Everyone above 2 years old, excluding those reached in other activities	Women of child-bearing age attending ante-natal consultations Everyone who shows up excluding those reached in other activities
<b>Frequency of NTD tablets distribution</b>	Twice a year	Once a year for LF and SCH Twice a year for STH	Once a year	Ongoing throughout the year
<b>NTD targeted</b>	STH plus once a year SCH in co-endemic areas	STH plus SCH and LF in co-endemic areas	LF and SCH	STH plus SCH, LF in co-endemic areas Trachoma when cases are detected

Source: Literature review and key informant interviews

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has taken time and was developed thanks to a series of partnerships that have been established at national and regional level based on the increasing awareness and knowledge developed at global level.

### 3.3.1 Bilateral partnerships and partnerships at national level

Collaboration with key development partners working in the field of nutrition and NTDs was instrumental in helping Cambodia to set up the HSU at the CNM. These partners provided the technical assistance and, working side by side, the support needed for the MoH to acquire the ‘know-how’ on dealing with NTDs. While in the beginning, this knowledge was not nationally owned in any meaningful way, it was built over the years and supported by an array of partners, starting with the first activities carried out with MSF and the Red Cross in 1994. The CNM/HSU management was identified as the champion that proactively looked for partnerships for contributing to different aspects of the NTD field. The WHO played a key role in transferring the technical knowledge on global level strategies by working in close collaboration with the CNM/HSU to develop the key policy papers, such as the National Strategic Plan, that would guide Cambodia’s fight against NTDs. According to key informants from the donors’ community: *‘at the beginning [of the programme] it was an intensified work, as this was a new area of health, with completely new people in charge. The work done and the training imparted was much more technical’.*

The technical assistance led to a gradual transfer of knowledge through piloting the strategies for the implementation of the MDA, which progressively scaled up from covering a few districts and provinces to reach a nationwide scale in the case of STH. Piloting strategies allowed for the CNM/HSU managers to familiarise themselves with tested global strategies and gradually build the knowledge to find local solutions on how to better adapt the international strategies to the local context. *‘This “transfer of ownership” has allowed the programme to grow and improve little by little the WHO guidelines and recommendation to the local context’* (key informant interview). As the size of

the programme gradually increased, knowledge trickled down to provincial and district managers, who also became more efficient and experienced. The current staff, both senior and young professionals, have learned through progressive exposure to programme activities as well as training in different aspects of the programme.<sup>53</sup> Development Partners<sup>54</sup> have been also crucial for sponsoring key CNM/HSU staff and Provincial Health Department managers to attend international training and workshops. Senior staff have also acquired academic qualifications (i.e. the CNM/HSU Programme Manager benefitted from an MSc degree in the London School of Hygiene and Tropical Medicine sponsored by the WHO).

**‘15 years ago the National Programme worked in very close collaboration with the WHO but now they are good enough, we are more like cheerleaders. The support is ongoing but it shifted’ – Donor’s representative**

Throughout the programme’s existence the WHO played a pivotal role, providing technical assistance, mediating with the pharmaceutical companies to obtain drug donations and getting programme funding. Its role has varied over the years. According to a key informant, now *‘the WHO provides supports if the programme have an urgent gap. For instance for FBT they helped us look through different networks and partners and got us funding from the Dokkyo University’.*

### 3.3.2 Regional and global partnerships

Due to the communicable nature of NTDs, and their endemicity in the region, for elimination targets to become a real possibility, control and elimination strategies require integrated regional plans that serve as roadmaps for member states and partners, provide a template for national plans of action, help to monitor programme progress and mobilise funds.<sup>55</sup>

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53 Training, including refreshment training sessions, has taken place at different times, targeting different groups of people. Provincial, district and key health centre personnel, as well as School Directors have been trained as trainers. They are charged with training community, health and education staff. The CNM/HSU with support from the WHO and other key partners also conducted workshops and seminars that included local authorities at district and commune level, as well as religious leaders and community groups such as women’s unions. Directors of schools, primary school teachers, health centre staff and medical doctors, among others, have participated in workshops and have been progressively receiving training about the integration of interventions, diagnosis, treatment and health education to be able to pass the knowledge to their communities (key informant interviews).

54 The Korean Association of Health Promotion, the London School of Hygiene & Tropical Medicine, the National Institutes of Health, the Global Fund, the International Development Research Centre Project, WHO, the Liver Fluke Network.

55 Research is also carried out in the region aiming to fill in the significant programmatic and knowledge gaps that still exist in prevention and control of communicable diseases. The WHO-WPRO works closely with research institutions and building activities. The Regional Network for Asian Schistosomiasis and other Helminth Zoonosis (RNAS+) developed a multinational research proposal on SCH and FBT, funded by the Canada’s International Development Research Centre. This project started in 2012 in Cambodia, China, the Lao People’s Democratic Republic and the Philippines (WPRO, 2013).

Although Cambodia is generally considered as part of South-East Asia, the WHO includes it instead in its Western Pacific region.<sup>56</sup> In both regions NTDs are widely endemic. Many countries and areas in the Western Pacific region have made notable progress in the control and elimination of NTDs, supported by different partners at national level. These countries have different local contexts and face diverse epidemiological profiles which mean that technical and operational strategies need to be adapted to national contexts (WHO-WPRO, 2011), but they also face similar challenges related to technical and programmatic issues, political and economic constraints, and the changing donor and partner landscape (WHO-WPRO, 2011).

As countries started programmes against NTDs, collaboration and partnerships became key to coordinating activities in border areas as well as sharing experiences and mutual learning. Cambodia is an active participant on the regional group forum to tackle NTDs. As part of this initiative, there is a Regional Action Plan for Neglected Tropical Diseases in the Western Pacific Region (2012-2016) developed as a critical step towards securing sustained financial and human resources for tackling NTDs, integrating disease-specific plans, measuring progress and improving coordination. The regional plan was prepared after several meetings of the managers of each country programme. As well as the annual meetings, training and workshops have been organised to build the capacity of country programmes while allowing them to share experiences and ways to overcome obstacles.<sup>57</sup>

### **‘To reach elimination of SCH we need to monitor very strictly the reservoir and intermediate host. We do this with the regional group’ – Government official**

The regional aspect of the programme has been identified as key in contributing to Cambodia’s success in tackling NTDs. Experiences shared between countries have informed national decisions by leveraging neighbours’ experiences. For example, when Lao PDR stopped MDA

for SCH, reinfection rates increased; based on Lao PDR experience, Cambodia continued MDA even after reaching prevalence levels that pointed to the cessation of treatment.

At the global level, perhaps the most significant partnership is CWW, a partnership between the pharmaceutical company Johnson & Johnson and the Task Force for Global Health (Atlanta, USA) for the global control of STH. CWW was initially responsible for overseeing the donation of drugs, moving on to provide technical assistance through its local partner, Helen Keller International and working in close collaboration with the MoH and the MoEYS. They became the main donors for mebendazole, one of the drugs of choice for STH. Other global partnerships that have played a role in the region include the Global Alliance to Eliminate Lymphatic Filariasis, which has helped in coordinating, supporting, and supervising the Global Programme for the Elimination of Lymphatic Filariasis in endemic countries in the region, and the Partnership for Parasite Control,<sup>58</sup> which has coordinated STH control activities in the region. Partnerships with the pharmaceutical industry, which are usually mediated by the WHO, NGOs and other players, have been and remain crucial (Montresor et al., 2008).

### **3.4. Resource mobilisation for the programme: drugs donations and funding**

Drugs provided by pharmaceutical donation programmes have been indispensable to establishing a Cambodian NTD control programme and reducing prevalence levels of STH, SCH and LF. The funds to cover the costs of drugs have been contributed mainly by external financing.

Accurate financial data for the programme is scarce and sometimes contradictory. Based on the few sources available and key interviews, a general picture of the financing story behind the progress achieved is presented in this section. Box 4 (overleaf) details a Financial Gap Analysis conducted by USAID for 2012, which serves as an example of how much financing is needed to roll out the programme while identifying the gaps in funding. Their analysis shows that the funds required to support the NTD Programme are relatively small.<sup>59</sup> However, even this small

56 The WHO South East Asia Region has 11 Member States: Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste. There are 37 countries and areas in Western Pacific Region. These are: American Samoa; Australia; Brunei Darussalam; Cambodia; China; Cook Islands; Fiji; French Polynesia (France); Guam (USA); Hong Kong (China); Japan; Kiribati; Lao People’s Democratic Republic; Macao (China); Malaysia; Marshall Islands; Federated States of Micronesia, Mongolia; Nauru; New Caledonia (France); New Zealand; Niue; Commonwealth of the Northern Mariana Islands, Palau; Papua New Guinea; Philippines; Pitcairn Islands (UK); Republic of Korea; Samoa; Singapore; Solomon Islands; Tokelau (New Zealand); Tonga; Tuvalu; Vanuatu; Viet Nam; and Wallis and Futuna.

57 Examples of workshops attended: ‘Intestinal Parasite Control Project in the Central Area of Cambodia’ (Korea); ‘The Regional Training for Strengthening Monitoring and Evaluation (M&E) in the Greater Mekong Sub-region’ (Lao); ‘Innovative Strategies for Sustainable Control of Asian Schistosomiasis and Other Helminth Zoonoses through Socio-Ecosystem-Bases Interventions’ (China); ‘Regional Program Managers Meeting on Lymphatic Filariasis and other Selected Neglected Tropical Diseases’ (Fiji); ‘The 96 years of Opisthorchiasis, Past, Present and Future International Congress of Liver Flukes’ (Thailand).

58 Launched after the World Health Assembly in 2001, it is composed of agencies of the UN, WHO Member States, research institutes and a multitude of NGOs. WHO acts as the Secretariat for the group and also as the lead technical agency (WHO website on NTD partnerships: [www.who.int/intestinal\\_worms/partnership/en](http://www.who.int/intestinal_worms/partnership/en)).

59 According to USAID Financial Gap Analysis the programme would require US\$2.8 million for 2012, in which year the government expenditure on health was US\$134 (million US\$ constant 2005) or US\$188 (million current).

#### Box 4: Estimated programme cost, funding gap, and sources of financing

USAID conducted a financial gap analysis estimating the financing cost and gaps for 2012, before Cambodia became part of its NTD Programme (Chu, 2011).<sup>†</sup> While the situation is likely to have been different in previous years due to the changing landscape of donors, external funds and drug donations secured, it can provide an idea of the programme's financial situation and needs in more recent years. Table 6 shows that the total programme cost estimated for 2012 was \$2.8 million, of which only about 40% was expected to be covered according to the funds and drugs secured by the time of the analysis. This means that the Cambodian government would have needed to find additional funds of \$1.7 million.<sup>††</sup>

**Table 6: Total cost and funding gap – estimation for 2012**

	Activities	Drugs	Overhead	Total
<b>Total program costs</b>	\$1,661,275	\$1,056,883	\$160,000	\$2,878,158
<b>Total program funding</b>	\$310,000	\$821,642	-	\$1,131,642
<b>Funding gap</b>	\$1,351,275	\$235,241	\$160,000	\$1,746,516

Source: Chu, 2011

The funding gap mainly prevents the programme from fully covering the operational cost of activities and overheads and emphasises the efforts made by the CNM/HSU to manage the scarce resources in the most efficient way. The findings pointed to the urgent need to look for further partnerships with drug donation programmes as the majority of the programme funding was allocated for purchasing drugs (about 90% of which would have been needed for pre-school-aged children and women of child bearing age).

The analysis found that the MoH would be the main source of financing for the programme, accounting for about 74% of the total programme cost for 2012, of which 91% would be allocated to the procurement of drug. The remaining 26% would be supplied by the pooled funds and the WHO, mainly to cover operational costs of activities.

**Table 7: NTD Programme by financing source – estimation for 2012**

Funding source	Amount	%
Government/MOH	\$836,643	73.9
Drug acquisition	\$821,642	72.6
Trichiasis surgery	\$10,000	0.9
Unrestricted	\$5,000	0.4
Salaries	TBD	TBD
Pooled funds	\$200,000	17.7
HSSP2	\$100,000	8.8
ADB-CDC2	\$100,000	8.8
WHO	\$95,000	8.4
Total	\$1,131,642	100

Note: USAID funding gap analysis, based in estimations, established that both pooled funds contributed \$100,000 each, while information obtained from CNM/HSU staff interviews, also estimated, put those figures at about \$300,000 for ABD/CDC and about \$160,000 coming from the HSSP2.

Source: Chu, 2011

<sup>†</sup> The Funding Gap Analysis Tool is an application for estimating, summarising, and analysing annual costs and gaps for integrated NTD control. It is driven by user-input cost estimates and also incorporates demographic, epidemiologic and unit cost information. In the case of Cambodia, it was applied in 2011 to estimate the gaps for 2012. Therefore the numbers might slightly differ from the actual disbursements of 2012.

<sup>††</sup> These figures do not include FBT and strongyloidiasis as they are NTDs not covered by the USAID Programme, so the full funding gap is likely to be larger.

amount of money has been crucial for the country to be able to put in place the necessary activities that have made the programme a success, which also makes the progress achieved even more impressive. Without this resource mobilisation, the programme would not have been able even to exist.

### 3.4.1 Small fragmented funding but strategically focused contributions

Funding for the programme has evolved over time, varying as different donors target different NTDs. Although it was not possible to calculate the precise amount donors have contributed, examples of funds provided by donors are presented in Table 8 (overleaf).

The picture presented here shows how the Cambodian government is dependent on small and fragmented funding streams from an ever-changing range of donors.<sup>60</sup> However, the CNM/HSU has been proactive in looking for partners to fund and collaborate with different components of the programme, and throughout the existence of the programme it has managed to secure most of the funding needed and partially filling the gaps with allocations from the government budget.

It has not been possible to quantify the funds or drugs contributed by donors when STH and LF were integrated into the programme. It is known from the interviews conducted, however, that MSF was a key funder for the period 1994-1999, succeeded by the Sasakawa Memorial Health Foundation and the Japanese Government, which supported the programme through the WHO until 2007.

Since 2001, however, the main source of funding for the programme's operational costs has been the MoH's budget from the ADB/CDC1 (2005-2009), ADB/CDC2 (2011-2015) and the second Health Sector Support Project (HSSP2) (Box 5, overleaf). The amount received from these pooled funds has been small but vital for sustaining core programme activities. According to key informants from the CNM/HSU, the amount of money derived from these funds varies each year and seems to have decreased in the last two years as the schemes reach their final stages and new priorities have emerged (i.e. avian flu).<sup>61</sup> However, the programme's funding prospects are good as in 2011 Cambodia was approved to be part of the USAID NTD Programme, which will provide financial support through FHI-360. The USAID NTD Programme supports countries financially and technically to deliver regular, large-scale treatment for at-risk populations through a jointly agreed

package of interventions based on countries' needs. Negotiations took place throughout 2012 and 2013 and the CNM/HSU is currently waiting for final approval from Washington.

### 3.4.2 Drug donations allowing provision of free treatment

The donation of drugs has been crucial in allowing the government to treat its population for NTDs and to provide this treatment free of charge. The source of drug donations has varied over time, but seems to have had a piecemeal pattern. They have come from pharmaceuticals, donors or private companies (MoH, 2010). The MSF and WFP donated praziquantel (for SCH) at the early stages of the programme (though the CNM/HSU does not know from which pharmaceutical). WHO also has provided drug donations throughout the programme's existence. KOIKA has provided praziquantel for the last six years. Albendazole, donated by GlaxoSmithKline, covered all LF treatment for (about 800,000 tablets annually). From 2007/2008 Johnson & Johnson (through CWW) became the biggest donor of mebendazole for treating STH, covering all school-aged children in the country (about 6 million tablets per year).<sup>62</sup>

**'With the help of the donation from the donor, we can complete all our activities concerning the MDA-program that have made possible to reach the targeted population at risk' – Government official**

World Vision Australia recently provided 10 million tablets of Albendazole 400mg and 300,000 tablets of praziquantel 600mg. The Korean Association of Health Promotion provided 150,000 praziquantel and 200,000 albendazole tablets from 2009 to 2011. They have also contributed praziquantel for controlling FBT in 16 villages of the pilot project area.

Donations usually go through the national government, which is in charge of deciding how to distribute them. When donations cannot be secured through a donation programme, the CNM/HSU asks the MoH to cover the gap, which usually procures the additional tablets needed.

60 This 'fragmentation' or 'broad partnerships' in terms of funding support, if properly coordinated and mapped out may be a good recommendation to minimise duplication and optimise available resources.

61 The ABD/CDC funding went from around \$300,000 in 2012 to \$200,000 for 2013 and the HSSP2 pooling, which was about \$160,000 in 2012 went down to \$60,000 for 2013 so far (interview with CNM/HSU management staff, August 2013).

62 Johnson & Johnson primarily donates the drugs for deworming with CWW being responsible for overseeing the donation and providing technical assistance.

**Table 8: Examples of activities financed by donors**

Development partners	Activities funded
Red Cross and MSF	First explorations on SCH and pilot activities in targeted villages
Cambodian Pasteur Institute	Analysis of the first samples collected, which determined the existence of SCH in the country
WHO	(plus Tropical Public Health Institute) Stool samples studies (parasitologic surveys) finding SCH prevalence levels of more than 50% (plus MSF) Development of the funding appeal in collaboration with CNM/HSU that was later used for advocacy and engagement of new funding partners Intermittent small incentives and small funds were provided to incentivise staff from other sectors (i.e. teachers) Prevalence survey on FBT
Action Contre la Faim	Nationwide rapid assessment survey with emphasis along the Mekong river
Several NGOs already working in remote areas (early stages of the programme)	Distribution of drugs to places where government access was difficult due to financial constraints and road conditions
World Food Programme	Procurement of drugs and distribution of food during the early STH deworming campaigns
UNICEF and WHO	Training workshops in hygiene, sanitation and deworming to all school directors as well as procurement of a kit of materials for children
CWW through Helen Keller International (2009)	Studies to create an evidence-based approach to change the school curriculum, followed by the development of the new curriculum in collaboration with the School Health Department plus supplementary teachers' training
Swiss Tropical and Public Health Institute and the UBS Optimus Foundation (2009/2010)	Prevalence survey on strongyloidiasis
Dokkyo Medical University in Japan	Prevalence studies on FBT and procurement of drugs for pilot areas
KOIKA (Korean Aid)	Donated material for laboratories plus technical support for running analysis

Source: Key informant interviews with CNM/HSU staff

### 3.4.3 Government funding

The government's financial contribution to the programme covers various aspects. While the financial contributions from the government in early years are not known, from the figures presented in the USAID 2012 gap analysis suggests the government may have been the programme's main funder for a few years. Almost all government funds are allocated to drug purchasing in order to procure all pills required for STH, SCH and trachoma not covered by the current donation programmes.

CWW has been donating about 6 million mebendazole tablets annually since 2007/08, with the MoH purchasing an additional 5 million tablets needed to reach all STH target groups. Most importantly, the government has to purchase at market prices (\$0.15 per tablet), stressing the

importance for the government of acquiring the drugs through donations. The extra 5 million pills needed to cover all target groups for STH would cost the government about \$750,000. In the case of SCH, the MoH would buy for 2012 100,000 praziquantel tablets at the standard market price of \$0.71. The purchase of non-donated drugs is a significant burden on government budgets (Chu, 2011). The drugs needed to treat trachoma, which is based on people approaching health facilities, have historically been covered by the government (Chu, 2011).

Since the programme has been integrated into the health system, the government has indirectly funded it through the increased funds allocated to the health sector. It also funds the programme directly, supporting staff salaries, from central to local level of the government

**‘Previously almost nobody [donors] considered this area of health for funding, until just recently. That’s why we requested funds from everywhere, to the region [WPRO], to different networks, the Swiss Tropical Institute, etc.’ – Government official**

### Box 5: Pooling funds contributing to the CNM/HSU

The Greater Mekong Subregion (GMS) Communicable Diseases Control (CDC) fund (commonly referred to in Cambodia as ADB/CDC), is a sub-regional fund supporting three countries: Cambodia, Lao PDR, and Vietnam. In 2005, the Asian Development Bank and WHO/WPRO supported the first GMS Regional CDC Project (ADB/CDC1) with \$38.75 million for four years. A second GMS Regional CDC Project (ADB/CDC2) worth \$42.5 million started in 2010 (ADB, 2012). ADB gives funds to the MoH through the CDC Project for three components, usually ranked in priority order: (1) CDC/Malaria Sub-Unit, (2) Dengue Sub-Unit and (3) Helminths Sub-Unit (key informant interview).

The First Health Sector Support Project (HSSP1), which was in line with the first MoH Health Strategic Plan 2003-2007, was co-funded by four partners: the World Bank, UK Department for International Development (DFID), the United Nations Population Fund (UNFPA), and the ADB (WHO, 2009). This approach has led more donors to pool resources to support the second MoH Health Strategic Plan 2008-2015 with approximately \$145 million over a five-year period under the Second Health Sector Support Project (HSSP2). HSSP2 provides approximately \$30 million annually to support the MoH's Annual Operational Plan, complementing other sources of funding. Seven donors are channelling funds through the HSSP2: the World Bank, DFID, UNFPA, the United Nations Children's Fund (UNICEF), Belgian Technical Cooperation, Agence française de développement, and the Australian Agency for International Development (MoH, 2008a).

Note: In these three countries communicable diseases control was identified as a priority for regional collaboration in view of emerging infectious diseases and the development of economic corridors.

staff implementing the programme, both from the MoH and MoEYS. According to key informants, there is also an implicit cost of the programme that is covered by the government and by the efforts made by the people working for the programme. This applies particularly to teachers, who are playing a health role not covered by their job specifications. Even though this is difficult to quantify, there are many costs associated with logistics that are not cost-free and usually borne by individuals.

It is expected that the government will soon be able to stop buying the drugs and instead secure them through USAID funding.

## 3.5 Broader progress in the health, WASH and education sectors

### 3.5.1 Broader progress in health

Because the NTD Programme is fully integrated into the health system structures, broader progress achieved in the sector has also facilitated the implementation and performance of the programme.

As stated before the progress achieved in Cambodia on NTDs over the past decade has taken place simultaneously with a comprehensive health sector reform, and although there is still much room for improvement, the reforms have led to important improvements in the health system, albeit coming from a particularly low base after the fall of the Khmer Rouge regime.

Primarily, significant increases since the mid-1990s in government, private and external donor investment in the health sector have helped to rebuild human,

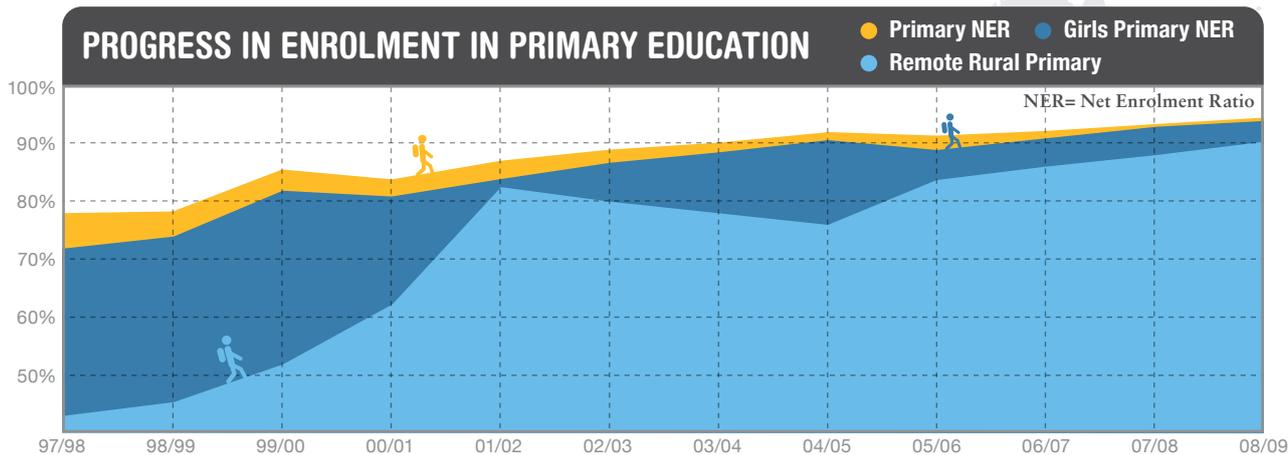
physical and technical capacity. The largest increases came from government financing, whose expenditure on health went from \$30 million (constant 2005) in 1995 to \$134 million in 2012, representing a 4.5-fold increase (WHO global health expenditure database), while its expenditure per capita increased from \$4 in 2000 to \$9.36 in 2009 (MoH and WHO, 2012). Development partners and the private sector have also notably tripled their spending on health in the same period (or by a factor of 3.2 and 2.8, respectively). As a result of these resourcing efforts and implementation of the Health Coverage Plan, the number of health facilities and health personnel expanded significantly. The government built new health facilities and upgraded existing ones: about 121 existing district hospitals were upgraded and almost 800 commune clinics were converted into health centres (Eldon and Gunby 2009 quoted in Asante et al., 2011). This decentralised structure played an important role in facilitating integration of NTD activities within the health system (as discussed in Section 3.2).

Additionally, the introduction of user fees in 1997 as part of the overall health financing reforms appears to have succeeded in increasing access and utilisation for under-served poor populations (Akashi et al., 2004; Meessen et al., 2006; Bigdeli and Annear, 2009). Bigdeli and Ir (2010) argue that the establishment of formal user fees where informal, under-the-table unregulated fees already existed did not have a major impact on poor households, but it did help to improve health facilities and incentivise health personnel. Because 99% of the revenue from user fees is kept at facility level (60% for staff incentives, 39% for operational costs, with only 1% going to the national treasury), the reform allowed for



# Cambodia

Linking health and education systems in the fight against neglected tropical diseases (NTDs)



## LEADING TO...

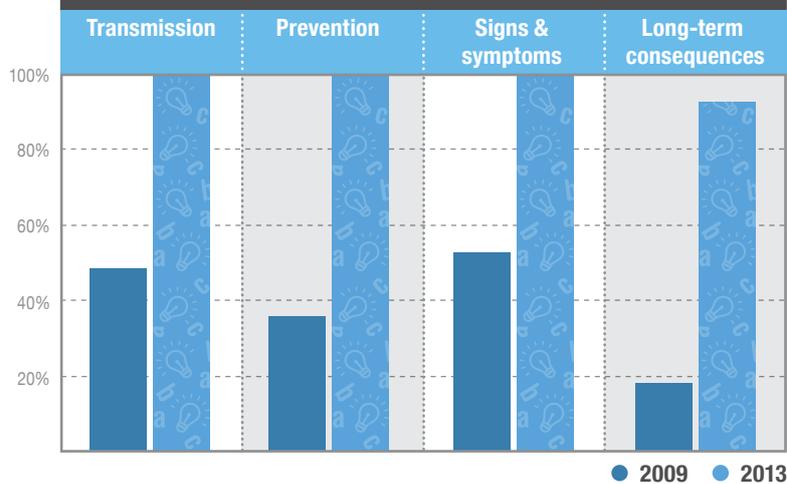


More children reached by the deworming campaign.



More children reached by the health education curricula.

## MORE STUDENTS HAVE LEARNT ABOUT NTDs:



“ This strategy has a multiplicative effect as children go back home and tell their families what they have learned at school, becoming also an effective channel to reach mothers, families and the broader community. ”

National Centre for Parasitology, Entomology and Malaria Control (CNM)

Sources: 1. Ministry of Education, Youth and Sport of the Kingdom of Cambodia (MoEYS) | 2. School Health Department of the MoEYS in collaboration with Helen Keller International and support from Children Without Worms

better salaries for health workers. Also, the availability of cash for recurrent costs has facilitated the improvement of health centres, supplementing the limited resources coming from the government budget. User fees were set by the community itself at an affordable level (they vary depending on the local context) and were introduced together with exemptions for the poorest patients.<sup>63</sup>

Early assessments of the impact of user fees showed that health centre activity substantially increased as a result of improved staff attendance, better maintenance and supplies and improved management practices. The combination of user fees and exemptions seems even to have helped to increase access for the poor, to increase utilisation of essential services, and for facilities to reduce dependence on donor support (Wilkinson et al., 2001; Barber et al., 2004; Akashi et al., 2004). However, this positive effect was mainly seen at primary health care level, where basic services are not expensive. Issues with the implementation of the exemption system for the poor also emerged as they were not properly implemented (Bigdeli and Ir, 2010).

To respond to this challenge in 2000 the government put in place the Health Equity Funds (HEFs) as a way of targeting subsidies for the poor by reimbursing facilities for services provided to those patients. They also reimburse transport cost and provide food allowances for caretakers, and therefore address other major financial barriers to accessing health care (Bigdeli and Annear, 2009). After an initial pilot stage, HEFs have become the major pro-poor approach in health financing in Cambodia.

More and improved facilities, additional and better incentivised health staff and the geographical extension of the health facilities network may well have contributed to the successful implementation of MDA campaigns.

### 3.5.2 Progress in WASH

NTDs thrive in places with unsafe drinking water, poor sanitation and unsatisfactory hygiene practices. While improvements in all of these are an integral part of NTD control interventions, they are difficult to achieve as they involve significant investments in infrastructure as well as widespread efforts to change behaviours (key informant interview).

In spite of being one of the sectors that has lagged behind the general progress achieved in Cambodia, WASH has made progress in both urban and rural settings. Access to improved water sources has reached 81% in 2008 in urban areas, surpassing the MDG target. In rural areas access went from 33% in 1990 to 56% in 2008. Although there is no evidence linking the improved access to clean water with the reduction of cases of trachoma experienced in recent years (see following section), according to key government officials, the increased access to improved sources of water may well have reduced the number of cases of trachoma reported since no specific intervention had been carried out so far to prevent infections.

Progress has also taken place in the area of sanitation, although at a slower pace. Access to improved sanitation in urban areas almost doubled from 38% in 1990 to 67% while it has tripled in rural areas, albeit from the very low level of 5% in 1990, to reach 18% in 2008 (SWA, 2010) (Figure 10, overleaf). Despite this, access to sanitation is still extremely low, particularly in rural settings.

Some improvements have also been seen in the reduction of open defecation practices, which are still widespread in Cambodia. Open defecation is a strong predictor for child stunting (Spears, 2012), as well as a major cause for the spread of STH. Improvements were faster in urban areas where the proportion of people practising open defecation declined from 49% to 15% between 1990 and 2010. But progress in rural areas was much slower, reducing from 89% to 72% in the same period. In spite of the progress achieved, according to the WHO and UNICEF joint monitoring programme conducted in 2012, Cambodia has one of the lowest rates of access to improved water and sanitation and hygiene in the region and is the country in the region in which open defecation is most widely practised (Figure 11, overleaf).

### 3.5.3 Progress in education – high levels of school attendance

Cambodia has made remarkable progress in education since the fall of the Khmer Rouge (See Figure 12, overleaf).<sup>64</sup> Over the past decade, the country managed to re-establish a more inclusive primary and secondary education system, which

**‘...the cost of taking the drugs from the Central Medical Store to people’s mouths, in many occasions made by the health facilities personnel or the teachers themselves, represents time spent by them and the commitment to do additional tasks that might be outside of their jobs specifications, with some of them even putting time and money from their pockets (i.e. transport costs)’ – Key government official**

63 Community participation in implementation and monitoring of the schemes was seen as a safeguard for effective implementation.

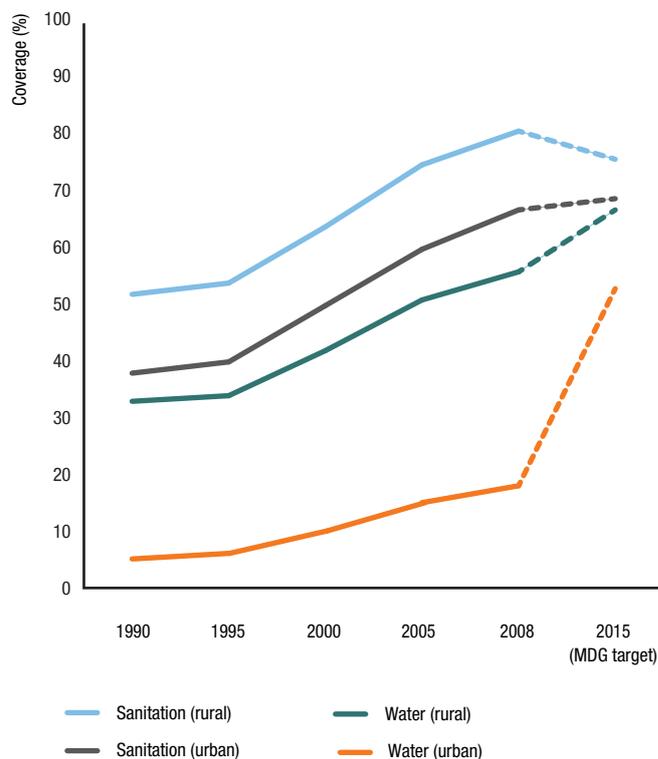
64 Indeed, Cambodia was selected as a case study of progress for the Education dimension in the first round of Development Progress Stories. See Engel and Rose, 2011.

translated into almost all children attending school. It has also closed the gender gap at primary and lower secondary levels, with the biggest achievements being among girls in rural and remote areas and among lower income quintiles (Engel and Rose, 2011).

According to Engel and Rose (2011), a number of initiatives were key to progress in rebuilding the education system, which was almost non-existent after the fall of the Khmer Rouge. These include: (1) the abolition of school fees in 2000 throughout the country, which helped increase enrolment, with the greatest increases occurring in remote areas; (2) the expansion of a nationwide school system, which in less than 20 years built over 6,600 primary schools, facilitating access to education particularly in rural and remote areas, where school construction has been most intensive; (3) the recruitment of teachers from remote areas to teach in underserved schools, which has been facilitated by training lower secondary graduates and setting up teacher training scholarships for students, which increased the supply of young teaching recruits to small isolated schools; and (4) scholarships for the poor increased enrolment rates by 31.3% among beneficiaries and by as much as 50% for girls in the poorest income quintile.

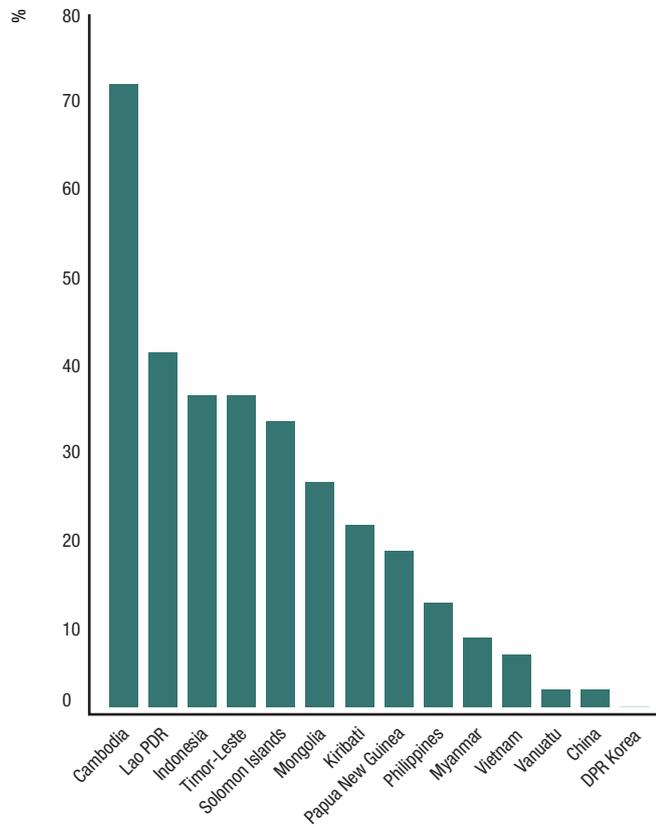
The high attendance achieved, particularly in primary schools, has contributed to the performance of the deworming campaigns, which have been able to reach the maximum number of school-aged children, the primary target group for STH. The progress achieved in education also means that more children are being reached by the health education curriculum, which is transmitting messages about hygiene and NTDs prevention by promoting healthy behaviour within the classroom (see Section 2.4).

**Figure 10: Cambodia's progress towards the sanitation and water MDGs 1990–2008 and progress required to achieve MDGs**



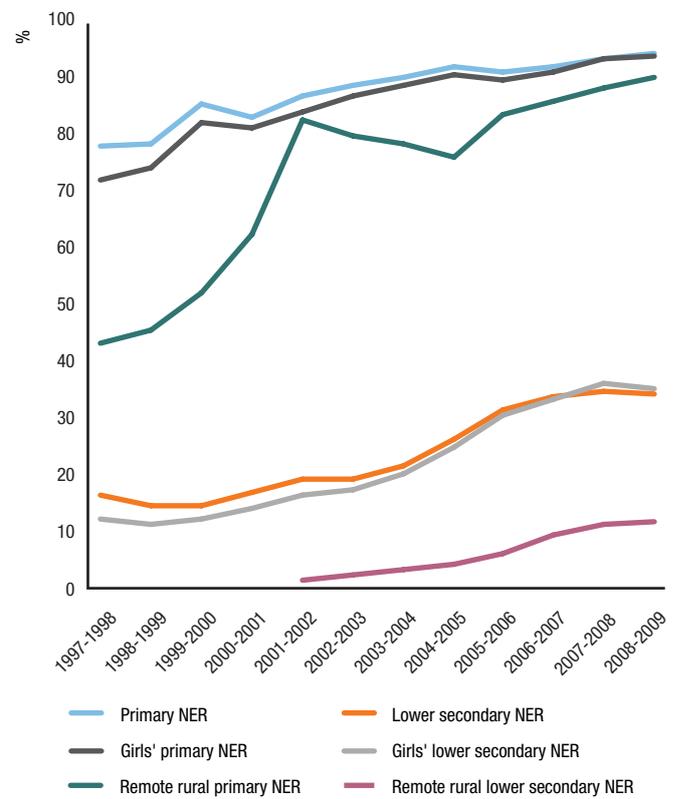
Source: SWA, 2010

**Figure 11: Percentage of the rural population practising open defecation – East Asia & Pacific**



Source: UNICEF, 2013

**Figure 12: Expansion of primary and secondary education, 1997/1998 – 2008/2009**



Source: MoEYS data

# 4. What are the challenges?



Although progress in tackling NTDs has been remarkable, there are still some challenges that will need to be addressed in order to control and eliminate transmission of all targeted diseases.

## 4.1. Dependence on external assistance and constant efforts to secure funding

Despite being an extremely inexpensive and cost-effective programme, the CNM/HSU represents a significant burden for the MoH to support it on its own. According to the analysis of the SCH component of the programme, ‘the cost of the programme per beneficiary (\$1.02) represents a relevant part of the per capita expenditure on health of the Cambodian government’ (Croce et al., 2009: 283), corresponding to a yearly cost per capita of around 16%-17% of the total government per capita

expenditures on health, or 12.5% assuming the drugs would be covered by an external agency (at \$6.1 in 2006 when the study was conducted).<sup>65</sup> Even though government expenditure on health has dramatically increased from \$30 million (constant 2005) in 1995 to \$134 million in 2012 (WHO global health expenditure database) with the government expenditure on health per capita increasing from \$4 in 2000 to \$9.36 in 2009 (MoH and WHO, 2012), health budget allocations have had to deal with several competing priorities. Particularly in its early stages when the establishment of the NTD sub-unit coincided with wider health-sector reforms carried out by an under-resourced MoH,<sup>66</sup> priorities were focused on rebuilding the health infrastructure, increasing the number and training of health care personnel, and attending to the numerous needs resulting from the genocide. More recently, maternal and child

65 While this analysis has been done only for SCH and there are no available studies conducted for STH in Cambodia, evidence from other countries indicates that deworming has similar cost-effectiveness results (Karnofsky, 2012).

66 In those years, apart from the irregular provision of salaries, the health ministry had minimal budgetary allocations for services; supervision, drug supply and logistics for disease-control programmes (Hill and Eang, 2007).

health, the provision of basic primary health services in rural areas and the control of communicable diseases with high mortality rates and frequent outbreaks, such as malaria and dengue, have dominated the health ministry's priorities. These factors resulted in NTDs being a lower budgetary priority, despite the minimal funding that the CNM/HSU require (key informant interview).

As described above, external funding has been continuous but rather fragmented, with those NTDs that have not attracted donor funding remain largely neglected within the government's activities (i.e. trachoma, FBT and strongyloidiasis). Likewise, drug donations have been only secured for certain diseases and target groups. Each donor agency has different mandates and regulations that allow them to cover either certain diseases, activities, and/or different target groups. For instance, community support (i.e. health volunteers) has been funded irregularly depending on the source of funding. CWW can only provide drugs to treat school-aged children. In 2013-2014 the CNM/HSU received donations of albendazole from World Vision Australia for pre-school-aged children and women of child-bearing age. The most recent partner of the CNM/HSU, the USAID NTD Programme, only targets five diseases: LF, onchocerciasis (not endemic in Cambodia), SCH, trachoma, and STH (hookworm, ascariasis, trichuriasis), thus the drugs and funds necessary to start addressing FBT or strongyloidiasis cannot come from this source. Thus, other sources of financing need to be pursued for strategies or activities that target risk groups or diseases that are not covered by certain donors. So far the CNM/HSU has resorted to asking the MoH to procure the necessary drugs from its own budget.

As a result, taking the programme activities forward has required constant effort by the CNM/HSU to secure funding year after year. However, both funds for the operational costs of the programme and the drugs necessary to cover all at risk target groups have been not completely ensured. To fill the gaps in drugs donations, the government has made notable efforts and has managed to fund the procurement of most drugs not covered by any donation programme through its National Budget. However, until recently this has not been enough to cover the shortfall.<sup>67</sup> The government purchases drugs at their market price, which is usually 8 to 10 times higher than the production cost of the donated tablets. The major gap in drug donations for STH, SCH and

trachoma is likely to be covered from now on by the USAID NTD Programme. However, additional sources of funding and donations would need to be identified for the CNM/HSU to put in place strategies to deal with FBT and strongyloidiasis.

## 4.2 Remaining inequalities in access to health services

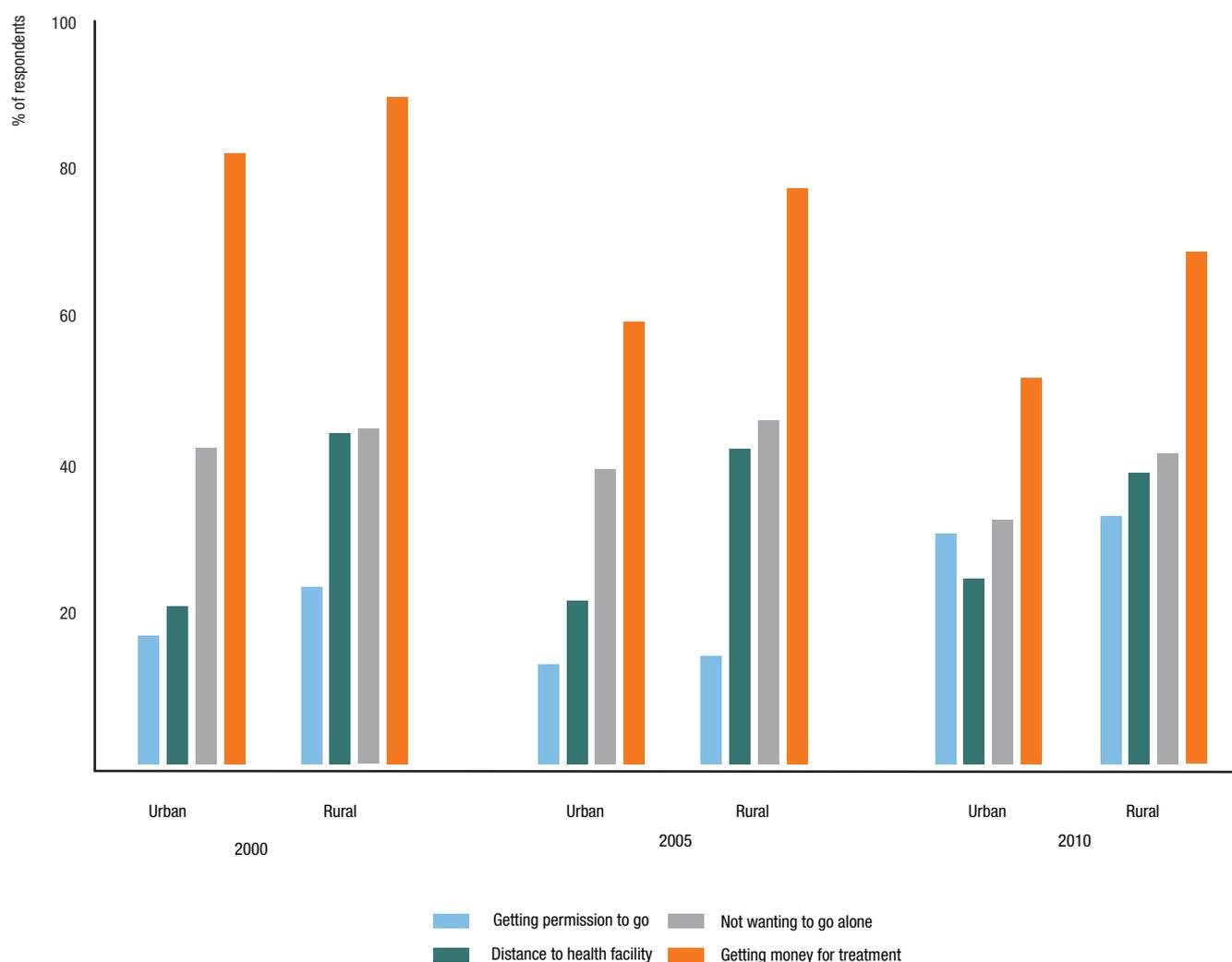
Despite improvements in the health sector, important barriers to accessing health care remain. This may have a bigger impact in reaching mainly WCBA. Getting money for treatment has consistently been cited as the main problem: in 2010 the majority of Cambodians cited prohibitive costs as a barrier to health access. Rural residents report more difficulties in accessing health care, particularly with regard to long distances required to travel to a health facility (Figure 13, overleaf). There is a relationship between level of education and problems in accessing health care: women with less education are more likely to cite travel to health centres and money to pay for treatment as barriers to access, although this may also be correlated with location and income status; and there is a relationship between wealth groups and access to health services: in 2005, 86% of the poorest quintile cited getting money for treatment as a barrier to accessing health care and 79% of the poorest cited this as still a problem in 2010 (Figure 14, page 49).

## 4.3 Further progress needed in the WASH sector to achieve lasting behavioural change

In spite of the notable progress achieved in this area (described in Section 3), particularly in relation to health education carried out in schools, much remains to be achieved if appropriate levels of access to water and sanitation in Cambodia are to be attained and if behaviour change – in relation to open defecation and hand-washing in particular – is to be sustained (HKI, 2013). Open defecation is still the norm among rural Cambodians and in spite of efforts and messages disseminated to date, accounts from the field point to misunderstandings of certain WASH messages: school teachers, for instance, sometimes ask children to take off their shoes when using the latrines, annulling efforts to prevent STH infections. Similarly, while many people have made the effort to

<sup>67</sup> For instance, according to USAID financial gap analysis the total pills needed for rolling out the STH deworming at schools campaign were estimated to be 17.9 million, meaning that there would be a shortfall of 6.8 million pills needed to cover all STH target groups. For 2013-2014 the programme received albendazole from World Vision Australia to cover pre-school aged children and women of child bearing age (Interview with CNM/HSU staff). While in 2011 the Korean Association of Health Promotion and the Korean International Cooperation Agency donated 50,000 tablets to treat SCH, at the time of the funding gap evaluation, no external donor had yet committed to donate praziquantel. The number of pills estimated to reach all at-risk people in 2012 was 245,000, with the government being able to purchase 100,000, meaning 145,500 pills would still be needed in 2012. The limited treatment of trachoma has so far consisted of providing tetracycline ointment to infected people approaching health facilities, with the small amount of drugs required for their treatment being historically covered by the government.

**Figure 13: Perceived problems in accessing women’s health care: rural vs urban**



Source: National Institute of Statistics et al., 2001, National Institute of Public Health et al., 2006 and National Institute of Statistics et al., 2011

construct latrines adjacent to their homes, often they buy them for ‘status’ reasons or they reserve them for guests, while still practising open defecation. The situation is particularly unsatisfactory in rural settings. By 2012 72% of Cambodians living in rural areas practised open defecation, which has a direct impact on the spread of STH (Spears, 2012).

Addressing WASH issues in an efficient way is particularly important for Cambodia given the environmental and infrastructure challenges.<sup>68</sup> As such, better building techniques and standards for sanitation infrastructure need to be put in place. In urban areas,

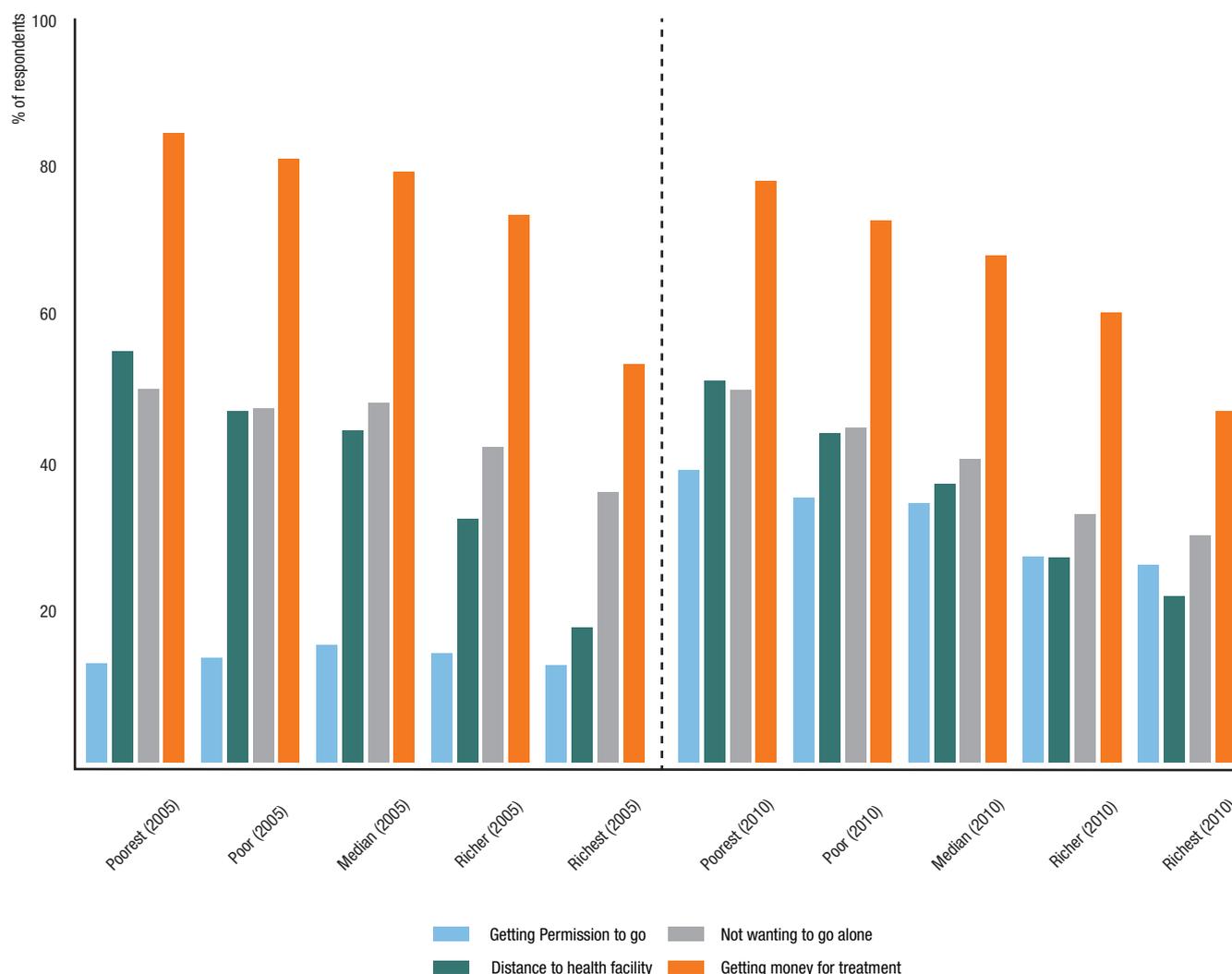
although increases in access to water and sanitation have been notable, the main problem is how to deal with waste, with only 10% of waste being treated (key informant interview). The growth of unplanned settlements outside of Phnom Penh is also increasing the pressure on the city’s existing wastewater infrastructure and the system of natural drainage, with most of the waste still draining into the sea.<sup>69</sup>

Government interventions, through the Ministry of Rural Development (MRD), have been limited and rural sanitation has generally not been prioritised in sector or programme budgets, with small-scale projects having only

<sup>68</sup> For instance, most Cambodians live around the Mekong lowlands and suffer from the seasonal flooding. This represents a challenge even for those who do have latrines, as these are usually flooded, letting the infected eggs come out and spread around the soil (Key government official).

<sup>69</sup> See the World Bank website on Cambodia’s environment: <http://tinyurl.com/3fplhrq>.

**Figure 14: Perceived problems in accessing women's health care: income quintiles**



Source: MoH & WHO (2012)

a marginal impact (WSP, 2012). Most interventions have relied on NGO initiatives and external funding.<sup>70</sup>

Until recently the government took a supply-side approach by providing subsidies for households to build their own latrines. However, funding has been scarce and the strategy has reached only 20% of households. Further, it discouraged people from buying or building their own sanitation facilities while waiting for subsidies to reach them (key informant interview). Since 2005 several innovative demand-side approaches have been tested, mainly through two strategies: Community-Led Total Sanitation (CLTS) and Sanitation Marketing.

The CLTS strategy was put in place in 2005 with support from UNICEF and it is currently a major element of the MRD's strategic approach to improving rural sanitation. CLTS encourages communities to do their own appraisal and analysis of open defecation and to take action (WSP, 2012). It targets community behaviour change by spreading messages about the risks involved in practising open defecation, the importance of hand-washing and treating drinking water, and so on. To date CLTS has been put in place in about 560 villages in 13 provinces, with more than 182 villages (33%) now being 'open defecation free'.<sup>71</sup> A parallel approach is School-Led Total Sanitation, which

<sup>70</sup> At least 48 NGOs and other development partners are working on the sector; however, their work is still very fragmented and uncoordinated and not necessarily aligned with the 2003 National Policy on Water Supply and Sanitation, neither with the recently issued National Strategy on Rural Water Supply, Sanitation and Hygiene for 2010-2015 (key informant interviews). 'Random NGOs have put toilets and latrines here and there and this also discourages people to take the initiative to build them themselves' (key informant interview with donor's representative working on WASH).

<sup>71</sup> IDS website on Community-Led Total Sanitation ([www.communityledtotalsanitation.org/country/cambodia](http://www.communityledtotalsanitation.org/country/cambodia)).

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focuses on bringing communities and schools together to build appropriate sanitation facilities. As its success is so dependent on school directors, progress has been uneven between schools, districts and provinces. According to key informants from the donors' community, 'it is not uncommon that when latrines get broken, they are not repaired'. Budget constraints are also a challenge as there are no government funds allocated for water and sanitation in schools; funding comes almost exclusively from external sources (key informant interview).

In 2008 the MRD, in collaboration with the World Bank's Water and Sanitation Program (WSP), embarked on a market-based approach to delivering sanitation in rural areas. The concept, known as 'Sanitation Marketing', aims to increase demand for sanitation and to build private sector capacity to supply products and services. The approach was piloted from 2009 to 2011 in six districts and was later expanded to eleven districts (WSP, 2012). The design of an 'Easy Latrine' or 'ready-to-install latrine package' offered consumers the opportunity to buy a pour-flush latrine that they could install themselves.<sup>72</sup> Enterprises were encouraged to hire commissioned sales agents, who were trained in promotional tactics, to sell latrines in villages (WSP, 2012). By the end of the project, 24 enterprises had sold a total of 10,621 Easy Latrines to households. While pilot experiences have identified this as a viable approach to deal with sanitation in rural areas, they have also shown many challenges that would need to be addressed in order to scale-up the strategy. The country is currently looking for a number of innovative financing mechanisms, including consumer microfinance to facilitate up-front investment (although cheaper than typical latrines, the basic Easy Latrine marketed at \$35 – equivalent to 25% of the monthly expenditure of households in the poorest quintile). In the longer term, market support roles must be taken up by local government, which will require training, finance and support.

Behaviour change is a long-term endeavour and for change to be more effective – and for messages to be assimilated – understanding the culture of the country is vital. For instance, according to a key informant working in WASH, new strategies are taking advantage of the value of privacy and respect for the elderly in the Cambodian culture, leading them to experiment with messages such as 'your daughter is going to be seen by others' or stressing

the inconvenience it represents for the elder family members to defecate in the open.

In order to address weaknesses in the behavioural change component, the CNM/HSU developed the National Communication Strategy for the Neglected Tropical Diseases Control in Cambodia (July 2013) with technical and financial support from USAID/FHI360. The communication strategy identified three major interventions: promote advocacy, stimulate school and community dialogue, and increase knowledge. The communication strategy will use interpersonal communication (peer education, outreach education and counselling involving schools, communities and local authorities), small group activities, and the media (role plays, radio/TV drama, songs, call-in programmes, and interactive and folk media which are well understood by school children and local communities). Additionally, information, education and communication materials will be improved, with the key message being made more concise for specific diseases, and translated into ethnic minority languages. Information and dissemination channels will be built and strengthened to continuously disseminate the key messages (CNM, 2013b). This will be crucial if Cambodia is to capitalise on the gains made so far by PCT-MDA and to start envisaging reaching elimination in the medium/long term.

#### 4.4 Limited inter-sectoral collaboration with other ministries, particularly the MRD

Inter-sectoral links, particularly with the MoEYS, have been key to the success of the CNM/HSU, but links with other key ministries are still incipient. Improving relationships with the ministries responsible for WASH will be particularly important in the long term. However, such collaboration is complicated by the fact that responsibilities are distributed between various ministries whose mandates often overlap and in practice the division of responsibilities is not clear, despite the establishment of coordination systems put in place in 2007.<sup>73</sup>

In the case of NTDs, strengthening the links between the CNM/HSU, the School Health Department and the MRD's Department of Rural Health Care should be actively encouraged.<sup>74</sup> But while the MRD has been active since

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72 The project targeted existing producers of prefabricated concrete products as focal enterprises and later on entrepreneurs come on board on their own. These entrepreneurs learned how to make an 'Easy latrine', replicating the home delivery and direct sales model developed by the initial NGOs implemented project. Project staff offered short training, advice and encouragement to the self-starters and market competition. An 'Easy Latrine Easy to buy, easy to install, easy to use' marketing slogan was developed, including a product banner, branded installation instructions, and a leaflet (WSP, 2012).

73 The MRD is responsible for water supply and sanitation in rural Cambodia. Under the MRD, the Department of Rural Health Care is responsible for sanitation and hygiene promotion, as well as monitoring related services. The Department of Rural Water Supply is tasked to develop water supply for rural areas. In urban areas, the provision of drinking water and the regulation of the private sector involved in piped water systems fall under the Ministry of Industry, Mines and Energy, which oversees the Phnom Penh Water Supply Authority, which produces and supplies clean water for general uses in the city. Rural water provided by private operators or public authorities capable of full cost recovery also falls under the jurisdiction of the Ministry of Industry, Mines and Energy. The Ministry of Public Works and Transport has the key mandate for urban drainage including sewage. Other ministries such as the Ministry of Water Resources and Meteorology and the Ministry of Environment are responsible for the conservation of water resources and environmental issues. The coordination system established is the Technical Working Group on Rural Water Supply, Sanitation and Hygiene and the Water and Sanitation Sectoral Working Group, a loose coalition of water and sanitation stakeholders from government and NGOs.

74 Another ministry the CNM/HSU plans to partner with in the future is the Ministry of Women's Affairs.

1996, the ministry seems to be weak in terms of institutional organisation. According to key donor informants from the sector, it lacks the leadership and capacity to lead the sector in a coordinated way. This is further affected by the number of development partners working in the sector, who in many cases have their own agendas. There is no overall framework for coordinating all actors; a mapping activity to establish ‘who is working where’ is in only its initial stages (interview with donor’s representative).

According to UNDP and UNICEF (2007) and accounts from interviews conducted in August 2013, the institutional structures of the sector, particular at lower administrative levels where implementation takes place, are not well developed when compared to the MoH and MoEYS (see Table 9).

As a consequence, coordinating WASH and NTD activities is a challenging task. According to donors’ representatives, ‘We are struggling to link WASH with NTDS’. Very few organisations that are highly experienced in NTD programming do not have a similar level of expertise in the area of WASH and vice versa, with WASH programmes often failing to recognise the burden of NTDS. Thus, each sector tends to work towards a different set of goals (Savage et al., 2012).

In spite of the less developed institutional stage of the MRD, the rural development sector has started to receive

more attention in recent years. Development partners (mainly WSP and UNICEF) have been working with MRD to build political will and develop institutional capacity to carry out the required sector reforms. However, a clear operational plan and support for sub-national government is required, and the Rural Water Supply, Sanitation and Hygiene Sector Strategy 2010-2015 is meant to provide this guidance. The MRD has also drafted a set of National Sanitation Marketing Guidelines for sub-national government and formed a Rural Sanitation and Hygiene Sub-Working Group focused on how to bring together CLTS, sanitation marketing and behaviour change approaches and how to improve targeting and delivery of latrine subsidies. Despite these promising activities, the sector is now at a critical point where the MRD needs to consolidate the experiences and achieve a more cohesive programmatic approach to improving rural sanitation at scale (WSP, 2012). However, there is optimism in the possible linkages and coordinated activities that may emerge with the CNM/HSU based on the successful experience of horizontal integration with the MoEYS. But building stronger links between the CNM/HSU and MRD will take some time. In the meantime, MDA is the only way to keep NTDs under control.

**Table 9: National and sub-national level administrative units of MRD**

Administrative level	Ministry of Rural Development
National	MRD has 11 departments, 4 of them deal with rural water supply and sanitation
Provincial	Provincial Department of Rural Development with six sections: (i) rural water supply, (ii) rural health care, (iii) rural credit, (iv) rural roads, (v) community development, and (vi) administration and finance
District	District Office of Rural Development is weak, and where it exists often consists of only a few persons without clear responsibilities. Tonle Sap Rural Water Supply and Sanitation Sector is developing capacity at this level to help supervise field activities of that project
Commune	MRD is not officially represented at the commune level (after 2002)
Village	Village Development Committee (VDC) exists in some villages

Source: UNDP and UNICEF, 2007



Photo: © Nicolas Axelrod /RESULTS UK

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# 5. What lessons can we learn?

Building on the increasing global awareness of the importance of tackling NTDs for the achievement of broader development goals, the Cambodian experience illustrates that by tailoring international guidelines to the local context it is possible to establish an integrated, cost-effective programme to control and eliminate NTDs, even in a country recovering from conflict, with a limited health budget, and in a context of multiple health sector reforms. This case study can provide valuable lessons of horizontal and vertical integration of routine health care activities into government structures that could be replicated in other countries facing up to NTDs.

- Horizontal integration through strong collaboration between different ministries at every institutional level is not only possible but essential for rolling out a successful deworming campaign.
- Integrated NTD control can be implemented through existing government structures for cost-effective impact.
- Development partners have a role to play, not only in providing funding but also in building the technical knowledge for countries to find their own solutions.
- Continuous efforts to secure funding for NTD programmes, albeit small and fragmented, are essential to allow these programmes to implement their basic activities.

## *Horizontal integration through strong collaboration between the MoH and MoEYS*

Integrating activities between the MoH and the MoEYS, two ministries with different mandates, institutional structures and hierarchies, requires not only strong collaboration but also high-level political commitment to ensure that ministerial partnerships work smoothly, taking advantage of the comparative advantage of each institution. This is especially true for the MoEYS because it has had to take on a role outside its mandate, just as teachers have had to take on an extra task without receiving extra incentives. This tight and coordinated working partnership needs to work at every administrative level in order to ensure a successful country-wide deworming campaign, which is the main strategy implemented by the NTD Programme responding to the nationwide endemicity of STH. The primary risk group for STH is school-aged children, making schools the obvious environment in which to reach them while offering the infrastructure and personnel to support and carry out simple health interventions alongside health and hygiene education.

## *Integrated NTD control via existing government structures ensures cost-effective impact*

Cambodia has managed to integrate NTD interventions by leveraging existing government health and education structures. Complementary strategies have been carried out separately or in combination according to the geographical overlap of the diseases and the different at-risk groups targeted. Deworming at schools is complemented by integrating NTD drugs in a joint package of interventions delivered through routine outreach activities (immunisation, antenatal care, health education, family planning, tuberculosis and leprosy care, vitamin A supplements) that target pre-school-aged children, women of child-bearing age (the latter are also targeted through antenatal care visits), and everybody over two years old in provinces and districts in which SCH and LF are endemic. To ensure everyone targeted for LF and SCH is reached, special village meetings are organised once a year with village health volunteers responsible for gathering the community together. Additionally, to ensure almost everybody targeted for receiving NTDs drugs is reached, health centres and health posts also stock drugs to treat those not reached through the other approaches.

Within the MoH, the integration of health interventions that fall under different health programmes also requires tight collaboration and coordination in planning, supply management, supervision and monitoring to efficiently deliver an integrated package of activities implemented collectively by a number of actors working at different institutional levels.

Integrating NTD interventions into existing structures has made the most of scarce resources while at the same time allowing for reaching as many targeted people as possible. It is efficient in terms of staff time and training contributing to the cost-effectiveness of the programme since the logistics and the personnel are already in place.

## *Development partners have a role to play in transferring technical knowledge and building local ownership*

While local engagement is crucial to developing an NTD programme, there is an important transitional role for development partners in building technical knowledge and providing access to strategies and guidelines on how to deal with NTDs until the local capacity is fully developed. National-level partnerships provided the initial technical assistance that eventually led to a

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gradual transfer of knowledge. This was done by jointly piloting the adaptation of international guidelines and recommendations to the local context while at the same time allowing the local management and staff to familiarise themselves with the possible problems and develop their own solutions. In this way the programme could gradually grow and improve through time and exposure to the different activities leading to a ‘transfer of ownership’.

The strong commitment of the CNM/HSU management, identified as a champion for NTDs, proactively pursued the development of partnerships with an array of donors. Its engagement in the broader reform process ensured that the essential elements of NTD control were integrated into the restructured health services. The integration of NTD activities at every administrative level helped transfer knowledge and ownership from central to provincial and district levels, with staff becoming more and more efficient while being progressively trained in different aspects of the programme.

As other programmes in the region pass through similar experiences, regional partnerships start playing a bigger role, not just to eventually achieve elimination of NTDs, which requires countries to coordinate activities in border areas, but also because they face their own challenges and become more knowledgeable about the specific challenges they face, they are able to share experiences and learn from each other. Regional partnerships are also important for carrying out joint advocacy initiatives to secure funding through the WHO’s Regional Office for the Western Pacific. Global partnerships have been also crucial for facilitating drug donations and coordinating, supporting and supervising activities among countries.

### ***Continuous multiple outreach efforts can help to secure funding and drug donations***

Despite a growing economy and increased budget allocations for the MoH, the CNM/HSU is heavily

dependent on small, fragmented funding streams from an ever-changing landscape of donors. Until its recent incorporation in the USAID NTD Programme, to ensure uninterrupted drug supplies and funding to cover operational costs the programme has made continuous efforts to ensure the ongoing engagement of multiple donors that contributed to different components and activities. This small but crucial stream of funds has covered the minimal operational costs that have allowed the MDA campaigns to eventually expand to every administrative district, making the Cambodian NTD programme one of the largest deworming programmes in the region at a very low cost. Drug donations have also been crucial in enabling the country to provide NTD services free of charge.

While external funding and drug donations have made the programme possible, the Cambodian government has demonstrated how a significant and sustained effort to network with multiple parallel funders pays off. The CNM/HSU has had the managerial skill to live with this fragmentation and to work with multiple small external partnerships, which also takes significant effort. In spite of its challenges, this scenario also ensures a minimum continuity of resources while reducing the risk of a breakdown in services. However, the government also needs to be prepared – and able – to step in when necessary. The willingness of the government to step in to buy medicines at market price to maintain MDA where necessary is particularly noteworthy, as is the pro bono time put in by teachers and other government staff. Other countries with NTD burdens presumably face similar funding scenarios, so Cambodia’s experience provides useful lessons not on how to avoid fragmentation but how to live with it and to invest in those relationships, even though they can be frustrating.



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This publication is based on research funded by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

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