

National Programme for the Control of Schistosomiasis and Intestinal Helminthiasis



Towards elimination of Schistosomiasis and Soil-Transmitted Helminthiases in Cameroon

A road map for paradigm shift 2021-2030



Acknowledgements

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Edited by Professor Louis-Albert TCHUEM TCHUENTE

Schistosomiasis and soil-transmitted helminthiases are neglected tropical diseases that affect poor rural communities but have also spread to urban areas. In Cameroon, they impose a devastating human, social and economic burden on more than 10 million people.

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Abbreviations and acronyms

ALB:	Albendazole
CAA:	Circulating Anodic Antigen
CCA:	Circulating Cathodic Antigen
CLTS:	Community Lead Total Sanitation
CSP:	Centre for Schistosomiasis and Parasitology
DHIS:	District Health Information System
ESPEN:	Expanded Special Project for Elimination of Neglected Tropical Diseases
FGS:	Female Genital Schistosomiasis
GIS:	Geographic Information System
GSK:	GlaxoSmithKline
HIV:	Human Immunodeficiency Virus
HMIS:	Health Management Information Systems
J&J:	Johnson & Johnson
MDA:	Mass Drug Administration
MINADER:	Ministry of Agriculture and Rural Development
MINCOM:	Ministry of Communication
MINEDUB:	Ministry of Basic Education
MINEE:	Ministry of Water Resources and Energy
MINESEC:	Ministry of Secondary Education
MINSANTE:	Ministry of Public Health
MBD:	Mebendazole
NGDO:	Non-Governmental Development Organization
NTD:	Neglected Tropical Diseases
PC:	Preventative Chemotherapy
PNLSHI:	Programme National de Lutte contre la Schistosomiase et les Helminthiases Intestinales (National Programme for the Control of Schistosomiasis and Intestinal Helminthiasis)
POC:	Point of Care
PRESAC:	Pre-School-aged Children
PZQ:	Praziquantel
SAC:	School-aged Children
SCH:	Schistosomiasis
STH:	Soil-Transmitted Helminthiasis
USAID:	United States Agency for International Development
WASH:	Water, Sanitation and Hygiene
WHO:	World Health Organization

Foreword



It has been 15 years since Cameroon launched its first strategic plan for the control of schistosomiasis and intestinal helminthiasis. Over the years, significant progress in the control of these diseases has been realized across all ten Regions of the country, as summarized in the Progress Report 2003-2019 published in August 2020.

However, the report also showed that there remain several challenges to reach the elimination target.

In February 2020, I chaired the tenth statutory meeting of the National Schistosomiasis and Intestinal Helminthiasis Control Committee in Cameroon. Based on scientific evidence, the epidemiology of transmission and the risks of schistosomiasis re-emergence after stopping treatment, the Committee endorsed the need for the country to work for elimination and not to be limited to the control of these parasitic diseases.

The Committee therefore unanimously reiterated Cameroon's commitment to the elimination of schistosomiasis and intestinal helminthiasis. Hence, the Committee urged the Programme to

develop adequate strategies for the elimination of schistosomiasis and intestinal helminthiasis, with a strong emphasis on the harmonization of data collection, increased communication and awareness, increased ownership by stakeholders, parents, and communities, and strengthening of health districts for the implementation of activities.

This road map 2021-2030 builds on the experiences

and lessons learned and the momentum of the past fifteen years. The document provides a framework for understanding our new strategy. It also gives a snapshot of where we stand and will serve as a signpost for action in the coming years as we strengthen the efforts of partners, donors, and communities in this

final stretch towards achieving the elimination goals.

This road map is a call to action for all stakeholders to align their strategies and plans towards the prevention of infections and alleviation of the suffering of people affected by schistosomiasis and intestinal helminthiasis in Cameroon.

«This Road map will strengthen programme and country ownership in line with the WHO NTD Road map vision»

Dr. Manaouda Malachie
Minister of Public Health
Cameroon

Summary: Targets and milestones for Schistosomiasis and STH elimination road map in Cameroon

Programmatic actions / Strategic actions	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1. Complete precision mapping	Conduct precision mapping surveys									
2. Expand access to treatment	Scale-up and expand access to treatment to all populations in need									
	Advocate to increase access to medicines and to ensure provision of sufficient quantities of Praziquantel and Mebendazole or Albendazole									
		Treat all SAC, Pre-SAC and Adults in all Health Areas eligible for schistosomiasis and/or STH MDA								
		Ensure that medicines are available in health facilities and pharmacies throughout the year to allow treatment of those in need								
3. Strengthen health system operational capacities		Build capacity of health districts on implementation: planning, resource mobilization, monitoring and evaluation								
	Improve the facility based reporting of cases via HMIS: Data collection through DHIS-2									
	Laboratory capacity: Build capacity of health district laboratory technicians in diagnosis and epidemiological data collection									
	Train and establish pools of technical laboratory experts on schistosomiasis and STH									
4. Intensify multi-sectoral actions	WASH interventions: Develop synergies for access to clean water (including construction of boreholes), behavior change, improvement of sanitation and hygiene									
	Snail control: Conduct mapping of snail distribution in selected schistosomiasis endemic health districts, and implement focused snail control									
5. Monitoring and evaluation	Advocate for continued mapping and re-assessment of the burden of schistosomiasis and STH at all levels									
	Establish a system for routine monitoring of control implementation and updating of databases and the Atlas of schistosomiasis and STH transmission									
	Establish and update health district and health area scorecards									
	Conduct Research and Innovation: Role of Pre-SAC and adults in sustaining transmission; Variability and seasonality of transmission in relation to the efficacy of treatment; Assess the magnitude of female genital schistosomiasis (FGS), etc.									
						Impact surveys				
6. Advocacy and funding	Advocate for adequate financial resources									
	Advocate to increase access to medicines (Praziquantel, Mebendazole, Albendazole)									
7. Encourage country and community ownership	Develop communication strategies addressing key audiences	Involve communities in snail control and snail monitoring								
	Develop a comprehensive national policy on schistosomiasis and STH elimination, with key complementary interventions									
	Advocate for improved water and sanitation, with a link to water development projects									

Targets and milestones for Schistosomiasis and STH elimination in Cameroon

At a glance - A roadmap for paradigm shift 2021-2030

2022

Short term

- **Precision mapping completed**
- **Access to treatment expanded to all populations in need**
- Medicines available in sufficient quantities
- **Operational capacities strengthened at all levels for data collection through DHIS-2**
- Communication strategies addressing key audiences developed
- A comprehensive national policy on schistosomiasis and STH elimination, with key complementary interventions, developed
- **Adequate financial resources mobilized**

2025

Medium term

- Laboratory capacity of health district technicians built for schistosomiasis and STH diagnosis and epidemiological data collection
- **A system for routine monitoring and evaluation established**
- Mapping database and Atlas of schistosomiasis and STH transmission updated
- **Scorecards of health district and health area endemicity established and updated**
- Impact surveys conducted

2030

Long term

- **All SAC, Pre-SAC and adults treated in all health areas eligible for schistosomiasis and/or STH MDA**
- Data collected through DHIS-2 in all health areas
- WASH interventions implemented
- **Snail mapping and snail control implemented in selected schistosomiasis endemic health districts**
- Impact surveys and programme evaluation conducted
- **Operational research and innovation conducted, including FGS**



«The National Schistosomiasis and Intestinal Helminthiasis Control Programme is a flagship programme. It is one of the most active programmes at the Ministry of Public Health that gives tangible results with clear impacts»

His Majesty Alim HAYATOU

*Secretary of State to the Ministry of Public Health
in charge of the Fight against Epidemics and Pandemics*



«The World Health Organization appreciates the high quality work that is being done. This road map is extremely important for Cameroon because it aims to eliminate schistosomiasis and intestinal helminthiasis. One of the important pillars of this road map is the multisector action to achieve the well-being of our populations. I reaffirm WHO's commitment to strengthen advocacy and help the Ministry of Public Health mobilize the necessary resources to implement this ambitious road map»

Dr Phanael HABIMANA

World Health Organization Representative in Cameroon

I. Introduction

On the 12th November 2020, the new WHO road map for neglected tropical diseases (NTDs) 2021-2030 was endorsed by Member States at the Seventy-third World Health Assembly. This road map was officially launched by WHO on the 28th January 2021. The NTDs prioritized by WHO are a diverse set of 20 diseases. The road map sets out global targets and actions to align and re-focus the work of countries, partners and stakeholders during the next decade, including cross-cutting targets aligned with the Sustainable Development Goals.

Two targets are set for schistosomiasis (SCH) and soil-transmitted helminthiases (STH):

(i) **Elimination as a public health problem**, defined as achievement of < 1% proportion of heavy intensity infections for SCH, and < 2% proportion of infections of moderate and heavy intensity for STH.

(ii) **Interruption of transmission (elimination)**, defined as reduction to zero of the incidence of infection in a defined geographical area, with minimal risk of reintroduction.

Schistosomiasis is a parasitic disease caused by infection with *Schistosoma* trematodes. Human schistosomiasis is caused by six species of *Schistosoma*: *S. mansoni*, *S. japonicum*, *S. mekongi*, *S. guineensis*, *S. intercalatum*, and *S. haematobium*. Transmission occurs through contact with water infested with larval forms (cercariae) that develop in freshwater snails, the intermediate host. Inadequate sanitation increases the risk of transmission.

There are two main types of the disease, as defined by WHO (2020):

- **Intestinal schistosomiasis**, the signs of which are abdominal pain, diarrhoea, blood in the stool, and, in advanced stages, enlargement of the liver and spleen, fibrosis, portal hypertension and fluid accumulation in the peritoneal cavity; and
- **Urogenital schistosomiasis** (*S. haematobium* only), the signs of which are bloody urine, fibrosis of the bladder and damage to the ureter and kidneys; genital forms manifest as pain in the testis and bloody semen, abdominal and pelvic pain in women, pain during intercourse, ectopic pregnancies and infertility; association with HIV transmission has been demonstrated in co-endemic areas.

Soil-transmitted helminthiases are caused by infection with intestinal parasites (*Ascaris lumbricoides*, *Trichuris trichiura*, *Necator americanus*, and *Ancylostoma duodenale*). Infection results in anaemia, malnutrition, impaired physical and cognitive development, abdominal pain, and diarrhoea. Transmission occurs through eggs or larvae in faeces, which contaminate soil in areas with poor sanitation.

These diseases affect poor rural communities, suburb, and urban areas. They constitute a major public health problem; impose a devastating human, social, and economic burden; and cause significant morbidity, particularly in school-aged children who are the most vulnerable and most affected group.

Between 2006 and 2019, 122 million cumulative treatments have been delivered for SCH and STH. These treatments have led to significant drops in infection levels in Cameroon, reaching up to 90% overall reduction of STH prevalence and 70% overall reduction of SCH prevalence. An overall 87% treatment coverage of school-aged children was achieved (Figures 1 and 2).

Where are we now?

In Cameroon, the first country-wide assessment of the burden of schistosomiasis and STH was conducted in 1985-1987. The surveys showed that STH were widely distributed across the country, while schistosomiasis was predominant in the three northern Regions, i.e. Adamawa, North, and Far-North. More specifically, school-aged children were primarily infected and polyparasitism was frequent, with many children co-infected with at least two species of STH and schistosomiasis. It was estimated that more than 2 million Cameroonians were infected with bilharzia and more than 10 million with intestinal worms.

Taking advantage of the renewed momentum for schistosomiasis in early 2000, the National

Programme for the Control of Schistosomiasis and Intestinal Helminthiasis in Cameroon was created on 11 March 2003 and was officially launched on 25 March 2004. Starting with very limited resources, the programme gradually mobilized national and international partners and has benefited from USAID NTD Program support between 2010 and 2017. This support, together with drug donation from Johnson & Johnson and Merck, through WHO, has boosted and enabled significant accomplishments. The most important accomplishments are summarized in the 2003-2019 progress report published in August 2020 (PNLSHI, 2020).

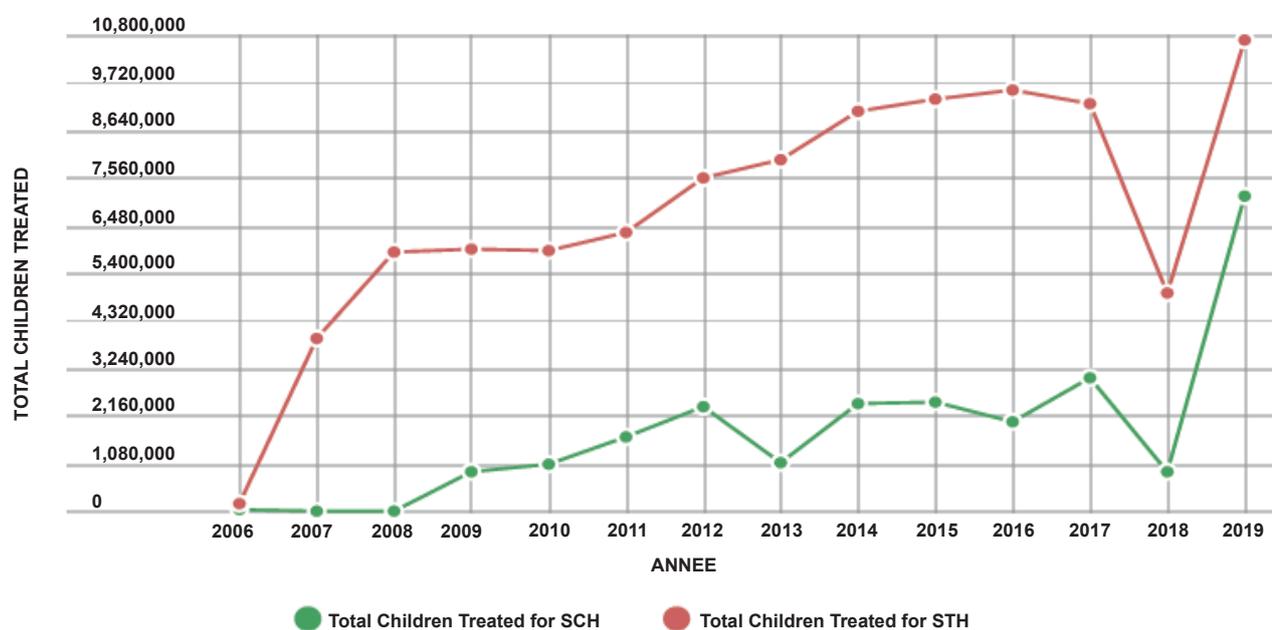


Figure 1. Evolution of the number of children treated for schistosomiasis and STH in Cameroon between 2006 and 2019.

Progress by the Numbers

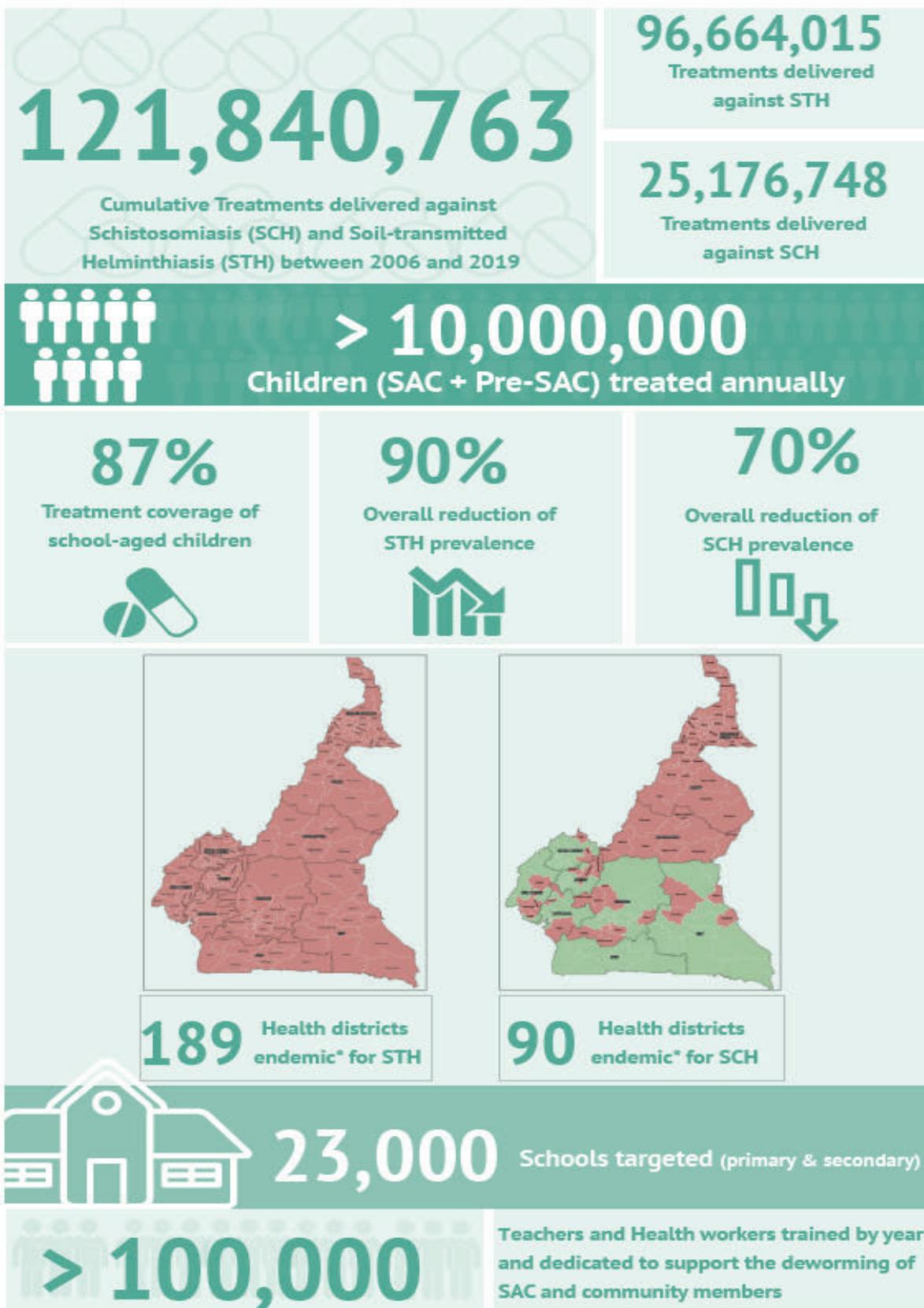


Figure 2. Progress in the control of schistosomiasis and STH in Cameroon.

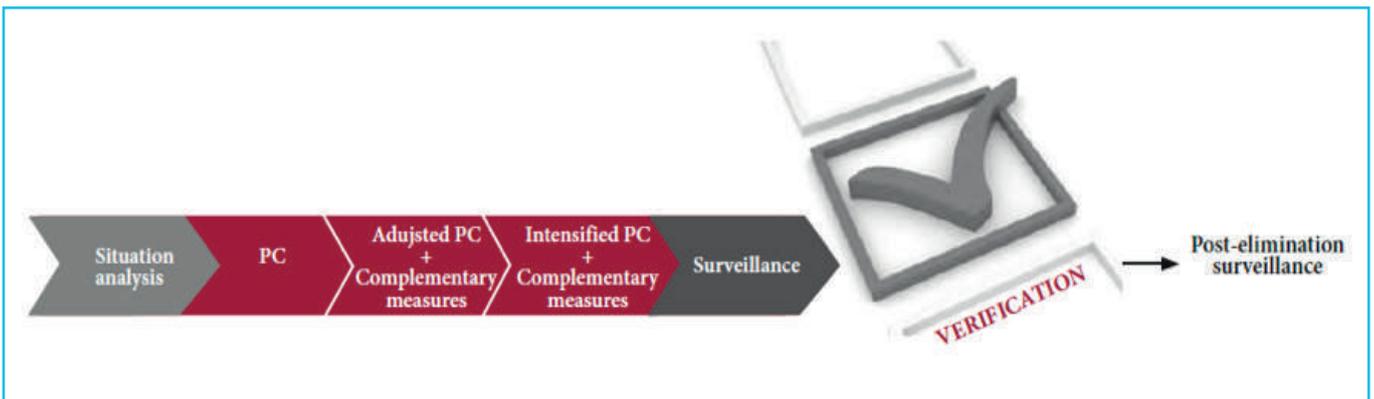


Figure 3. Programmatic steps to control and eliminate schistosomiasis (WHO, 2013).

What are we going to do?

In 2017, Cameroon committed to the elimination of schistosomiasis and STH. Therefore, the goals of the programme are successively:

- **Elimination of schistosomiasis and STH as a public health problem (control of morbidity).**
- **Interruption of transmission of schistosomiasis and STH (elimination).**

These ambitious goals lead to several challenges and requirements. Indeed, as recommended by WHO (2013), when a programme progresses towards elimination, activities should be gradually reorganized such that more robust means are deployed in progressively smaller areas of residual transmission. Such a “final push” approach relies on both preventive chemotherapy and the implementation of complementary public-health interventions. These complementary public-health interventions include health education for

behavioural change, provision of safe water and sanitation, environmental management, and snail control (Figure 3).

The present road map for paradigm shift 2021-2030 was developed to accelerate progress towards the elimination of these two neglected tropical diseases. This road map is aligned with the Cameroon health sector strategy, the national development strategy 2020-2030, the sustainable development goals, and the WHO road map for NTDs 2021-2030.

The road map outlines specific and measurable targets for 2030 with interim milestones for 2023 and 2025. In the vision of eliminating schistosomiasis and STH, the intensification of interventions to be implemented within the framework of the new road map revolves around specific objectives and programmatic actions.

The road map is expected to encourage the fundamental paradigm shift in the approach to tackling schistosomiasis and STH by:

- ***moving from a control to an elimination approach;***
- ***paying more attention to complementary public health interventions;***
- ***intensifying country and community ownership of the program and mainstreaming program into the health system; and***
- ***allocating more resources as the elimination of these diseases requires more investment in human resources, health education, environmental improvement, equipment, and infrastructures.***

Complete precision mapping

Expand access to treatment

Strengthen health system operational capacities

Encourage country and community ownership



**PROGRAMMATIC
ACTIONS**

Intensify multi-sectoral actions

Advocacy and funding

Monitoring and evaluation

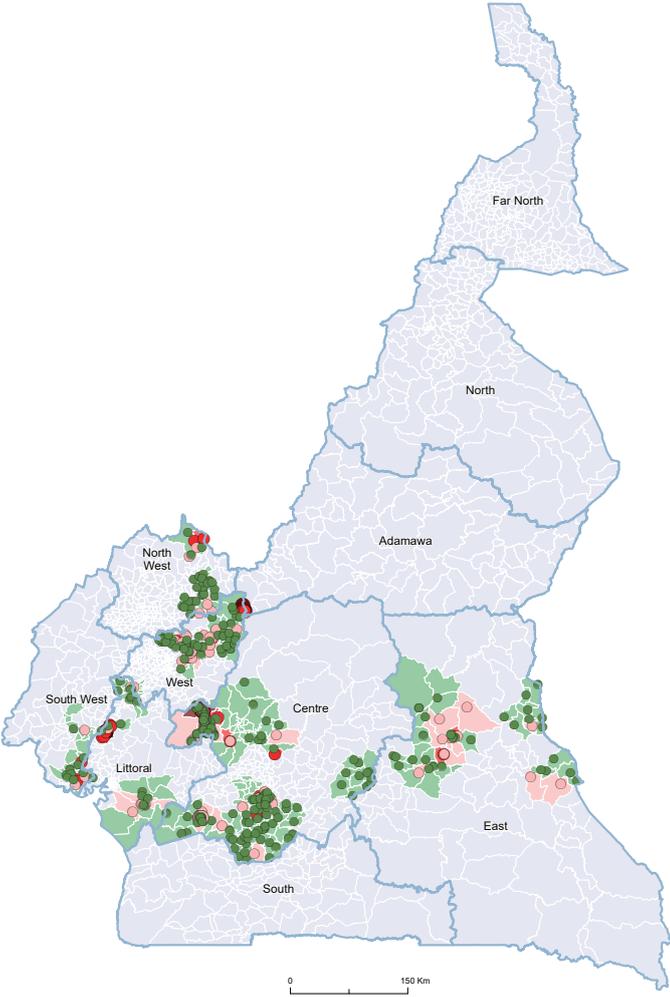
Programmatic Actions towards the Elimination of Schistosomiasis and STH in Cameroon

II. Programmatic actions

To achieve the 2030 road map targets, the following critical actions should be implemented:

1. Complete precision mapping
2. Expand access to treatment
3. Strengthen health system operational capacities
4. Intensify multi-sectoral actions
5. Monitoring and evaluation
6. Advocacy and funding
7. Encourage country and community ownership

II.1. Complete precision mapping



Where are we now?

The mainstay of current schistosomiasis and STH control is preventive chemotherapy (PC) with praziquantel, mebendazole and albendazole, targeting school-aged children, based on the disease endemicity within a subset of surveyed schools classified according to parasitological prevalence and the intensity of infections (WHO, 2006). However, recent studies have shown that the current conventional mapping design for schistosomiasis has several limitations and lead to several uncertainties and misclassification of some districts and their eligibility for PC. These inaccuracies prevent successful PC coverage of all populations that need treatment and, therefore, jeopardize the achievement of schistosomiasis elimination (Tchuem Tchuente et al., 2017). Indeed, due to the high focality of schistosomiasis transmission and its dependence on several environmental and epidemiological factors, there is a significant difference in infection rates between subsets and schools within the same health districts. Therefore, using a few schools to decide treatment for an entire district leads to uncertainty and errors if site selection and sampling are not conducted properly. At risk communities may not be treated while others may be over treated.

To ensure that medicines are used effectively and delivered to those that need them, WHO/

ESPEN conducted sub-district level analysis using spatial prevalence data supplemented by GIS technology district by district, to describe districts that should adjust their implementation strategy to shrink the country schistosomiasis map. Taking into consideration the lack of sub-district data in several African countries, ESPEN developed data quality and decision trees to guide countries for the refinement of schistosomiasis endemicity at sub-district level, using environmental suitability and local knowledge on disease epidemiology (Figure 4).

More recent studies conducted in Cameroon have demonstrated that **precision mapping** of schistosomiasis can complement sub-district level analysis, and maybe essential to move from disease control towards interruption of transmission in sub-Saharan Africa. Precision mapping involves sampling at a much finer geographical resolution, potentially examining all schools within every subunit (lowest administrative or health sub-division level) in each implementation unit in order to eliminate errors caused by variation in schistosomiasis rates (Tchuem Tchuente et al., 2018). This study produced detailed information on high-risk locations where intensified interventions should be focused to obtain higher impact, but also pinpointed areas of lower prevalence where drug needs could be significantly reduced.

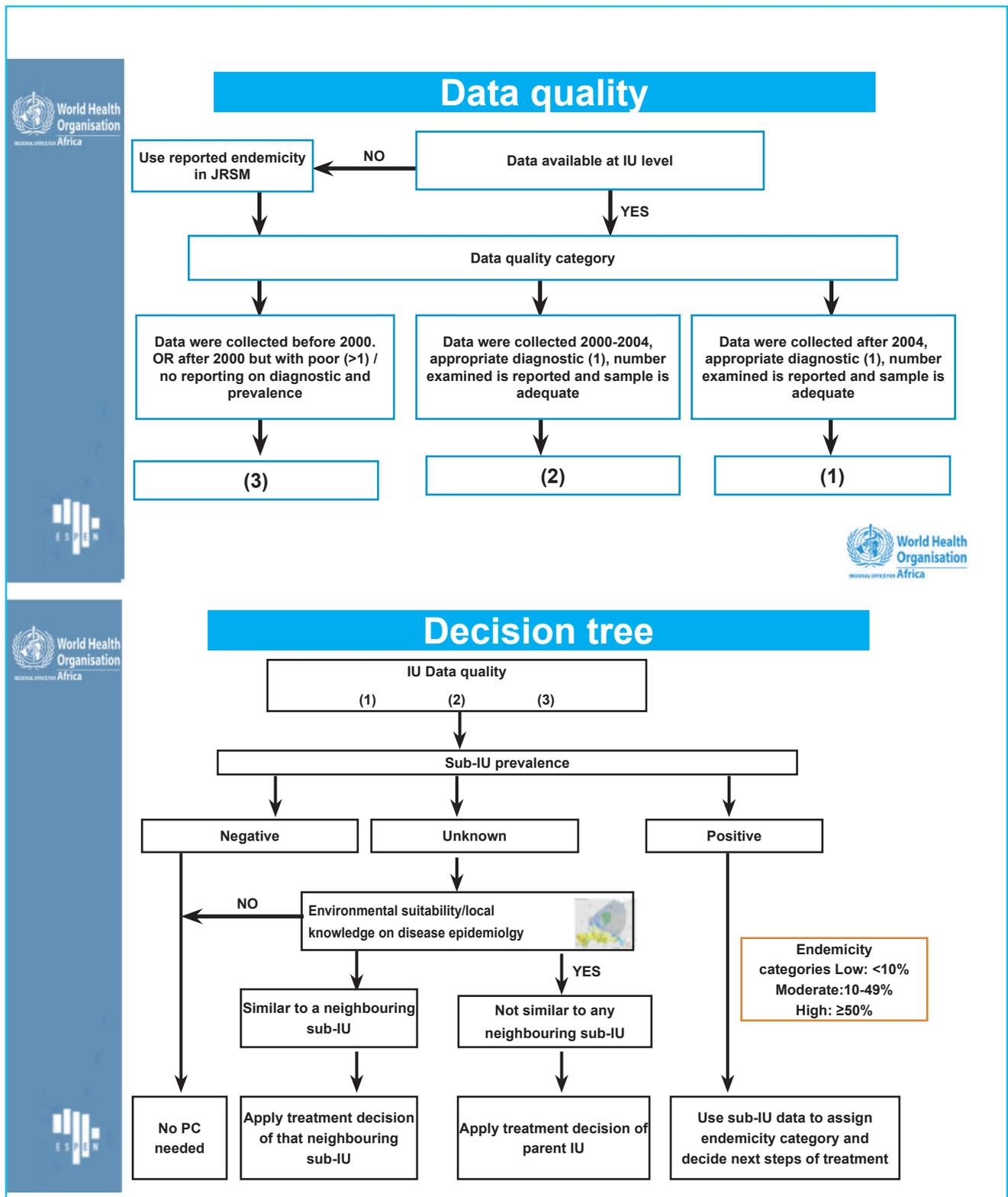


Figure 4. Data quality and decision trees to guide assessing the sub-district endemicity based on schistosomiasis data available at district level (WHO ESPEN, 2020).

Mapping gaps: Why should we conduct precision mapping?

The mapping situation in Cameroon was thoroughly analysed, taking into consideration the data available since 1985. The results, summarized in Table 1, show that over the total 1,798 health areas in Cameroon, 971 (54%) were never mapped so far. A total of 353 (20%) health areas were mapped in 1985, 507 (28%) in 2010, and 311 (17%) in 2018. Several health areas were mapped twice or thrice.

As disease transmission is dynamic and considering the variation of endemicity level over

years, especially in settings under preventive chemotherapy, it is recommended to regularly monitor the situation by updating mapping every 3 to 5 years. However, the last nationwide mapping surveys in Cameroon were conducted during 2010-2012. Therefore, taking into consideration the age of the data, it appears that the districts mapped in 2010-2012 are over due for a new survey, and **only those 311 health areas mapped in 2018 should be considered as updated for mapping.** The extent of mapping gaps is summarized in Table 1 and illustrated in Figure 5.

Table 1. Number of health areas mapped during past surveys and mapping gaps in Cameroon.

Regions	Number of Health districts	Number of Health areas	Number of Health areas mapped in 1985	Number of Health areas mapped in 2010	Number of Health areas mapped in 2018	Number of Health areas never mapped	Number of Health areas to map
Adamawa	9	89	33	38	0	42	89
Centre	30	284	88	92	121	87	163
East	14	114	43	59	42	31	72
Far-North	30	288	52	121	0	158	288
Littoral	24	188	35	25	27	126	161
North	15	151	31	64	0	82	151
North-West	19	227	6	18	32	175	195
South	10	104	26	16	0	71	104
South-West	18	117	1	19	24	79	93
West	20	236	38	55	65	120	171
TOTAL CAMEROON	189	1 798	353	507	311	971	1 487
Percentage (%)			20%	28%	17%	54%	83%

The mapping gaps is estimated at 1,487 health areas over 1,798, which represents 83%. There is an urgent need to complete the distribution map of schistosomiasis and STH in all health areas of Cameroon.

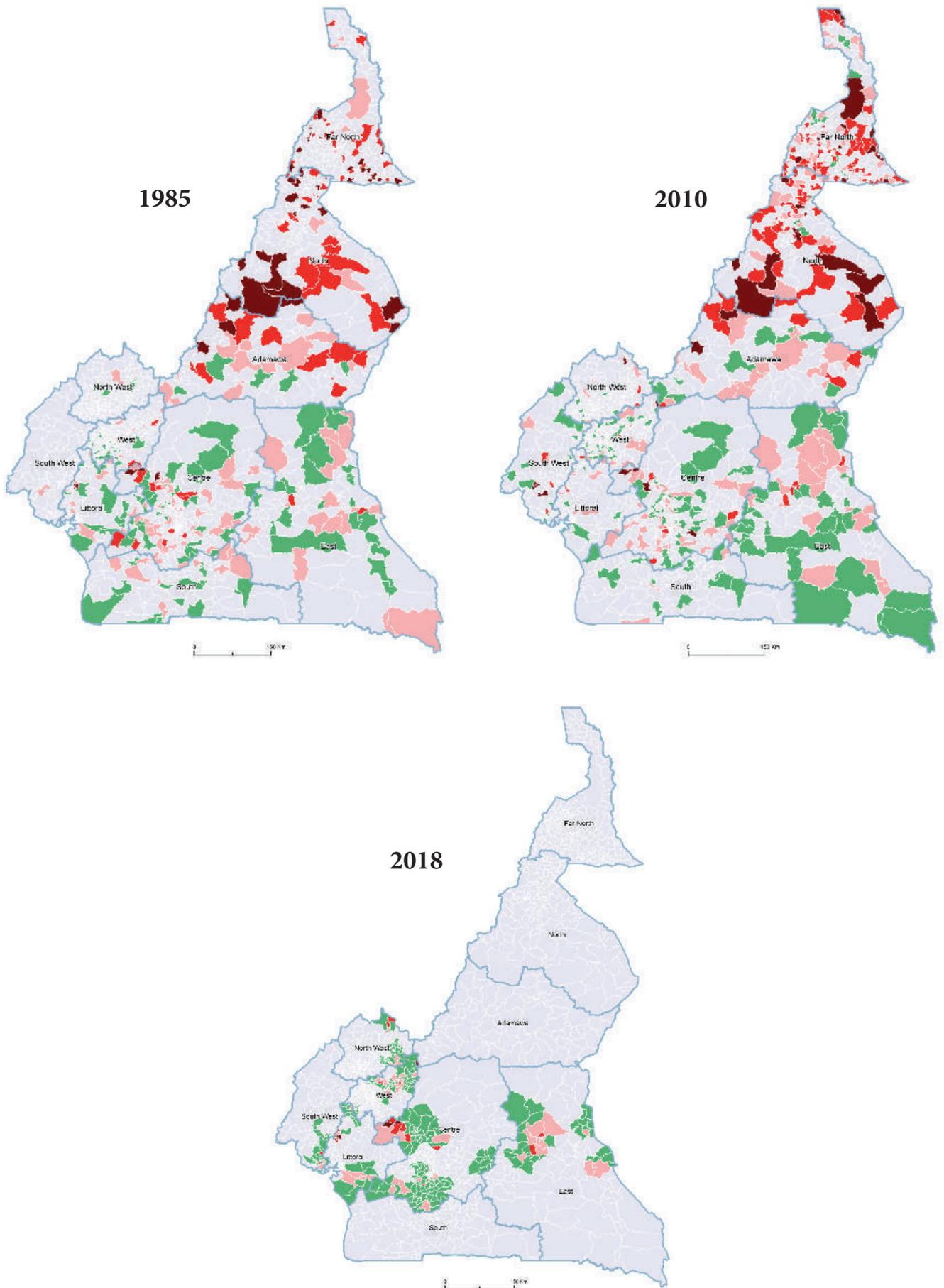
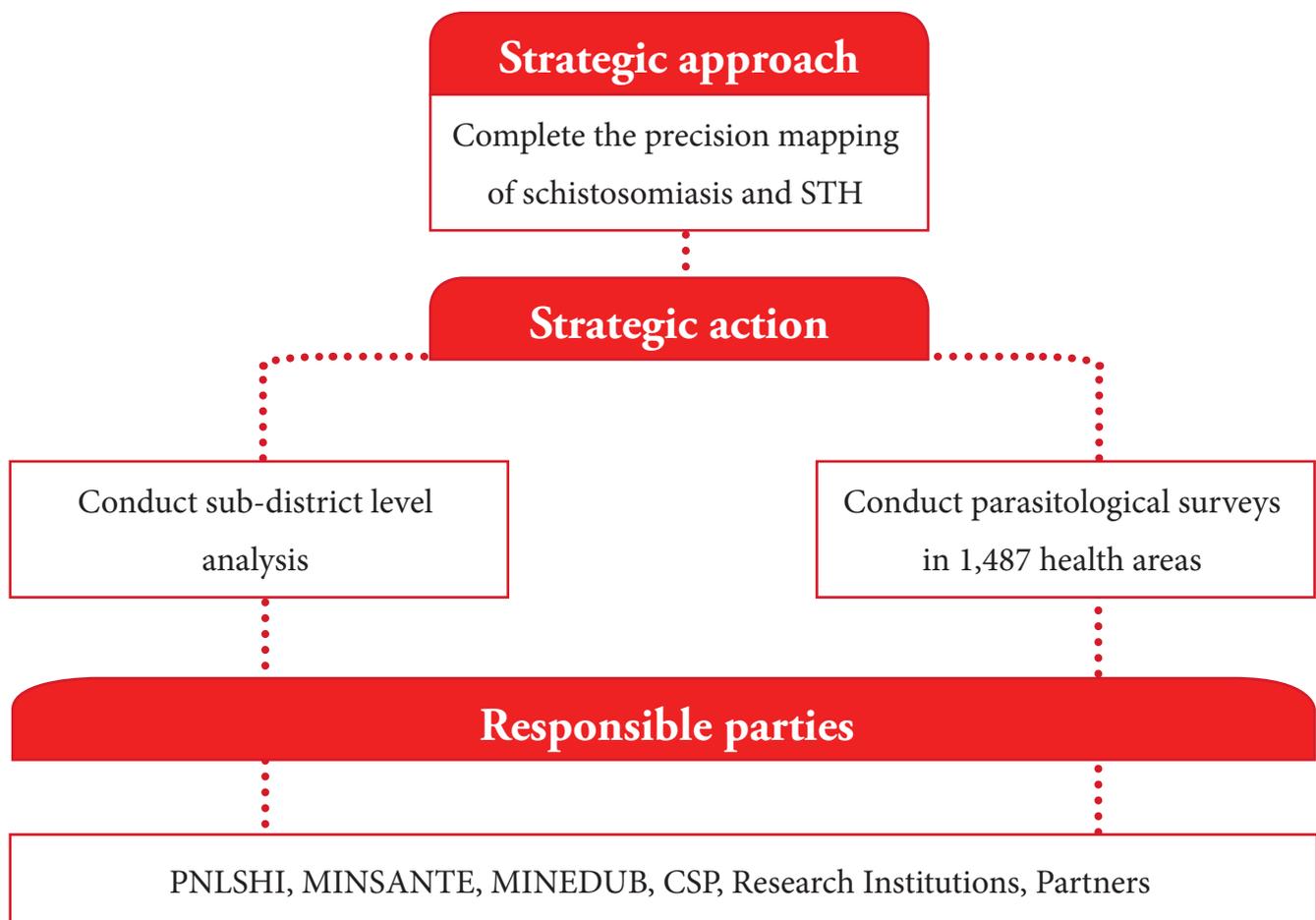


Figure 5. Maps of the distribution of schistosomiasis by health areas from surveys conducted in 1985, 2010 and 2018. The grey color corresponds to health areas without data, and illustrates the mapping gaps.

What are we going to do?

Precision mapping can generate the best evidence-based data to guide intensified interventions in targeted transmission zones. This allows for better and rational utilization of the donated praziquantel and available resources. By shrinking the map, the programme will optimally allocate resources to achieve a more rapid and sustained impact on schistosomiasis.

For the road map, the priority action is to complete sub-district level analysis and precision mapping to assess the detailed landscape of schistosomiasis and STH.



II.2. Expand access to treatment



Where are we now?

Although significant progress has been made over the past years to regularly implement MDA in all endemic health districts in Cameroon, the achievement is still distant from the country's target of disease elimination. School-based deworming interventions do not cover all children at risk despite the low cost of preventive chemotherapy and their significant impact on health.

To reach the schistosomiasis and STH elimination target, **there is an urgent need to expand treatment to all individuals at risk, including specific adult populations such as fishermen.** This extension of preventive treatment for schistosomiasis and STH remains a serious challenge and should be conducted at several levels.

There is a need to:

1. **Accelerate the scaling up of mass drug administration** to reach 100% of school-aged children (both enrolled and out-of-school) in all endemic areas of Cameroon.
2. **Extend treatment to the maximum number of preschool-aged children.** Children aged < 5 years are dewormed for STH during integrated vaccination campaigns. However, they are not targeted for schistosomiasis yet, because of a lack of suitable paediatric formulations of praziquantel. It becomes urgent to recognize the need for treating preschool-aged children as they can be

already infected through passive water contacts sometimes at alarming levels.

3. **Extend preventive chemotherapy to adult populations.** The available donated drugs were for school-aged children primarily, and therefore adults, especially high-risk populations such as fishermen, irrigation workers, and women were not treated during deworming campaigns. The risk factor of urogenital schistosomiasis for infection by HIV in women has been clearly demonstrated. Therefore, adolescent girls and women require treatment with praziquantel in areas endemic for *S. haematobium* more frequently than in non-endemic areas, to reduce the risk of development of genital lesions.
4. **Reach hard to reach and vulnerable communities.** These include communities that are poorly served by local health services, roads, and transport facilities, itinerant fishing and nomadic communities, seasonal migrants, peri-urban settlers, and those unwilling to accept health interventions (systematic non-compliers). There are also areas inadequately covered with preventive chemotherapy due to insecurity and conflict such as the North-West and South-West Regions.

What are we going to do?

The road map calls for the urgent need to:

1. **Extend preventive chemotherapy to all populations who need treatment**, inclusive of preschool-aged children, school-aged children, and adults. This is a prerequisite to achieving the elimination goal. Treating all those at risk or contributing to transmission will significantly reduce schistosome reservoirs in the communities and accelerate the interruption of parasite transmission. Furthermore, medicines should be made available in health centers, treatment stations, and pharmacies throughout the year to allow that all those who seek treatment can receive it at any time (and not only during deworming campaigns).
2. **Adapt treatment to transmission dynamics**. Schistosomes have a complex life cycle that requires a freshwater snail intermediate host and a vertebrate definitive host in which the parasites can undergo development. This ties transmission to landscapes where people and snails come together at the same water habitat. The success of the transmission depends on numerous factors, including biotic and abiotic features, such as climatic, physical and chemical factors that affect the survival and development of schistosome parasites and snail host populations as well as socioeconomic and behavioural characteristics of the human community such as water contact behaviour and the adequacy of water and sanitation, which affect the frequency and intensity of exposure to infected water. The disease transmission is highly focal, and the endemicity varies significantly from one locality to another, and from one health district to another. It is well known that the patterns and dynamics of transmission of schistosomiasis present tremendous complexity and variability between different foci and even within the same foci. The most significant determinants are water contact patterns, sanitation, hygiene level and the abundance and susceptibility of freshwater snail hosts. The existence of schistosome hotspots – i.e. transmission areas where

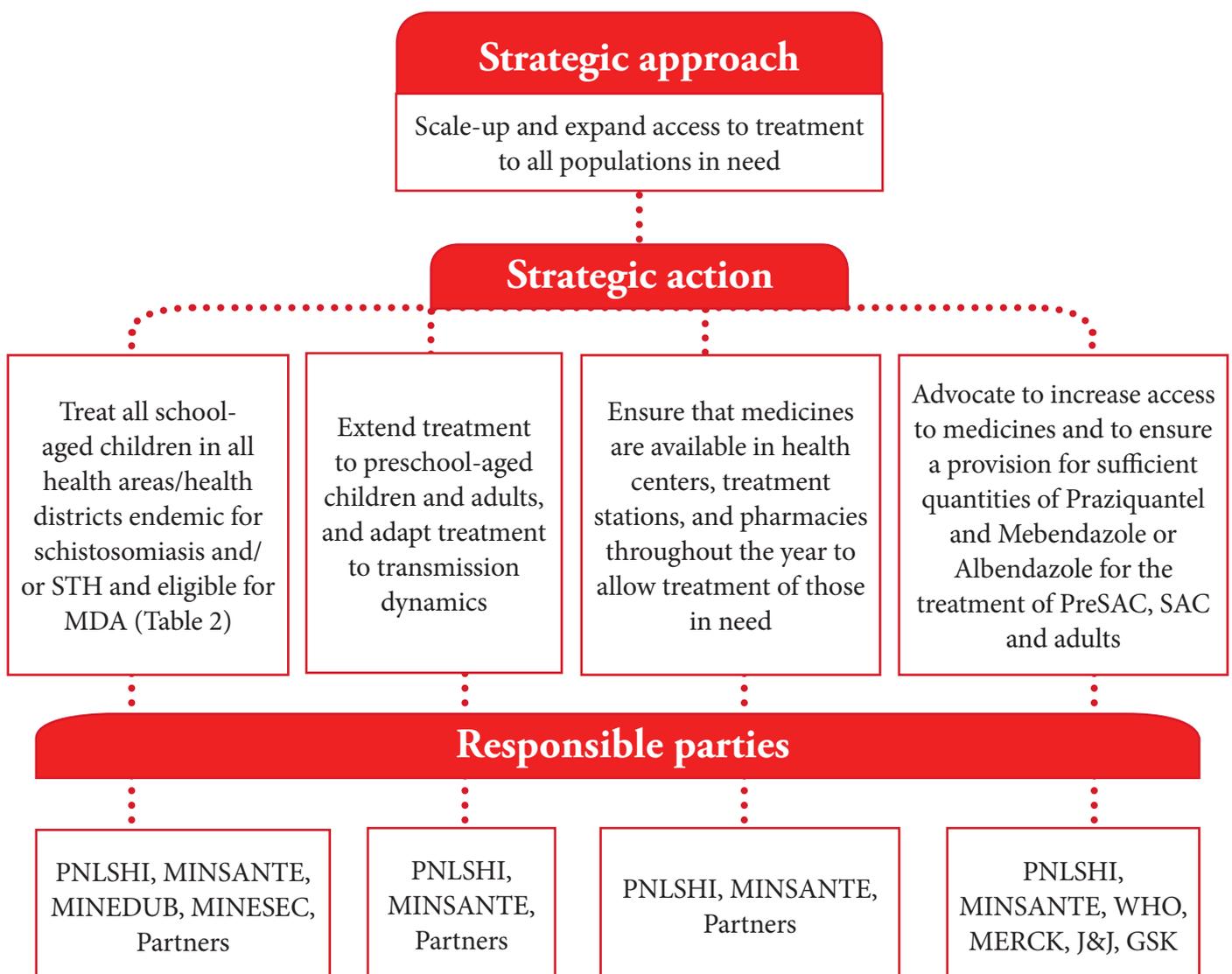
prevalence and intensities remain high despite repeated rounds of mass drug administration – has been demonstrated in several settings in Cameroon (Tchuem Tchuente et al., 2013). For example, schistosomiasis hotspots are observed in several localities around lakes and dams such as Barombi Kotto in the South West Region and Malantouen in the West Region, where water contacts are highly intense and lead to high reinfection patterns. In these foci, the prevalence rapidly returns near to the initial level within 6–12 months post-treatment. To be efficient in such hotspots, preventive chemotherapy should be repeated more frequently, at least twice per year. There is therefore a need to adapt treatment strategies to the different types of transmission settings

3. **Redefine disease endemicity and eligibility for MDA**. The eligibility of health districts for MDA implementation is determined by the disease endemicity levels which are generally estimated by the disease prevalence. Previously, the disease prevalence of the district was calculated as the mean prevalence of all samples from each district. The district was then classified as a non-endemic, low, moderate, or high-risk area. With a mixture of low and high prevalence within some districts, considering only the mean prevalence may lead to an underestimation of the disease occurrence, resulting in their exclusion for treatment. For example, a district with one school having 49% prevalence and four schools exhibiting 0% prevalence each, will have a mean prevalence of 9.8%. As this mean prevalence is below 10%, this district will be classified on the map as not eligible for mass drug administration. The consequence would be that in parts of this district populations will suffer for schistosomiasis and its morbidity without intervention from authorities. Therefore, it is necessary for the program to have the detailed distribution of the disease at the various sub-districts and schools' levels

to guide treatment decisions and avoid misclassifications. To adequately assess the implementation unit endemicity levels, our new approach is a careful analysis of individual point data, combining minimum, mean, and maximum school prevalences per sub-district and health district.

4. **Change treatment thresholds.** With the paradigm shift from control to elimination, the current recommended treatment strategy and treatment threshold for interventions is not compatible with the permanent interruption of transmission. Schistosomiasis, in particular, is a dynamic disease, and prevalence within communities can change rapidly from year to year. Thus

contamination of a water body by a few remaining infected individuals can give rise to outbreaks of disease that need to be quickly contained. WHO recommends that after achieving morbidity control, preventive chemotherapy should be appropriately adjusted to the new epidemiological conditions by lowering the prevalence risk thresholds. Further, beyond the stage at which elimination as a public-health problem is achieved, a more aggressive strategy will be required in order to attain the more ambitious goal of interrupting transmission. New guidelines with a new threshold towards the elimination of schistosomiasis are currently being developed by WHO.



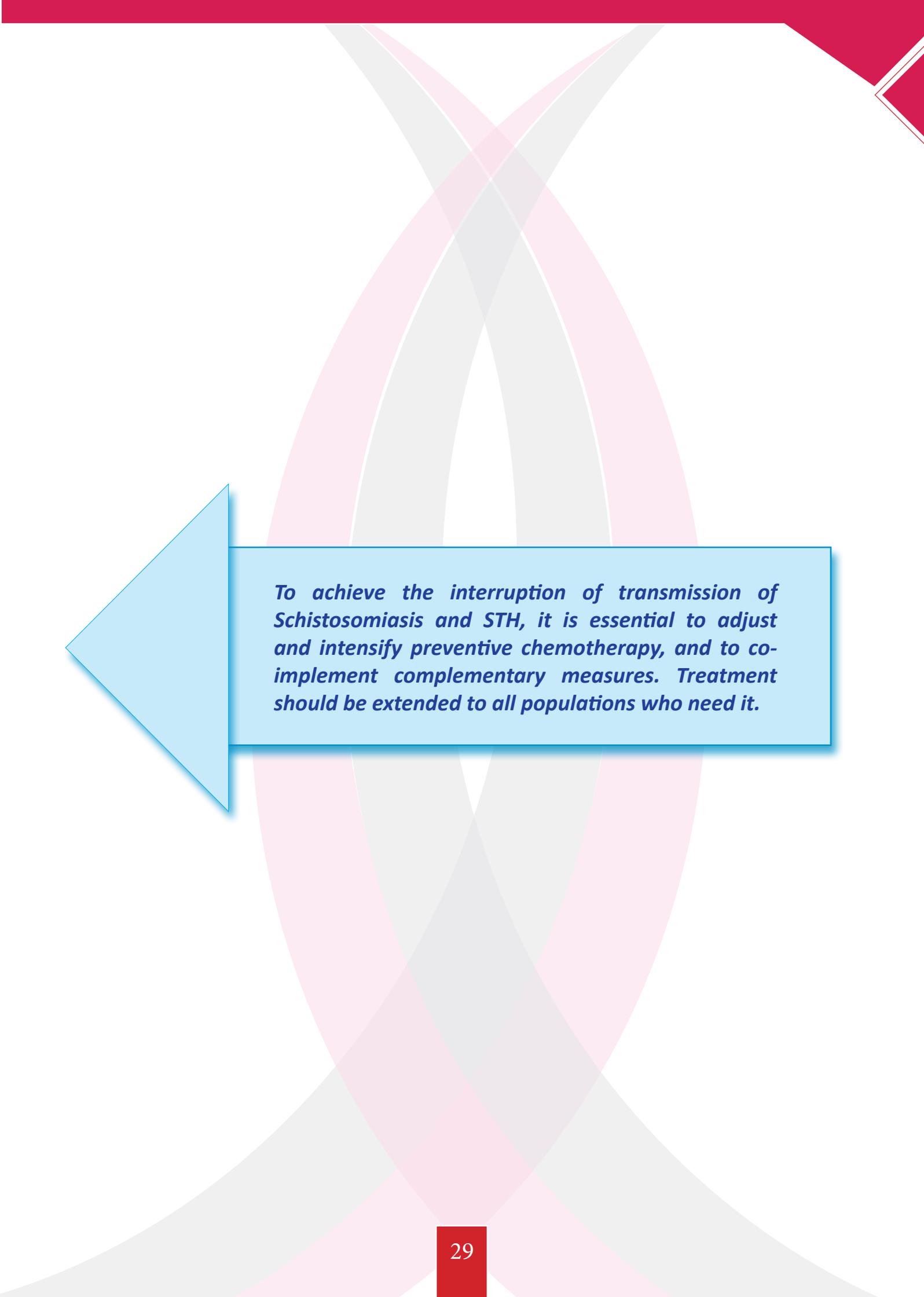
What adapted treatment strategy?

While the current WHO recommendations for preventive chemotherapy are valid for achieving morbidity control, a more intensified strategy to accelerate the achievement of interruption of transmission has been adopted in Cameroon, and will be further adjusted to optimize the impacts (Table 2).

Achieving the targets outlined in this road map will require the availability and accessibility of medicines. Access to medicines in sufficient quantities is a major challenge, which requires adequate support from drug donors.

Table 2. Recommended and adapted treatment strategy for schistosomiasis and STH elimination in Cameroon.

Disease	Baseline prevalence among SAC	Current action taken	Intensified action to be taken for the road map
SCH	≥ 50%	Treat all SAC once a year (Also treat adults in few selected hotspots – Twice a year)	Treat all SAC and adults + PreSAC once a year (Treat twice a year in identified hotspots)
	10-49%	Treat all SAC once a year	
	1-9%	No action	Selected treatment and PZQ available in health facilities
	0%	No action	Surveillance
	No Data	No action	Conduct precision mapping and decide for treatment regimen
STH	≥ 50%	Treat all SAC and PreSAC once a year	Treat all SAC, PreSAC and adults once a year (Treat twice a year in identified hotspots)
	20-49%		
	1-19%		
	0%	No action	Surveillance
	No Data		Conduct precision mapping and decide for treatment regimen



To achieve the interruption of transmission of Schistosomiasis and STH, it is essential to adjust and intensify preventive chemotherapy, and to complement complementary measures. Treatment should be extended to all populations who need it.

II.3. Strengthen health system operational capacities



Where are we now?

The interruption of schistosomiasis transmission is a long-term undertaking that requires significant changes in the approach, design and strategies with a focus on strengthening institutional capacities and surveillance response system. Strong health and related systems are essential to achieving the disease elimination goals. Robust national systems

facilitate the delivery of interventions in the field.

Although recommendations to stop MDA for SCH and STH have not been made by WHO yet, it would be good to put in place a more aggressive clinic/school based surveillance/test and treat strategy, along with targeted hygiene promotion through local health clinics and schools.

What are we going to do?

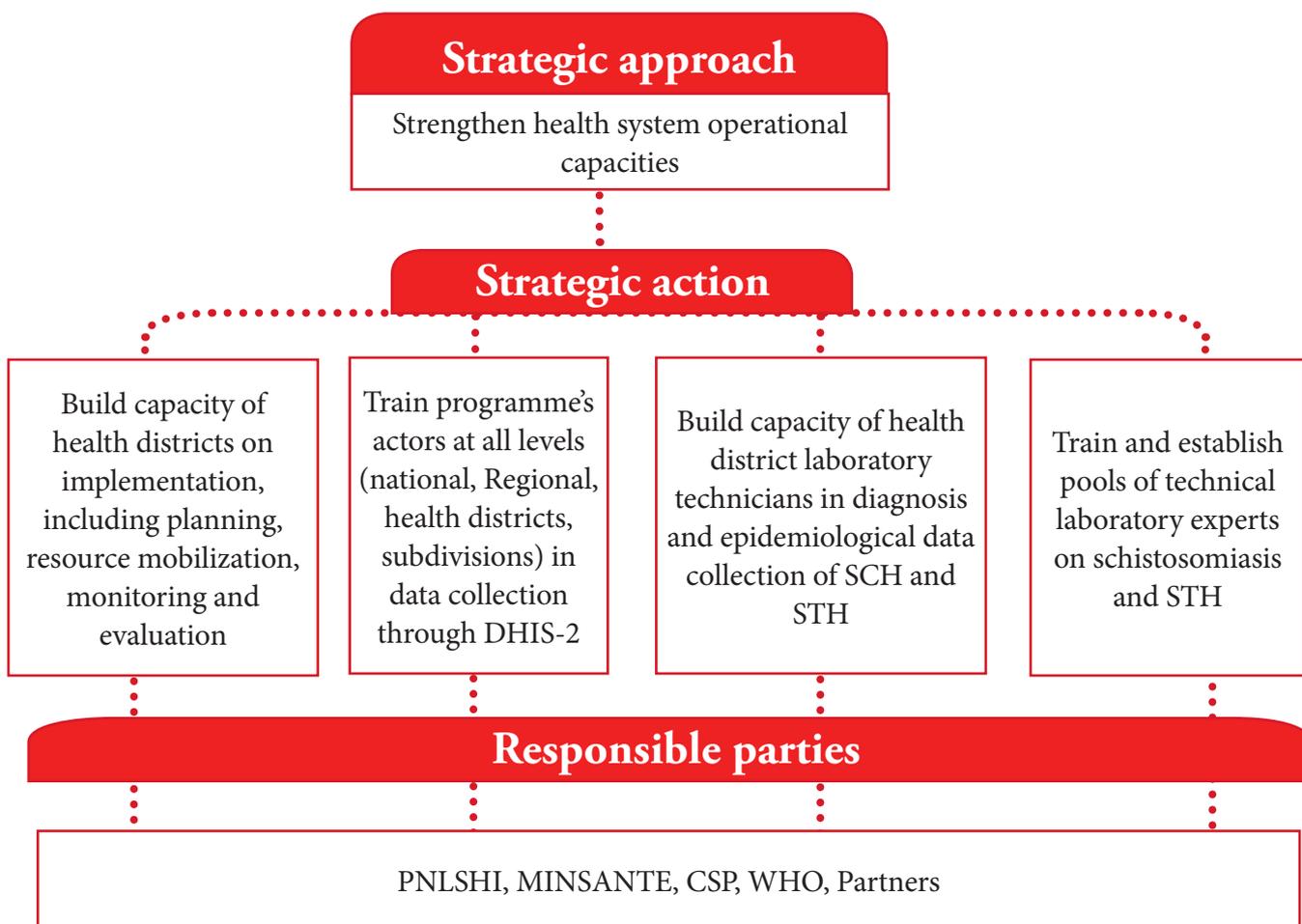
Strengthening the operational capacities at different levels of the health system will be vital to boosting the performance in achieving the road map targets. The capacity of local health clinics to maintain some type of long term surveillance will be improved to ensuring the sustainability of interventions. Awareness campaigns will be funded in the communities and schools that encourages local residents to report to health clinics with any signs or symptoms of SCH and STH; once at the health clinic they will receive free testing and treatment. Efforts will also be made to build capacity of health clinics (and possibly school health nurses) in supply chain management, including maintaining a stock of test kits and perform and report on diagnostic testing routinely (monthly); maintain PZQ and ALB/MBD stock on hand at local health clinic to provide full course treatment for positive cases; and reporting of these activities through DHIS-2 (training and supervision).

The road map will primarily focus on two key operational aspects, namely:

1. **Data collection through DHIS-2.** The Ministry of Public Health uses the District Health Information System 2 (DHIS-2) platform to collect national integrated health data and to report on diseases. This web-based health management information system is linked with the national HMIS system, and facilitates the collection of individual and aggregated data both online and offline on tablets and smartphones. It

is used to make decisions at both national and Regional levels. The system is being improved to integrate the collection of data of the schistosomiasis and STH programme, such as the treatment data and the epidemiological data. Data systems will be complete, timely, systematic, accurate, and disaggregated by age, gender, and location. The capacity of the programme's actors at all levels will be strengthened to collect and analyze data through the DHIS-2 platform. Therefore, training will be provided in all Regions and health districts to use DHIS-2.

2. **Laboratory capacity.** To achieve the ambitious elimination targets, the operational capacities of staff should be strengthened at all levels. Programme implementers at the implementation level, i.e. health district, should be able to conduct basic diagnosis and to implement monitoring and evaluation. They should be equipped with new data, tools and approaches to decision-making. Capacity building will be done for laboratory technicians at health facilities at the peripheral level for the diagnosis of these parasitic infections. Training and strengthening the operational capacities of health/laboratory technical staff at the implementation level will boost ownership and commitment and will be essential in cost-effective tracking progress and monitoring and evaluation of implementation towards the 2030 goals.





II.4. Intensify multisectoral actions



Where are we now?

Currently, interventions are limited to chemotherapy with praziquantel and mebendazole or albendazole. However, it is well known that treatment alone will not be sufficient to achieve the interruption of disease transmission. Therefore, the country should adopt an intensified approach that includes increasing the frequency of preventive chemotherapy in some areas, and extending the treatment to additional high risk groups. It also includes the implementation of complementary public-health,

environmental, and educational interventions. Complementary public-health interventions include health education for behavior change, provision of safe water and sanitation, environmental management, and snail control. Implementing these interventions is necessary to drastically reduce disease transmission. Their achievement requires inter-sectoral collaboration and partnership as the programme alone cannot raise the resources required.

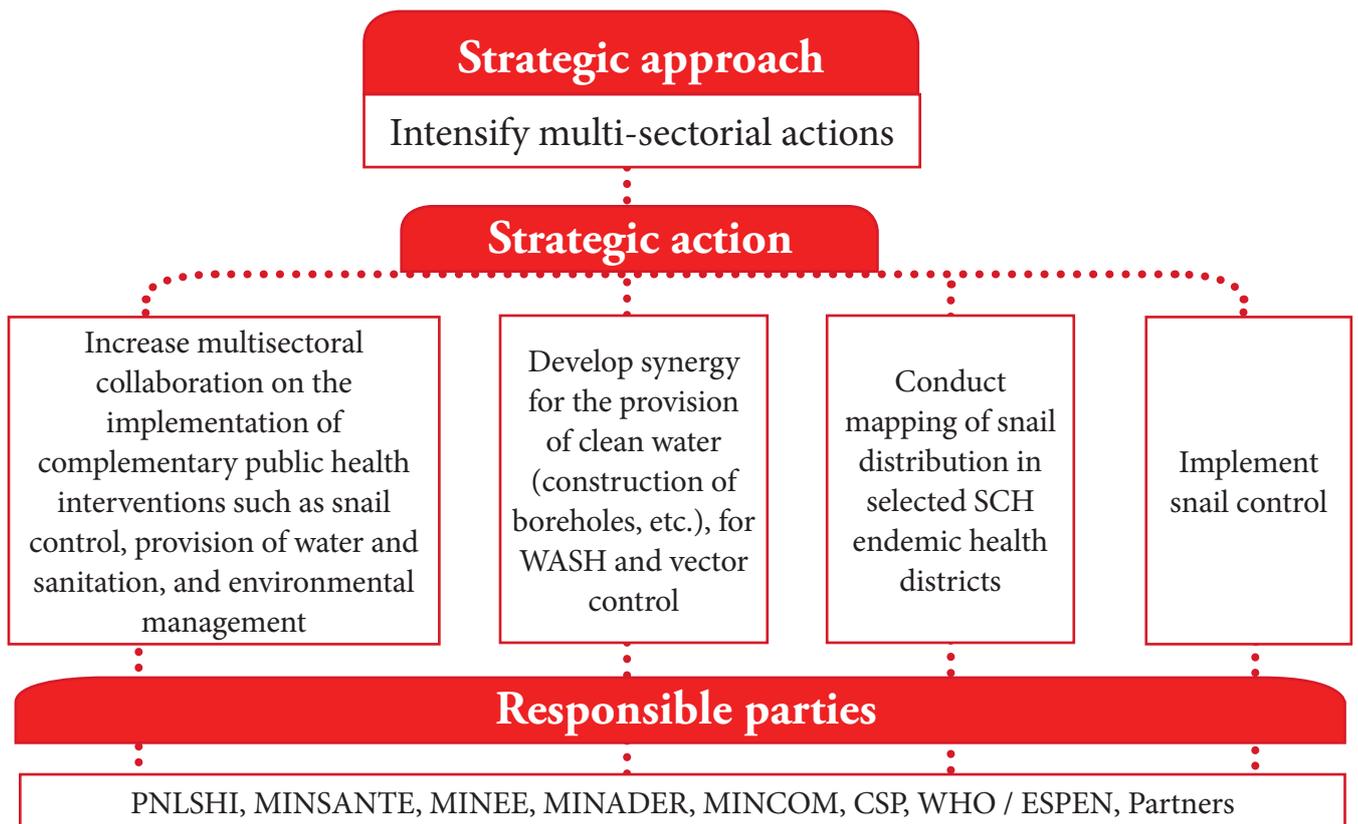
What are we going to do?

The road map emphasizes the need to intensify multi-sectorial actions that consolidate disease control and elimination and foster sustainability. Indeed, concerted action among all sectors is required to sustain and build on the progress made so far. The priority interventions include:

1. **WASH interventions.** In most schistosomiasis endemic districts, natural water bodies (many of which are infested with snails and infective schistosome cercariae, sometimes of zoonotic origin) continue to be the only sources of domestic water. Consequently, high-risk communities cannot avoid reinfections even if they were effectively treated. A further challenge is to address the needs of those where occupational exposure is a daily risk, for example agricultural workers and fishing communities. Poor sanitation is a major contributor to the transmission of schistosomiasis and STH and causes rapid re-infection among treated children and adults. Improvement in the waste disposal and a reduction in open defecation is essential for achieving interruption of transmission. Improvement in sanitation not only contributes to the prevention of transmission but also contributes to the prevention of many diarrheal diseases. Sensitization and mobilization of people to build and use latrines should be strengthened. In the WASH component, emphasis will be put on participatory

hygiene and sanitation transformation (PHAST), community-led total sanitation (CLTS), access to clean water (construction of boreholes, etc.), and behavior change. There are significant challenges for behavior changes and time and resources are needed to properly design and develop appropriate behavior change interventions.

2. **Snail control.** Environmental management for snail control has not been undertaken in Cameroon since 1975 due to funding limitations. To achieve the road map targets, snail control will be implemented in selected schistosomiasis transmission sites (with high human water contacts). Technical capacity will be built, and funding will be mobilized to implement reliable snail surveys and snail control. China has a vast experience in this field, and has developed effective snail control approaches, adapted to local situation in snail-infested areas. It is expected to benefit and learn from Chinese experiences within the framework of the current China-Africa cooperation for SCH elimination (Xu et al., 2016). Innovative new approaches to improve the targeting of snail control will also be explored: <https://www.washington.edu/news/2019/10/28/precision-mapping-with-satellite-drone-photos-could-help-predict-infections-of-a-widespread-tropical-disease/>.



GUIDELINES FOR LABORATORY AND FIELD TESTING OF MOLLUSCIDES FOR CONTROL OF SCHISTOSOMIASIS



FIELD USE OF MOLLUSCIDES IN SCHISTOSOMIASIS CONTROL PROGRAMMES

AN OPERATIONAL MANUAL FOR PROGRAMME MANAGERS



II.5. Monitoring and evaluation



Where are we now?

Monitoring and evaluation are essential for tracking progress, for correcting the programme when necessary, and for decision-making. Monitoring and evaluation will be strengthened by improving data collection, management, analysis, mapping, impact assessments, surveillance and reporting systems. Indicators will be used to obtain high-quality data for effective decision-making at all levels.

The road map describes the milestones and 2030 targets and approaches for reaching them. It provides a long-term vision, but progress should be measured over time in a standardized monitoring and evaluation framework. Monitoring will include periodic assessments of substantive progress in achieving milestones. In addition to annual reporting, formal reviews will be conducted in 2024, 2026, and 2031.

What are we going to do?

The road map will primarily focus on the following key operational aspects:

1. **Diagnostic tools.** Access to accurate and effective diagnostic tools is useful to monitor disease trends and assess the effectiveness of the control program, and guide policy decisions on interventions. Microscopy is the most widely used method for diagnosing for schistosomiasis and STH, yet it requires laboratory and trained technicians, and the sensitivity of microscopy is often relatively low. Because of its simplicity and relatively low-cost, the Kato–Katz technique is widely used for epidemiological field surveys and is recommended by the WHO for surveillance and monitoring of schistosomiasis and STH control programs. Though the specificity is high, the sensitivity of Kato–Katz in a single stool sample examination is limited by day-to-day variation in egg excretion rates, thus leading to measurement errors in estimating the presence of infection. This is particularly accentuated in areas with high proportions of light-intensity infections. As the intensification of large-scale interventions and repeated mass deworming significantly reduce the prevalence and intensities of schistosome infections, less intense infections are often missed if single stool samples are examined by the Kato-Katz method, resulting in significant underestimation of prevalence. Therefore, there is a need to develop and validate more sensitive diagnostic tools for

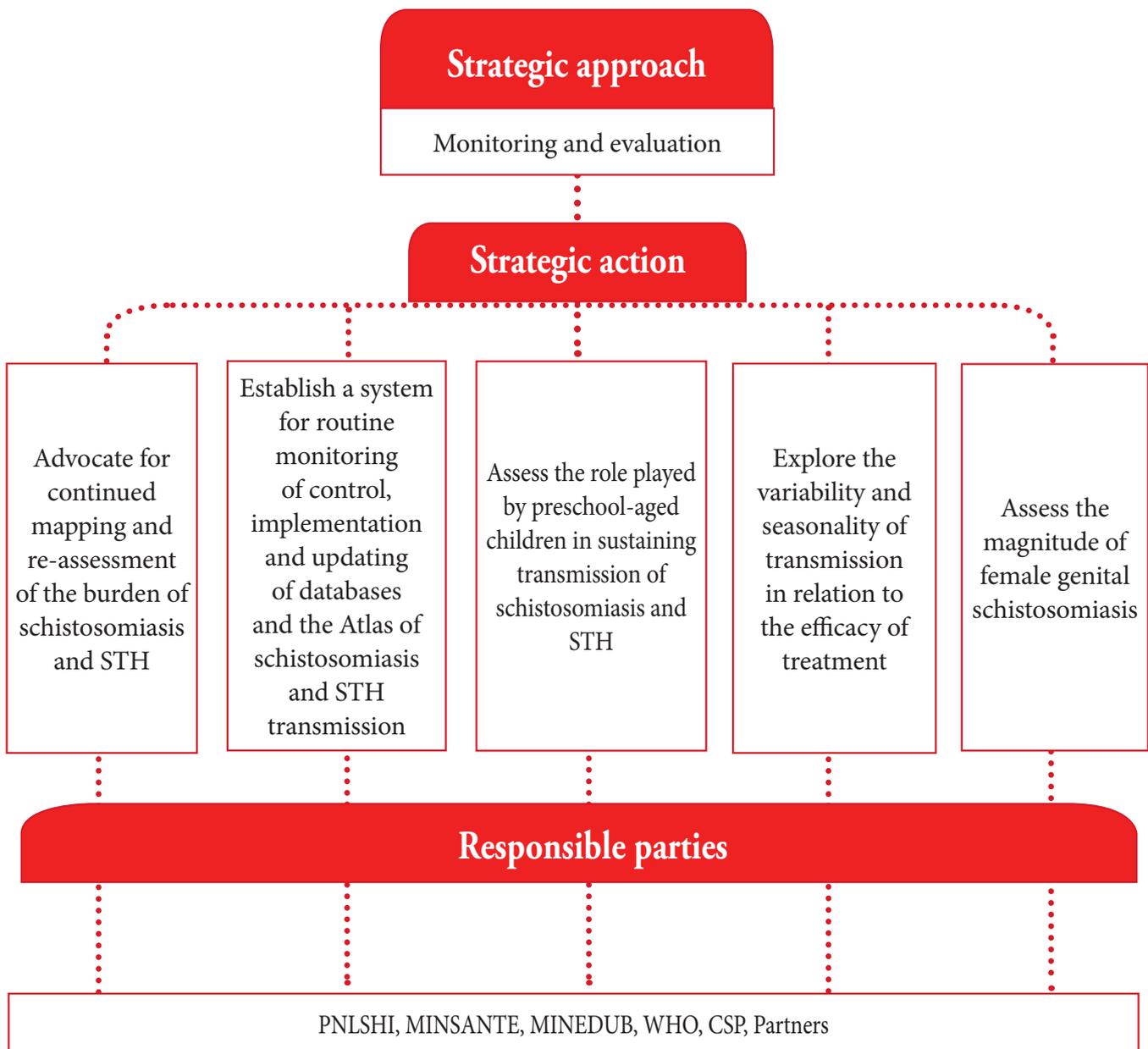
accurate surveillance and monitoring of schistosomiasis control programs, and for the monitoring of drug efficacy. Several alternative diagnostic tools have been tested for the detection of schistosome infections. The point-of-care urine-based circulating cathodic antigen (POC-CCA) test has been reported as more sensitive than Kato-Katz for intestinal schistosomiasis. This test has been widely applied for the diagnosis of *S. mansoni* in Africa. Studies have also demonstrated the higher sensitivity of the circulating anodic antigen (CAA) compared to Kato Katz or urine analysis alone. However, higher prevalence obtained with both CCA and CAA tests argues for the continuation of mass drug administration in endemic zones. The high costs to implement these tests and control interventions may certainly constitute a major constraint. As we move to elimination it may also be appropriate to move away from MDA to a test and treat scenario. Further efforts should be made to validate other detection tools. The choice of a specific diagnostic assay should be governed by the objective of the activity and according to the status of control. As the accuracy of a given diagnostic technique may vary significantly according to schistosomiasis transmission level, tools should be adapted when moving from morbidity control to elimination of infection. Moving toward the surveillance and elimination phases requires more

sensitive techniques such as antibody detection. However, sero-diagnostics tools for the detection of schistosome infections require blood sample collection (invasive) and access to affordable, high-quality reagents; all being limiting factors for their integration into large-scale national control programmes. These limitations are amongst the reasons why only a few countries have adopted antibody detection as a key strategy in schistosomiasis diagnosis. As transmission would be the measure of the true endpoint of elimination, consideration should also be given to the detection of natural schistosome infections in snails and the measurement of the force of infection from cercariae.

2. **Atlas of schistosomiasis and STH transmission.** At the occasion of the World NTD Day celebrated on January 30, 2020, the Ministry of Public Health of Cameroon and the Centre for Schistosomiasis and Parasitology launched the online “Atlas for Schistosomiasis and Soil-Transmitted Helminthiasis Transmission in Cameroon”. This online resource includes maps of schistosomiasis and STH prevalences at the national, Regional, health district, health area and school levels between 1985 and 2018. This first-ever detailed Atlas guides the Ministry of Public Health and Partners in the fight against schistosomiasis and STH. Data will be updated regularly. More information can be found at <https://www.ntdmaps.org>
3. **Establishing health district and health area scorecards.** In order to follow the progress towards the achievements of the road map targets, a scorecard will be developed to collect the disease prevalence of all health districts and health areas over the years. Indicators will be primarily based on the recommended WHO prevalence thresholds for preventive chemotherapy. However, **these thresholds will be adapted**

when relevant according to subsequently adjusted strategies. Assessing progress towards achieving the goals will require a regular collection of accurate data. The National Steering Committee, comprised of representatives from all stakeholder groups, will periodically review the progress and decide of a final scoring for each of the two diseases according to set criteria.

4. **Research and innovation.** Research, development and innovation are crucial to finding appropriate solutions against schistosomiasis and STH throughout the programme. Basic, operational and implementation research will be implemented to answer various questions and for monitoring the progress and determining when to change treatment regimens or to stop mass drug administration. The research will be conducted in collaboration with research institutions and other stakeholders. Innovation will include the potential use of molecular epidemiology and new technologies satellite imagery and drones. Research orientations and priorities may include various aspects of female genital schistosomiasis, behavioural, social aspects of communities, needs, perceptions in enhancing treatment compliance, healthy behaviors and reservoir hosts. Several species of schistosomes are zoonotic and can naturally be transmitted between humans and vertebrate animals. Many domestic and wildlife animals act as reservoir hosts for schistosomes. However, their potential reservoir role in the transmission of schistosomiasis in Africa is not well known. The complexities in population biology and transmission ecology between humans, and animal reservoirs affect the success of control programs and magnifies the challenges of elimination. Indeed, to eliminate schistosomiasis, one must not only eliminate the infection in the human population but also prevent or eliminate transmission from animal reservoirs.



II.6. Advocacy and funding



Where are we now?

In Africa, schistosomiasis and STH control programmes mainly depend on external funds for many interventions, including MDA and donated drugs. If funding ceases, consolidation of achievements made is generally not sustainable, with the rapid re-emergence of diseases as a result. With the intensification of interventions towards disease elimination, there is a need to increase funding to support the implementation of these interventions. More resources should be mobilized to develop greater multisectoral collaboration to combat schistosomiasis and STH. The third WHO report on NTDs, “Investing to overcome

the global impact of neglected tropical diseases”, recognizes the elimination and control of NTDs as a “litmus test” for universal health coverage; and calls all endemic countries to contribute by increasing their domestic investments to scale-up interventions. Domestic financing will have to be increased to meet the targets and to ensure the programme sustainably.

Schistosomiasis and STH treatments are considered as one of the “best buys” in development, as they provide a high social return and are cost-effective.

What are we going to do?

Since the creation of the Programme, the main partners who have provided financial support for the implementation of deworming campaigns in Cameroon between 2006 and 2019 are listed in the Table 3, by Region and by year.

Currently, and since 2019, Sightsavers and Good Neighbors are the main partners who are contributing resources to Government for the implementation of SCH and STH control/elimination.

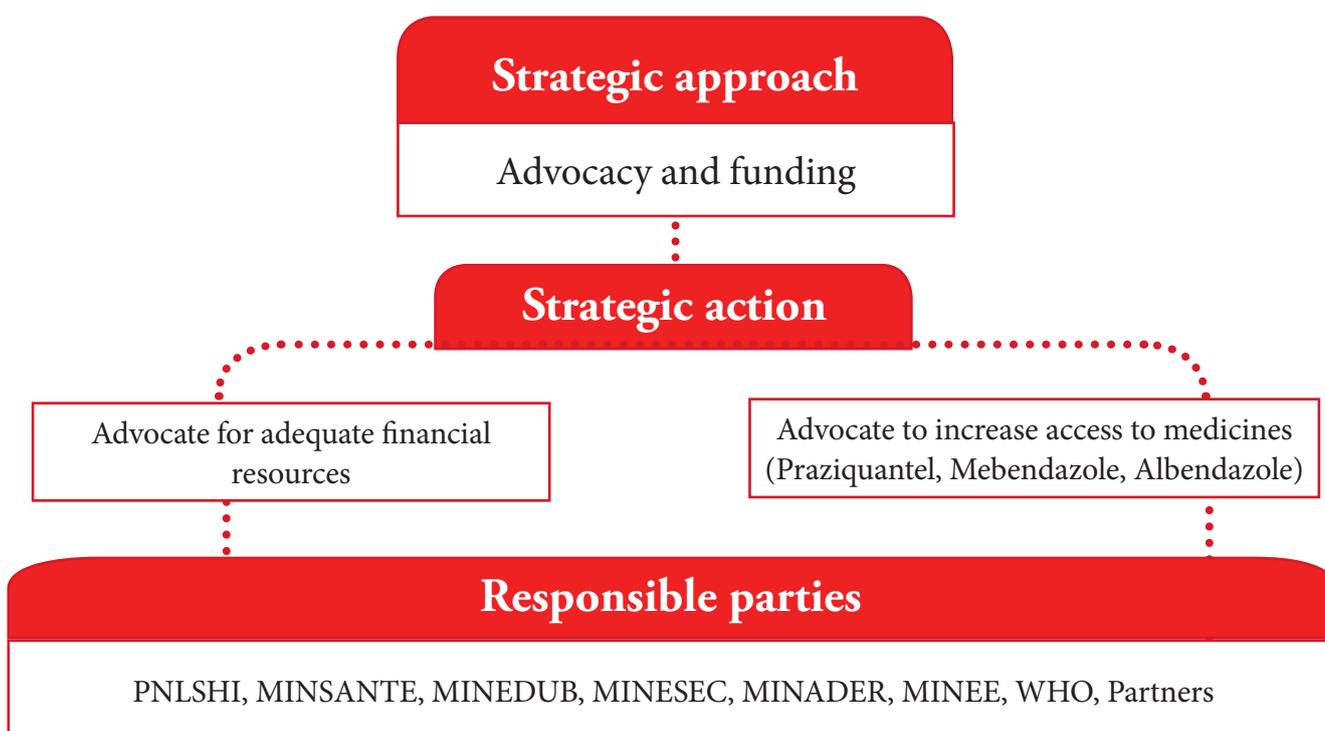
To support this road map, an investment case and a sustainability framework will be prepared. Both government and global stakeholders should help to close the funding gaps necessary to fulfil the 2030 targets and to sustain progress.

More advocacy will be made for schistosomiasis and STH elimination to become an integral part of national budgets and rely less on foreign aid and charity to achieve universal health coverage.

Table 3. Partners who provided financial support for deworming campaigns in Cameroon between 2006 and 2019.

Regions	2006	2007	2008	2009	2010 - 2017	2018	2019	
Adamawa	UNICEF WFP			Global Network for NTDs	USAID-RTI-HKI		GiveWell / Sightsavers	
Centre								Koica / Good Neighbors
East								GiveWell / Sightsavers
Far North								GiveWell / Sightsavers
Littoral								WHO / ESPEN
North								GiveWell / Sightsavers
North West								
South								
South West								
West								

Deworming campaign implemented.
 No deworming campaign.





II.7. Encourage country and community ownership



Where are we now?

Meeting the 2030 targets will require coordination, collaboration and cooperation among many sectors and stakeholders. Sectors such as vector control and WASH make critical contributions to progress on control of schistosomiasis and STH. Working together more effectively can accelerate and sustain progress towards disease elimination. Coordination is also necessary with the wide array of relevant partners, including donors, academic institutions, pharmaceutical companies, disease experts, multilateral organizations and implementing partners, to ensure effective service delivery.

Roles and responsibilities must be clear at each level and sector of the programme implementation. The role of partners is pivotal

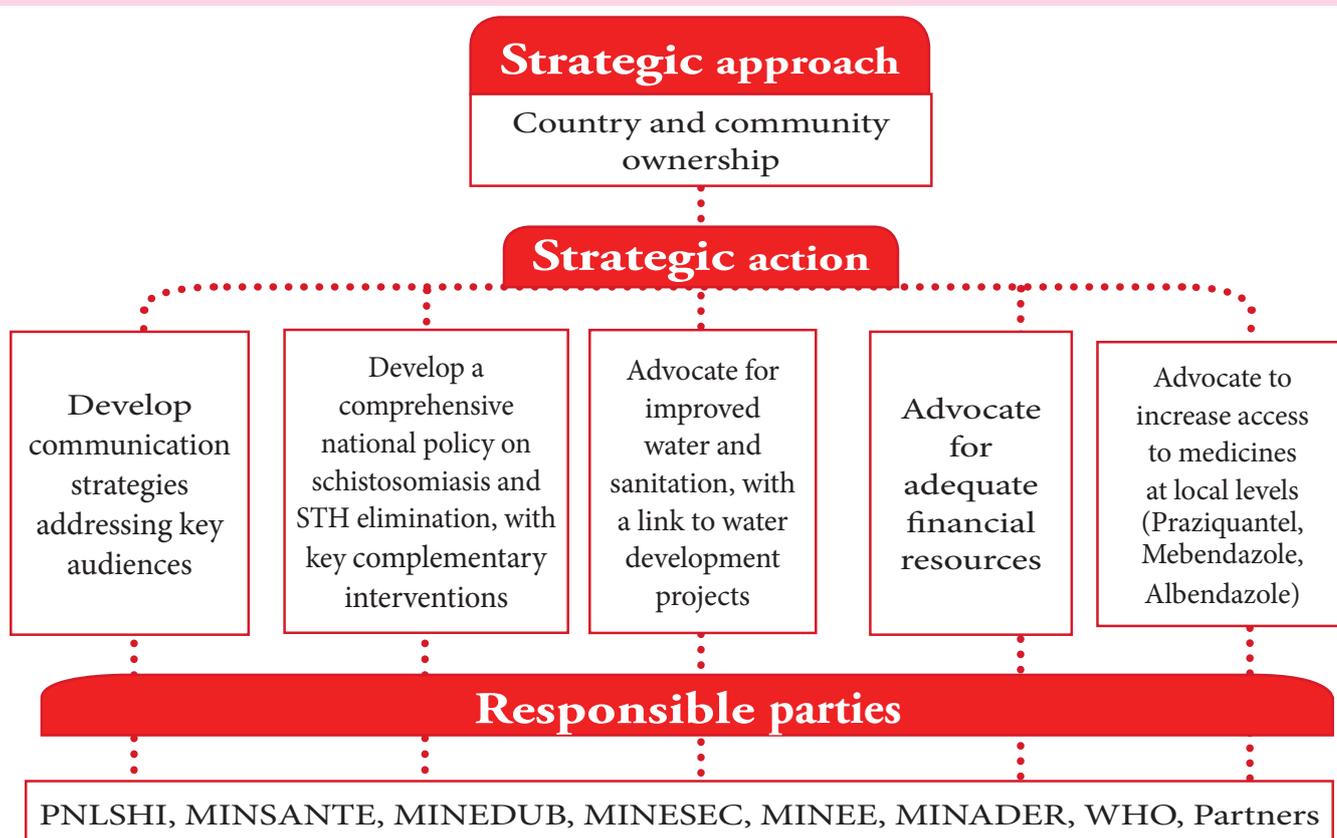
and they should assist the country to achieve its goals vis-à-vis the targets of the road map. Clear delineation of responsibilities among partners will ensure geographical coverage, avoid duplication and ensure that no community is overlooked. The coordination of this extensive, diverse network will be ensured by the Ministry of Public Health, which will work with all stakeholder groups.

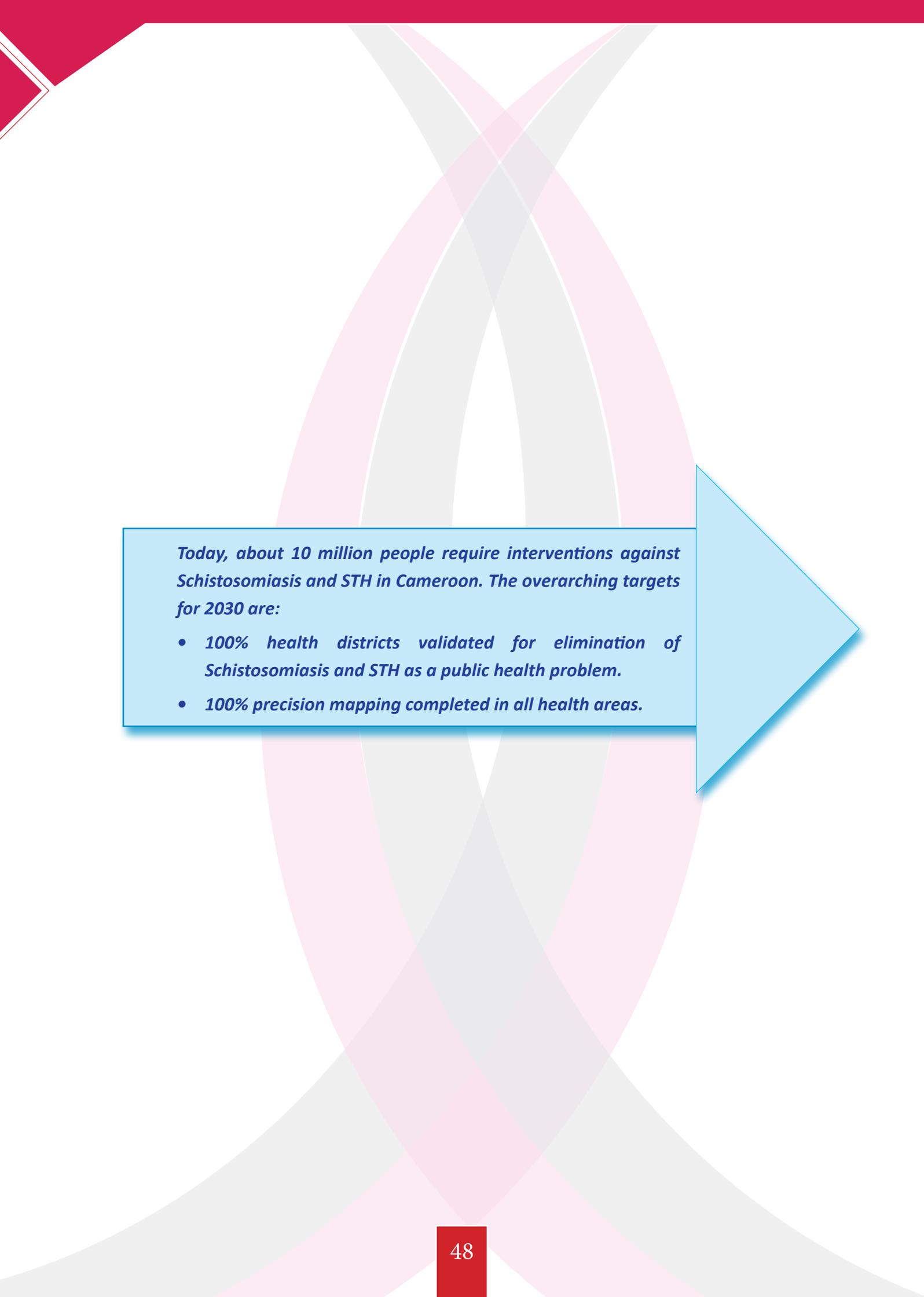
As the country is both the driver and the main beneficiary of progress towards the road map targets for 2030, it should increasingly assume the leadership in designing, delivering and evaluating the programme. Decentralized levels (Regions and health districts) are also essential for the successful implementation of interventions and local coordination of multisectoral action.

What are we going to do?

Country ownership is essential for meeting the 2030 NTD targets. As the health system is decentralized, the responsibility and ownership will be extended to local authorities and community leaders at all

levels of society, given their core role in raising awareness, behavioural change, and building local support for disease control interventions.





Today, about 10 million people require interventions against Schistosomiasis and STH in Cameroon. The overarching targets for 2030 are:

- *100% health districts validated for elimination of Schistosomiasis and STH as a public health problem.*
- *100% precision mapping completed in all health areas.*

III. Targets, milestones, and indicators

This section provides an overview of the targets, milestones and indicators for schistosomiasis and STH control and elimination in Cameroon.

This is aligned with the WHO's 2030 targets and milestones to facilitate future assessments and evaluations of progress made by the country.

III.1. Administrative, health and education divisions

For an efficient planning and implementation of the road map, it is important to take into consideration the structure of the administrative, health and education divisions in Cameroon, as

summarized in Table 4. Indeed, administrative, health, basic education and secondary divisions have different structures; which has an impact on the implementation of activities.

Table 4. Number of administrative, health and education divisions in Cameroon.

Levels	Administrative divisions	Health divisions	Basic education divisions	Secondary education divisions
I	National	Central	Central	Central
II	10 Regions	10 Regional Delegation of Health	10 Regional Delegations of Basic Education	10 Regional Delegations of Secondary Education
III	58 Divisions	190 Health Districts	58 Divisional Delegations of Education	58 Divisional Delegations of Education
IV	360 Sub-divisions		360 Sub-divisional Inspectorates of Basic Education	
		> 4 500 Health facilities	> 19 000 Primary schools	> 3 700 Secondary schools

III.2. Criteria to measure achievement of the goal

The final goal of the programme is the interruption of transmission of schistosomiasis and STH. This will be done in several steps and through the set of operational strategies.

The measurable indicators by actions / interventions are summarized in Table 5.

Table 5. List of indicators by programmatic actions.

Actions/Interventions	Indicators
Expand access to treatment	<ul style="list-style-type: none"> • Treatment coverage for schistosomiasis (by age group: school-aged children, adults) • Treatment coverage for STH (by age group: preschool-aged children, school-aged children, adults) • Number of people treated for schistosomiasis (by age group: school-aged children, adults) • Number of people treated for STH (by age group: preschool-aged children, school-aged children, adults) • Percentage reduction in people requiring interventions against schistosomiasis • Percentage reduction in people requiring interventions against STH
Complete precision mapping	<ul style="list-style-type: none"> • Number of health districts having completed precision mapping
Strengthen health system operational capacities	<ul style="list-style-type: none"> • Number of health districts using DHIS-2 platform for the collection of deworming data • Number of people trained for DHIS-2
Intensify multi-sector actions	<ul style="list-style-type: none"> • Number of schistosomiasis transmission sites where snail control is implemented • Number of boreholes drilled
Monitoring and evaluation	<ul style="list-style-type: none"> • Number of Health Districts validated for elimination of schistosomiasis as a public health issue (currently defined as <1% high level of schistosomiasis infections) • Number of Health Districts validated for elimination of STH as a public health issue (currently defined as <2% proportion of STH infections of moderate and heavy intensity due to STH) • Number of Health Districts having eliminated SCH (defined as zero local infections in humans, snails and animals for at least 5 consecutive years in a previously endemic health district)
Advocacy and funding	<ul style="list-style-type: none"> • Number of partners mobilized • Range of funding mobilized
Encourage country and community ownership	<ul style="list-style-type: none"> • Number of health districts taking ownership of schistosomiasis and STH control

III.3. Impact indicators

The proposed targets for schistosomiasis and STH of progress against these targets will be conducted are shown in Table 6. Annual reporting and review regularly.

Table 6. Road map targets, milestones and key variables and indicators.

Disease	Indicators	2020	2023	2025	2030
SCH	Number of Health Districts validated for elimination of SCH as a public health problem (currently defined as <1% proportion of heavy intensity of SCH infections)	10	25	50	90 (100%)
	Number of people treated for schistosomiasis (by age group: school-aged children, adults)	3 115 000 (3 115 000 SAC; 0 Adults)	3 500 000 (3 250 000 SAC; 250 000 Adults)	4 000 000 (3 500 000 SAC; 500 000 Adults)	6 000 000 (4 000 000 SAC; 2 000 000 Adults)
	Treatment coverage for schistosomiasis (by age group: school-aged children, adults)				90%
	Percentage reduction in people requiring interventions against SCH				
	Number of SCH transmission sites where snail control is implemented	2	10	15	20
	Number of Health Districts having eliminated SCH				
STH	Number of Health Districts validated for elimination of STH as a public health problem (currently defined as <2% proportion of STH infections of moderate and heavy intensity due to STH)	30	50	100	190 (100%)
	Number of people treated for STH (by age group: preschool-aged children, school-aged children, adults)	7 500 000 (3 300 000 PSAC; 4 200 000 SAC; 0 Adults)	10 000 000 (3 300 000 PSAC; 5 000 000 SAC; 1 700 000 Adults)	12 000 000 (3 500 000 PSAC; 5 500 000 SAC; 3 000 000 Adults)	15 000 000 (4 000 000 PSAC; 6 500 000 SAC; 4 500 000 Adults)
	Treatment coverage for STH (by age group: preschool-aged children, school-aged children, adults)				90%
	Percentage reduction in people requiring interventions against STH				
SCH and STH	Number of health districts having completed precision mapping			190 (100%)	190 (100%)
	Number of health districts using DHIS-2 platform for the collection of deworming data		190 (100%)	190 (100%)	190 (100%)
	Number of partners mobilized	3			10
	Range of funding mobilized				
	Number of Health Districts appropriating the fight against schistosomiasis and STH				190

N.B.: As the aim is disease elimination, an indicator showing the number of people that may no longer need MDA campaigns because transmission has been interrupted will be assessed.

21



Buruli ulcer Chagas disease Dengue
and chikungunya Dracunculiasis
Echinococcosis Foodborne
trematodiasis Human African
trypanosomiasis Leishmaniasis
Leprosy Lymphatic filariasis
Mycetoma, chromoblastomycosis
and other deep mycoses
Onchocerciasis Rabies Scabies
and other ectoparasitoses
Schistosomiasis Soil-transmitted
helminthiasis Snakebite envenoming
Taeniasis and cysticercosis
Trachoma Yaw

Ending the neglect to attain the Sustainable Development Goals

**A road map for neglected tropical
diseases 2021–2030**

30

IV. Critical actions to address WHO road map requirements

In the WHO road map for NTDs 2021-2030 document endorsed by the Seventy-third World Health Assembly, the targets, sub-targets and milestones for 2030, and the critical actions required to to achieve them are clearly described. These actions are summarized for each of the 20 diseases prioritized by WHO.

In this section, we summarize the critical actions for Schistosomiasis and Soil-transmitted helminthiases that will be implemented in Cameroon within the framework of the current 2021-2030 road map to achieve the targets and milestones for 2030, grouped by categories of cross-cutting themes.

Table 7a. Summary of critical actions to achieve road map targets (Technical progress).

Category	Actions required	
	Schistosomiasis	Soil-transmitted helminthiases
Scientific understanding	<ul style="list-style-type: none"> • Determine causes and strategies to prevent resurgence and to sustain elimination as a public health problem once achieved • Understand zoonotic transmission and interventions to address zoonotic reservoirs • Determine causes and develop strategies to address areas not responding to treatment • Determine impact of female genital schistosomiasis and association with HIV • Define both economic and health impact of clinical and “subtle” morbidity 	<ul style="list-style-type: none"> • Estimate precisely the epidemiology and burden of <i>Strongyloides stercoralis</i>
Effective intervention	<ul style="list-style-type: none"> • Utilize or implement current strategies according to guidelines (e.g. expand treatment to adults, implement WASH) and conduct operational research simultaneously to inform future interventions • Introduce or improve micro-targeting of MDA and other interventions at community level • Develop and launch safer, cheaper and effective snail control technology considering the environment • Conduct operational research to improve effective WASH and behaviour interventions for prevention • Improve morbidity management including coinfection and secondary infection • Coordinate with WASH services and organizations effectively to ensure access to sufficient clean water for bathing and washing and provide health education 	

Table 7b. Summary of critical actions to achieve road map targets (Strategy and service delivery).

Category	Actions required	
	Schistosomiasis	Soil-transmitted helminthiases
Operational and normative guidance	<ul style="list-style-type: none"> • Create guidance on how to sustain elimination as a public health problem and elimination of transmission • Develop methodological guidance for measuring progress and impact assessment • Develop intervention and monitoring strategies for urban and periurban settings 	
Planning, governance and programme implementation	<ul style="list-style-type: none"> • Adopt and implement current strategies nationally (e.g. expand to other groups including adults, school-aged children (SAC) not at school); improve compliance of MDA and WASH by strengthening social mobilization and behavioural change • Implement test, treat and track strategies in countries striving for elimination of transmission • Develop a coherent cross-sectoral governance structure (e.g. WASH, vector, education, animal) within countries to deliver interventions effectively; include schistosomiasis in their packages of universal health coverage 	<ul style="list-style-type: none"> • Integrate deworming in endemic areas in universal health coverage policies and programmes
Monitoring and evaluation	<ul style="list-style-type: none"> • Improve data quality and mapping to support target and track progress at the lowest level; implement granular mapping (harnessing new technologies) to support targeted MDA and other interventions at lower administrative or community levels • Collect M&E data from pre-SAC, SAC and adults to inform optimal treatment strategy • Implement impact assessments for potential strategy adjustment • Use endemicity data to target WASH investment and track progress to elimination • Improve reporting on distribution, leveraging new tools • Implement monitoring for efficacy of and drug resistance to praziquantel • Develop economic impact indicators to assess disease burden and programmatic progress 	<ul style="list-style-type: none"> • Utilize new technologies (drone mapping, environmental DNA, etc.) to decrease the costs of surveillance and mapping • Develop a surveillance guide with standard indicators • Establish an M&E system or integrate M&E with the national health information system • Simplify impact assessment survey • Monitor the efficacy of medicines and of drug resistance
Access and logistics	<ul style="list-style-type: none"> • Utilize donor coordination, supply and logistic tools to ensure access to sufficient quality-assured praziquantel to treat all in need • Ensure access to and delivery of treatment to all at-risk populations, including adults, according to the guidelines (e.g. through strengthening logistical aspects) • Ensure access to paediatric formulation of praziquantel for pre-SAC once available • Ensure access to molluscicides and zoonotic interventions as available • Ensure access to diagnostics as available 	<ul style="list-style-type: none"> • Improve access to medicines for women of reproductive age and preschool-aged children
Health care infrastructure and workforce	<ul style="list-style-type: none"> • Integrate schistosomiasis into primary health care • Build laboratory capacity for surveillance • Strengthen health care capacity for morbidity assessment and case management • Build capacity in malacology and snail control 	<ul style="list-style-type: none"> • Increase the number of testing facilities for routine laboratory testing of STH • Ensure transition to school-based programmes in settings where LF MDA stops

Table 7c. Summary of critical actions to achieve road map targets (Enablers).

Category	Actions required	
	Schistosomiasis	Soil-transmitted helminthiases
Advocacy and funding	<ul style="list-style-type: none"> • Advocate to international and domestic stakeholders and policy-makers to strengthen ownership of schistosomiasis control and elimination programmes and their integration into universal health coverage • Mobilize extra resources for progress towards the ultimate goal of elimination of transmission, which would allow MDA to be stopped; mobilize resources for medicines, molluscicides and other needs • Develop a request of interest for WASH investments in areas endemic for schistosomiasis 	<ul style="list-style-type: none"> • Increase domestic financing to ensure sustainability • Secure drug donations for women of reproductive age and preschool-aged children • Advocate for expanded sanitation in endemic areas and develop a return on investment for WASH investments in STH-endemic areas
Collaboration and multisectoral action	<ul style="list-style-type: none"> • Coordinate cross-sectoral interventions to implement treatment, WASH and behavioural strategies in communities, schools and health facilities; ensure access to clean water • Integrate schistosomiasis interventions with other NTDs for efficiencies (e.g. MDA/preventive chemotherapy) • Strengthen collaboration with other actors in the health care sector for genital manifestations, coinfections and severe morbidity management • Promote snail control as part of the Global Vector Control Response and coordinate with environment groups • Coordinate with animal sectors and the One Health approach 	<ul style="list-style-type: none"> • Integrate PC with other programmes (e.g. nutrition, vaccinations) to increase cost-effectiveness and coverage • Integrate surveillance and mapping across diseases (e.g. lymphatic filariasis, schistosomiasis, onchocerciasis, polio, scabies) • Ensure effective WASH strategies to prevent resurgence • Coordinate effectively with other ministries (water, education, housing)
Capacity and awareness building	<ul style="list-style-type: none"> • Support training of health staff in laboratory diagnostics, clinical management of cases and genital manifestations, malacology and snail control; integrate trainings with other NTDs and sectors • Develop epidemiological skills in workforce to enable assessment of treatment strategies and their tailoring • Adopt strategy for long-term sustainability and greater national ownership • Raise awareness among general public of the disease and its transmission, prevention and WASH and NTD interventions through production of manuals 	<ul style="list-style-type: none"> • Integrate training in the routine activities of health facilities

As highlighted by WHO in the road map for NTDs 2021-2030, Country ownership is essential for meeting the 2030 Schistosomiasis and STH elimination targets with the support of national, Regional and global stakeholders. A significant investment in infrastructure is essential for eliminating these NTDs.



V. Conclusion

The landscape of schistosomiasis and STH is changing across Cameroon owing to the many ongoing interventions currently underway. In some Regions, progress may be uneven but in some health districts, there are real prospects to transition from control into interruption of transmission and ultimately elimination. To manage this transition, the road map calls for a reconsideration of some of the current diagnostic

tools and the realignment of existing prevalence treatment thresholds and their interpretation in defining areas where intervention is required. The key challenge will be sustaining and expanding the current access to donated medicines and judging when it is appropriate to move from MDA to selective treatment, which will ensure that the health system is adapted to respond to these new disease dynamics.

This road map is a call to action for government sectors, donors, implementing partners, disease experts and all other stakeholders to align their strategies and plans towards the prevention and elimination of schistosomiasis and soil-transmitted helminthiases in Cameroon.

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Annexes

ANNEX 1. Drug requirement for preventive chemotherapy

Following the previous recommendations and the score card, we have for SCH and STH the situation of drug requirements for the next three years (2021 -2023).

The drug need will be reassessed and estimated accurately after the completion of precision mapping and the update of schistosomiasis and STH distribution and health area endemicities.

SCH

YEAR	Estimated population				Population requiring PC for SCH			
	Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total
2021	26 932 431	3 479 667	7 190 957	15 189 896	-	4 250 191	3 035 995	7 286 186
2022	27 632 674	3 570 138	7 377 922	15 584 833	-	4 360 696	3 114 931	7 475 627
2023	28 351 124	3 662 962	7 569 748	15 990 039	-	4 474 074	3 195 919	7 669 993
TOTAL	82 916 229	10 712 767	22 138 627	46 764 768	-	13 084 961	9 346 846	22 431 807

YEAR	Required Drugs: PZQ			Total
	Pre-SAC	SAC	Adults	
2021	-	10 625 478	9 107 986	19 733 463
2022	-	10 901 740	9 344 793	20 246 533
2023	-	11 185 185	9 587 758	20 772 943
TOTAL	-	32 712 403	28 040 537	60 752 940

STH

YEAR	Estimated population				Population requiring PC for SCH			
	Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total
2021	26 932 431	3 479 667	7 190 957	15 189 896	3 479 667	7 190 957	4 336 126	15 006 750
2022	27 632 674	3 570 138	7 377 922	15 584 833	3 570 138	7 377 922	4 448 865	15 396 925
2023	28 351 124	3 662 962	7 569 748	15 990 039	3 662 962	7 569 748	4 564 536	15 797 245
TOTAL	82 916 229	10 712 767	22 138 627	46 764 768	10 712 767	22 138 627	13 349 526	46 200 920

YEAR	Required Drugs: MBD/ALB			Total
	Pre-SAC	SAC	Adults	
2021	3 479 667	7 190 957	4 336 126	15 006 750
2022	3 570 138	7 377 922	4 448 865	15 396 925
2023	3 662 962	7 569 748	4 564 536	15 797 245
TOTAL	10 712 767	22 138 627	13 349 526	46 200 920

ANNEX 2. Estimates of people requiring treatment for Schistosomiasis and STH by Health District in Cameroon

TOTAL		26 932 431	3 479 667	7 190 957	15 189 896	0	4 250 191	3 035 995	7 286 186	3 479 667	7 190 957	4 336 126	15 006 750
Region	Health District	Estimated population by health district in 2021				Population requiring PC for SCH				Population requiring PC for STH			
		Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total	Pre-SAC	SAC	Adults	Total
Adamawa	BANKIM	118 390	15 296	31 610	66 772		31 610	16 693	48 303	15 296	31 610	33 386	80 292
	BANYO	163 281	21 096	43 596	92 090		43 596	46 045	89 641	21 096	43 596	23 023	87 715
	DJOHONG	81 261	10 499	21 697	45 831		21 697	11 458	33 155	10 499	21 697	22 916	55 112
	MEIGANGA	169 553	21 906	45 271	95 628		45 271	23 907	69 178	21 906	45 271	47 814	114 991
	NGAOUNDAL	93 815	12 121	25 049	52 912		25 049	13 228	38 277	12 121	25 049	26 456	63 626
	NGAOUNDERE RURAL	252 687	32 647	67 467	142 515		67 467	71 258	138 725	32 647	67 467	71 258	171 372
	NGAOUNDERE URBAIN	405 471	52 387	108 261	228 686		108 261		108 261	52 387	108 261	57 172	217 820
	TIBATI	110 466	14 272	29 494	62 303		29 494		29 494	14 272	29 494	31 152	74 918
TIGNERE	123 265	15 926	32 912	69 521		32 912	34 761	67 673	15 926	32 912	34 761	83 599	
Centre	AKONOLINGA	89 063	11 507	23 780	50 232				0	11 507	23 780	25 116	60 403
	AWAE	28 876	3 731	7 710	16 286				0	3 731	7 710	8 143	19 584
	AYOS	43 422	5 610	11 594	24 490		11 594	6 123	17 717	5 610	11 594	12 245	29 449
	BAFIA	172 229	22 252	45 985	97 137		45 985	48 569	94 554	22 252	45 985	48 569	116 806
	BIYEM ASSI	398 470	51 482	106 391	224 737				0	51 482	106 391	56 184	214 057
	CITE VERTE	445 411	57 547	118 925	251 212		118 925		118 925	57 547	118 925	62 803	239 275
	DJOUNGOLO	913 659	118 045	243 947	515 304		243 947	128 826	372 773	118 045	243 947	128 826	490 818
	EBEBDA	22 847	2 952	6 100	12 886				0	2 952	6 100	6 443	15 495
	EFOULAN	453 049	58 534	120 964	255 520		120 964	63 880	184 844	58 534	120 964	63 880	243 378
	ELIG MFOMO	17 327	2 239	4 626	9 772				0	2 239	4 626	2 443	9 308
	ESEKA	85 603	11 060	22 856	48 280		22 856	12 070	34 926	11 060	22 856	24 140	58 056
	ESSE	27 399	3 540	7 316	15 453				0	3 540	7 316	7 727	18 583
	EVODOULA	21 457	2 772	5 729	12 102				0	2 772	5 729	6 051	14 552
	MBALMAYO	128 236	16 568	34 239	72 325		34 239	18 081	52 320	16 568	34 239	36 163	86 970
	MBANDJOCK	62 417	8 064	16 665	35 203				0	8 064	16 665	17 602	42 331
	MBANKOMO	33 019	4 266	8 816	18 623		8 816	4 656	13 472	4 266	8 816	9 312	22 394
	MFOU	108 612	14 033	28 999	61 257		28 999	30 629	59 628	14 033	28 999	30 629	73 661
	MONATELE	51 751	6 686	13 818	29 188				0	6 686	13 818	14 594	35 098
	NANGA EBOKO	67 310	8 696	17 972	37 963				0	8 696	17 972	18 982	45 650
	NDIKINIMEKI	47 506	6 138	12 684	26 793		12 684	13 397	26 081	6 138	12 684	13 397	32 219
	NGOG MAPUBI	56 742	7 331	15 150	32 002				0	7 331	15 150	16 001	38 482
	NGOUMOU	46 122	5 959	12 315	26 013		12 315	6 503	18 818	5 959	12 315	13 007	31 281
	NKOLBISSON	181 593	23 462	48 485	102 418		48 485	25 605	74 090	23 462	48 485	25 605	97 552
	NKOLNDONGO	909 991	117 571	242 968	513 235		242 968	128 309	371 277	117 571	242 968	128 309	488 848
	NTUI	136 879	17 685	36 547	77 200		36 547	19 300	55 847	17 685	36 547	38 600	92 832
	OBALA	135 387	17 492	36 148	76 358				0	17 492	36 148	38 179	91 819
OKOLA	49 629	6 412	13 251	27 991				0	6 412	13 251	13 996	33 659	
SAA	74 494	9 625	19 890	42 015				0	9 625	19 890	21 008	50 523	
SOA	47 785	6 174	12 759	26 951				0	6 174	12 759	6 738	25 671	
YOKO	45 326	5 856	12 102	25 564				0	5 856	12 102	12 782	30 740	

	TOTAL	26 932 431	3 479 667	7 190 957	15 189 896	0	4 250 191	3 035 995	7 286 186	3 479 667	7 190 957	4 336 126	15 006 750
Region	Health District	Estimated population by health district in 2021				Population requiring PC for SCH				Population requiring PC for STH			
		Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total	Pre-SAC	SAC	Adults	Total
East	ABONG MBANG	83 731	10 818	22 356	47 224				0	10 818	22 356	23 612	56 786
	BATOURI	118 426	15 301	31 620	66 792				0	15 301	31 620	33 396	80 317
	BERTOUA	337 939	43 662	90 230	190 598		90 230	47 650	137 880	43 662	90 230	95 299	229 191
	BETARE OYA	157 814	20 390	42 136	89 007		42 136	22 252	64 388	20 390	42 136	44 504	107 030
	DOUME	52 068	6 727	13 902	29 366		13 902	7 342	21 244	6 727	13 902	14 683	35 312
	GAROUA BOULAI	119 533	15 444	31 915	67 417				0	15 444	31 915	33 709	81 068
	KETTE	77 810	10 053	20 775	43 885		20 775	10 971	31 746	10 053	20 775	21 943	52 771
	LOMIE	46 604	6 021	12 443	26 285				0	6 021	12 443	13 143	31 607
	MBANG	33 533	4 332	8 953	18 913				0	4 332	8 953	9 457	22 742
	MESSAMENA	31 494	4 069	8 409	17 763				0	4 069	8 409	8 882	21 360
	MOLOUDOU	49 876	6 444	13 317	28 130				0	6 444	13 317	14 065	33 826
	NDELELE	99 363	12 838	26 530	56 041		26 530	14 010	40 540	12 838	26 530	28 021	67 389
	NGUELEMENDOUKA	31 474	4 066	8 404	17 751				0	4 066	8 404	8 876	21 346
	YOKADOUMA	120 786	15 606	32 250	68 123				0	15 606	32 250	34 062	81 918
Far North	BOGO	123 305	15 931	32 922	69 544		32 922	17 386	50 308	15 931	32 922		48 853
	BOURHA	81 323	10 507	21 713	45 866		21 713	22 933	44 646	10 507	21 713	11 467	43 687
	FOTOKOL	70 286	9 081	18 766	39 641		18 766	9 910	28 676	9 081	18 766		27 847
	GAZAWA	77 988	10 076	20 823	43 985		20 823	10 996	31 819	10 076	20 823		30 899
	GOULFEY	101 416	13 103	27 078	57 199		27 078	28 600	55 678	13 103	27 078		40 181
	GUERE	141 495	18 281	37 779	79 803		37 779	39 902	77 681	18 281	37 779	19 951	76 011
	GUIDIGUIS	185 406	23 954	49 503	104 569		49 503	52 285	101 788	23 954	49 503	26 142	99 599
	HINA	138 142	17 848	36 884	77 912		36 884	38 956	75 840	17 848	36 884		54 732
	KAELE	120 660	15 589	32 216	68 052		32 216	34 026	66 242	15 589	32 216	17 013	64 818
	KAR HAY	139 490	18 022	37 244	78 672		37 244	39 336	76 580	18 022	37 244	19 668	74 934
	KOLOFATA	123 617	15 971	33 006	69 720		33 006	34 860	67 866	15 971	33 006	17 430	66 407
	KOUSSERI	454 968	58 782	121 476	256 602		121 476	64 151	185 627	58 782	121 476		180 258
	KOZA	178 498	23 062	47 659	100 673		47 659	50 337	97 996	23 062	47 659	25 168	95 889
	MADA	168 237	21 736	44 919	94 886		44 919	47 443	92 362	21 736	44 919	23 722	90 377
	MAGA	202 468	26 159	54 059	114 192		54 059	57 096	111 155	26 159	54 059	28 548	108 766
	MAKARY	135 980	17 569	36 307	76 693		36 307		36 307	17 569	36 307		53 876
	MAROUA 1	202 035	26 103	53 943	113 948		53 943	28 487	82 430	26 103	53 943	28 487	108 533
	MAROUA 2	208 783	26 975	55 745	117 754		55 745	29 439	85 184	26 975	55 745		82 720
	MAROUA 3	182 918	23 633	48 839	103 166		48 839	51 583	100 422	23 633	48 839		72 472
	MERI	154 884	20 011	41 354	87 355		41 354	43 678	85 032	20 011	41 354		61 365
	MINDIF	60 145	7 771	16 059	33 922		16 059	8 481	24 540	7 771	16 059	8 481	32 311
	MOGODE	130 042	16 801	34 721	73 344		34 721	36 672	71 393	16 801	34 721	18 336	69 858
	MOKOLO	303 355	39 193	80 996	171 092		80 996	85 546	166 542	39 193	80 996	42 773	162 962
	MORA	309 502	39 988	82 637	174 559		82 637	87 280	169 917	39 988	82 637		122 625
	MOULVOUDAYE	155 034	20 030	41 394	87 439		41 394	43 720	85 114	20 030	41 394	21 860	83 284
	MOUTOURWA	57 076	7 374	15 239	32 191		15 239	8 048	23 287	7 374	15 239		22 613
	PETTE	64 221	8 297	17 147	36 221		17 147	18 111	35 258	8 297	17 147	9 055	34 499
	ROUA	101 401	13 101	27 074	57 190		27 074	28 595	55 669	13 101	27 074		40 175
TOKOMBERE	153 047	19 774	40 864	86 319		40 864	21 580	62 444	19 774	40 864	21 580	82 218	
VELE	157 797	20 387	42 132	88 998		42 132	44 499	86 631	20 387	42 132	22 250	84 769	
YAGOUA	271 946	35 135	72 610	153 378		72 610	38 345	110 955	35 135	72 610	38 345	146 090	

	TOTAL	26 932 431	3 479 667	7 190 957	15 189 896	0	4 250 191	3 035 995	7 286 186	3 479 667	7 190 957	4 336 126	15 006 750
Region	Health District	Estimated population by health district in 2021				Population requiring PC for SCH				Population requiring PC for STH			
		Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total	Pre-SAC	SAC	Adults	Total
Littoral	ABO	30 969	4 001	8 269	17 467				0	4 001	8 269	8 734	21 004
	BANGUE	374 375	48 369	99 958	211 148				0	48 369	99 958		148 327
	BOKO	354 173	45 759	94 564	199 754				0	45 759	94 564		140 323
	BONASSAMA	538 262	69 543	143 716	303 580				0	69 543	143 716		213 259
	CITE PALMIERS	290 736	37 563	77 627	163 975				0	37 563	77 627		115 190
	DEIDO	584 279	75 489	156 002	329 533				0	75 489	156 002		231 491
	DIBOMBARI	43 274	5 591	11 554	24 407				0	5 591	11 554	12 204	29 349
	EDEA	181 587	23 461	48 484	102 415		48 484		48 484	23 461	48 484	51 208	123 153
	JAPOMA	177 100	22 881	47 286	99 884				0	22 881	47 286		70 167
	LOGBABA	265 095	34 250	70 780	149 514				0	34 250	70 780		105 030
	LOUM	71 320	9 215	19 042	40 224		19 042	20 112	39 154	9 215	19 042	20 112	48 369
	MANJO	41 310	5 337	11 030	23 299				0	5 337	11 030	11 650	28 017
	MANOKA	30 721	3 969	8 203	17 327				0	3 969	8 203	4 332	16 504
	MBANGA	83 149	10 743	22 201	46 896				0	10 743	22 201	23 448	56 392
	MELONG	111 748	14 438	29 837	63 026		29 837		29 837	14 438	29 837	31 513	75 788
	NDOM	27 411	3 542	7 319	15 460				0	3 542	7 319	7 730	18 591
	NEW BELL	306 997	39 664	81 968	173 146				0	39 664	81 968		121 632
	NGAMBE	15 048	1 944	4 018	8 487		4 018	4 244	8 262	1 944	4 018	4 244	10 206
	NJOMBE PENJA	58 621	7 574	15 652	33 062				0	7 574	15 652	16 531	39 757
	NKONDJOCK	26 592	3 436	7 100	14 998				0	3 436	7 100	7 499	18 035
NKONGSAMBA	120 609	15 583	32 203	68 023				0	15 583	32 203	34 012	81 798	
NYLON	438 299	56 628	117 026	247 201				0	56 628	117 026		173 654	
POUMA	20 455	2 643	5 461	11 537				0	2 643	5 461	5 769	13 873	
YABASSI	24 108	3 115	6 437	13 597			6 799	6 799	3 115	6 437	6 799	16 351	
North	BIBEMI	165 205	21 344	44 110	93 176		44 110	46 588	90 698	21 344	44 110	23 294	88 748
	FIGUIL	102 532	13 247	27 376	57 828		27 376	14 457	41 833	13 247	27 376	14 457	55 080
	GAROUA I	295 753	38 211	78 966	166 805		78 966	41 701	120 667	38 211	78 966	41 701	158 878
	GAROUA II	322 534	41 671	86 117	181 909		86 117	90 955	177 072	41 671	86 117	45 477	173 265
	GASCHIGA	151 419	19 563	40 429	85 400		40 429	21 350	61 779	19 563	40 429		59 992
	GOLOMBE	68 020	8 788	18 161	38 363		18 161	19 182	37 343	8 788	18 161		26 949
	GUIDER	242 688	31 355	64 798	136 876		64 798	68 438	133 236	31 355	64 798	34 219	130 372
	LAGDO	224 320	28 982	59 893	126 516		59 893	63 258	123 151	28 982	59 893	31 629	120 504
	MAYO OULO	147 702	19 083	39 436	83 304		39 436	20 826	60 262	19 083	39 436	20 826	79 345
	NGONG	279 353	36 092	74 587	157 555		74 587	78 778	153 365	36 092	74 587	39 389	150 068
	PITOA	162 042	20 936	43 265	91 392		43 265	45 696	88 961	20 936	43 265	22 848	87 049
	POLI	117 270	15 151	31 311	66 140		31 311	33 070	64 381	15 151	31 311	16 535	62 997
	REY BOUBA	190 174	24 570	50 776	107 258		50 776	53 629	104 405	24 570	50 776	53 629	128 975
	TCHOLLIRE	212 762	27 489	56 807	119 998		56 807	59 999	116 806	27 489	56 807	59 999	144 295
	TOUBORO	314 497	40 633	83 971	177 376		83 971	88 688	172 659	40 633	83 971		124 604
North West	AKO	64 458	8 328	17 210	36 354		17 210	18 177	35 387	8 328	17 210	18 177	43 715
	BAFUT	42 510	5 492	11 350	23 976				0	5 492	11 350	5 994	22 836
	BALI	28 236	3 648	7 539	15 925				0	3 648	7 539		11 187
	BAMENDA	438 574	56 664	117 099	247 356				0	56 664	117 099	123 678	297 441

	TOTAL	26 932 431	3 479 667	7 190 957	15 189 896	0	4 250 191	3 035 995	7 286 186	3 479 667	7 190 957	4 336 126	15 006 750
Region	Health District	Estimated population by health district in 2021				Population requiring PC for SCH				Population requiring PC for STH			
		Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total	Pre-SAC	SAC	Adults	Total
North West	BATIBO	73 198	9 457	19 544	41 284				0	9 457	19 544	10 321	39 322
	BENAKUMA	51 887	6 704	13 854	29 264				0	6 704	13 854	14 632	35 190
	FUNDONG	127 668	16 495	34 087	72 005		34 087	36 003	70 090	16 495	34 087	18 001	68 583
	KUMBO EAST	110 354	14 258	29 465	62 240				0	14 258	29 465	31 120	74 843
	KUMBO WEST	106 064	13 703	28 319	59 820				0	13 703	28 319	29 910	71 932
	MBENGWI	45 144	5 833	12 053	25 461				0	5 833	12 053	12 731	30 617
	NDOP	188 393	24 340	50 301	106 254				0	24 340	50 301	26 564	101 205
	NDU	68 555	8 857	18 304	38 665		18 304	19 333	37 637	8 857	18 304	9 666	36 827
	NJIKWA	22 287	2 879	5 951	12 570				0	2 879	5 951	6 285	15 115
	NKAMBE	123 468	15 952	32 966	69 636				0	15 952	32 966	34 818	83 736
	NWA	59 441	7 680	15 871	33 525				0	7 680	15 871	8 381	31 932
	OKU	61 569	7 955	16 439	34 725				0	7 955	16 439	8 681	33 075
	SANTA	76 692	9 909	20 477	43 254				0	9 909	20 477		30 386
	TUBAH	60 297	7 790	16 099	34 008				0	7 790	16 099	17 004	40 893
WUM	112 783	14 572	30 113	63 610				0	14 572	30 113	31 805	76 490	
West	BAFANG	81 050	10 472	21 640	45 712				0	10 472	21 640	22 856	54 968
	BAHAM	46 235	5 974	12 345	26 077				0	5 974	12 345	13 039	31 358
	BAMENDJOU	42 467	5 487	11 339	23 951				0	5 487	11 339	11 976	28 802
	BANDJA	28 284	3 654	7 552	15 952				0	3 654	7 552	7 976	19 182
	BANDJOUN	97 170	12 554	25 944	54 804				0	12 554	25 944	27 402	65 900
	BANGANGTE	119 061	15 383	31 789	67 150		31 789	16 788	48 577	15 383	31 789	16 788	63 960
	BANGOURAIN	52 143	6 737	13 922	29 409				0	6 737	13 922	14 705	35 364
	BATCHAM	90 686	11 717	24 213	51 147				0	11 717	24 213	25 574	61 504
	DSCHANG	237 828	30 727	63 500	134 135				0	30 727	63 500	67 068	161 295
	FOUMBAN	254 530	32 885	67 960	143 555		67 960	35 889	103 849	32 885	67 960	71 778	172 623
	FOUMBOT	135 221	17 471	36 104	76 265		36 104	19 066	55 170	17 471	36 104	38 133	91 708
	GALIM	66 594	8 604	17 781	37 559				0	8 604	17 781	18 780	45 165
	KEKEM	48 054	6 209	12 830	27 102				0	6 209	12 830	6 776	25 815
	KOUOPTAMO	70 268	9 079	18 762	39 631		18 762	9 908	28 670	9 079	18 762	19 816	47 657
	MALENTOUEN	149 867	19 363	40 014	84 525		40 014	42 263	82 277	19 363	40 014	21 131	80 508
	MASSANGAM	50 383	6 509	13 452	28 416				0	6 509	13 452	14 208	34 169
	MBOUDA	192 737	24 902	51 461	108 704				0	24 902	51 461	54 352	130 715
	MIFI	441 133	56 994	117 783	248 799				0	56 994	117 783	124 400	299 177
	PENKA MICHEL	86 019	11 114	22 967	48 515				0	11 114	22 967	24 258	58 339
SANTCHOU	38 077	4 920	10 167	21 475				0	4 920	10 167	10 738	25 825	
South	AMBAM	119 771	15 474	31 979	67 551				0	15 474	31 979	33 776	81 229
	DJOUUM	42 463	5 486	11 338	23 949				0	5 486	11 338	11 975	28 799
	EBOLOWA	235 082	30 373	62 767	132 586				0	30 373	62 767	66 293	159 433
	KRIBI	174 529	22 549	46 599	98 434				0	22 549	46 599	49 217	118 365
	LOLODORF	42 762	5 525	11 417	24 118				0	5 525	11 417	12 059	29 001
	MEYOMESSALA	69 953	9 038	18 677	39 453				0	9 038	18 677	19 727	47 442
	MVANGAN	36 172	4 673	9 658	20 401				0	4 673	9 658	10 201	24 532
	OLAMZE	15 975	2 064	4 265	9 010				0	2 064	4 265	4 505	10 834

	TOTAL	26 932 431	3 479 667	7 190 957	15 189 896	0	4 250 191	3 035 995	7 286 186	3 479 667	7 190 957	4 336 126	15 006 750
Region	Health District	Estimated population by health district in 2021				Population requiring PC for SCH				Population requiring PC for STH			
		Total	Pre-SAC	SAC	Adults	Pre-SAC	SAC	Adults	Total	Pre-SAC	SAC	Adults	Total
South	SANGMELIMA	111 304	14 380	29 718	62 775				0	14 380	29 718	31 388	75 486
	ZOETELE	46 867	6 055	12 513	26 433				0	6 055	12 513	13 217	31 785
	AKWAYA	59 409	7 676	15 862	33 507				0	7 676	15 862	16 754	40 292
	BAKASSI	35 910	4 640	9 588	20 253				0	4 640	9 588	5 063	19 291
	BANGEM	25 991	3 358	6 940	14 659				0	3 358	6 940	3 665	13 963
	BUEA	180 844	23 365	48 285	101 996		48 285	25 499	73 784	23 365	48 285	50 998	122 648
	EKONDO TITI	58 617	7 573	15 651	33 060		15 651	16 530	32 181	7 573	15 651	8 265	31 489
	EYUMODJOCK	43 392	5 606	11 586	24 473				0	5 606	11 586	6 118	23 310
South West	FONTEM	127 921	16 527	34 155	72 147				0	16 527	34 155	36 074	86 756
	KONYE	135 691	17 531	36 229	76 530				0	17 531	36 229	38 265	92 025
	KUMBA	379 114	48 982	101 223	213 820				0	48 982	101 223	53 455	203 660
	LIMBE	206 887	26 730	55 239	116 684				0	26 730	55 239	58 342	140 311
	MAMFE	85 487	11 045	22 825	48 215				0	11 045	22 825	24 108	57 978
	MBONGE	94 121	12 160	25 130	53 084		25 130	26 542	51 672	12 160	25 130	13 271	50 561
	MUNDEMBA	22 345	2 887	5 966	12 603				0	2 887	5 966	3 151	12 004
	MUYUKA	118 277	15 281	31 580	66 708		31 580	16 677	48 257	15 281	31 580	16 677	63 538
	NGUTI	39 105	5 052	10 441	22 055		10 441	5 514	15 955	5 052	10 441	5 514	21 007
	TIKO	157 784	20 386	42 128	88 990		42 128	22 248	64 376	20 386	42 128	22 248	84 762
	TOMBEL	82 303	10 634	21 975	46 419				0	10 634	21 975		32 609
WABANE	46 745	6 039	12 481	26 364				0	6 039	12 481	13 182	31 702	

ANNEX 3. Health District endemicity for Schistosomiasis and STH by parasite species

The health district endemicity for each species of schistosomes and soil-transmitted helminths will be established, and will be regularly updated after the completion of precision mapping.

Region	Health District	<i>Schistosoma</i> species			STH species		
		<i>S. haematobium</i>	<i>S. mansoni</i>	<i>S. guineensis</i>	<i>A. lumbricoides</i>	<i>T. trichiura</i>	<i>A. duodenale/N. americanus</i>
Adamawa	Bankim	+	+		+	+	+
	Banyo	+	+		+	+	+
	Djohong		+			+	+
	Meiganga	+	+			+	+
	Ngaoundal		+				
	Ngaoundere Rural	+	+				+
	Ngaoundere Urbain	+	+		+	+	+
	Tibati	+	+				+
	Tignère	+	+				+
Centre	Akonolinga	+	+		+	+	+
	Awae				+	+	+
	Ayos	+			+	+	
	Bafia	+	+		+	+	+
	Biyem Assi		+		+	+	+
	Cite Verte		+		+	+	+
	Djoungolo		+		+	+	+
	Ebebda				+	+	+
	Efoulan		+		+	+	+
	Elig Mfomo		+		+	+	+
	Eseka		+	+	+	+	+
	Esse				+	+	+
	Evodoula				+	+	+
	Mbalmayo	+	+		+	+	+
	Mbandjock	+			+	+	
	Mbankomo		+		+	+	+
	Mfou		+		+	+	+
	Monatele				+	+	+
	Nanga Eboko	+			+	+	+
	Ndikinimeki		+		+	+	+
	Ngog Mapubi		+	+	+	+	+
	Ngoumou		+	+	+	+	+
	Nkolbisson		+		+	+	+
	Nkolndongo		+		+	+	+
	Ntui		+		+	+	+
	Obala	+	+		+	+	+
	Okola		+		+	+	+
Saa		+		+	+	+	
Soa		+		+	+	+	
Yoko				+	+		

ANNEX 4. Scorecard: Following progress

In the future, preventive chemotherapy will be implemented at the sub-district level. Therefore, the ambition is to develop a narrower scorecard by health areas. This can only be done after having completed precision mapping in all health areas of Cameroon.

Scorecard of the evolution of Health District endemicity for schistosomiasis and STH over years in Cameroon

Region	District de Santé	SCHISTOSOMIASIS				STH			
		1985	2010	2018	Overall (Max)	1985	2010	2018	Overall (Max)
Adamaoua	Bankim	3,0	18,0		18,0	73,3	38,0		73,3
	Banyo	79,5	65,2		79,5	44,1	10,0		44,1
	Djohong	41,7	10,0		41,7	74,5	14,0		74,5
	Meiganga	40,0	20,4		40,0	76,5	18,8		76,5
	Ngaoundal	7,7	24,5		24,5	68,8	12,0		68,8
	Ngaoundere Rural	62,0	12,0		62,0	56,0	6,1		56,0
	Ngaoundere Urbain	6,5	4,2		6,5	39,1	10,2		39,1
	Tibati	7,5	8,0		8,0	62,5	26,0		62,5
Tignere	89,6	58,0		89,6	77,1	24,0		77,1	
Centre	Akonolinga	3,1	8,0		8,0	100,0	71,4		100,0
	Awae	2,8	0,0		2,8	100,0	40,0		100,0
	Ayos	3,2	10,0	0,0	10,0	100,0	30,0	71,9	100,0
	Bafia	51,5	52,8	20,1	52,8	100,0	22,4	5,6	100,0
	Biyemassi		8,0	0,0	8,0		22,0	5,0	22,0
	Cite-Verte		9,6	0,0	9,6		13,8	10,0	13,8
	Djoungolo	0,0	21,0	2,0	21,0	45,5	16,0	8,9	45,5
	Ebebda	0,0	0,0		0,0	97,6	14,6		97,6
	Efoulan		24,2	3,0	24,2		13,1	19,1	19,1
	Elig-Nfomo		2,0		2,0		44,0		44,0
	Eseka	13,6	4,3	4,3	13,6	100,0	17,6	21,9	100,0
	Esse	1,9	0,0		1,9	96,2	42,0		96,2
	Evodoula	0,0	0,0		0,0	100,0	36,0		100,0
	Mbalmayo	9,1	14,0	2,1	14,0	100,0	57,1	46,0	100,0

Five colors are used for the scorecard and are defined as follows:

	No transmission. Prevalence = 0%
	Low transmission. Prevalence = 0.1-9.910% for SCH or 0.1-19.9% for STH
	Moderate transmission. Prevalence = 10-49.9% for SCH or 20-49.9% for STH
	High transmission. Prevalence ≥ 50%
	No Data

ANNEX 5. Integration of the road map programmatic actions within the health sector strategy (Cross-cutting approach)

Cameroon's 2016-2027 Health Sector Strategy (HSS) aims to contribute to accelerate the development of human capital for growth and sustainable development and to align with the Sustainable Development Goals by accelerating the implementation of universal health coverage. The 2016-2027 HSS sets a new vision in compliance with national and international priorities, the stakes, and the great challenges of the sector. The delimitation and the segmentation of the health sector are made in five components, namely:

- (i) Health promotion,
- (ii) Disease prevention,
- (iii) Case management,
- (iv) Health system strengthening, and
- (v) Governance and strategic steering.

Mainstreaming the program activities into the

health system to deliver interventions through its infrastructure will contribute to sustainable, efficient disease prevention and control, and enable (i) planning to be incorporated into overall national health planning and budgeting, (ii) data management to be included in health management information systems at all levels, and (iii) delivery of medicines to be coordinated through national medicines supply and logistics systems.

Therefore, the present road map programmatic actions, targets, and milestones are aligned with the Health Sector Strategy, as well as with the 2030 Sustainable Development Goals and the milestones of the WHO 2030 road map for neglected tropical diseases.

This alignment will be most critical in writing the annual work plans and budgets for implementation of activities for the control and elimination of schistosomiasis and STH.

The detailed budget will also be aligned to health sector strategy components, as shown below.

STRATEGY	TOTAL AMOUNT BY YEAR (FCFA)												TOTAL 2020-2030
	Implementation strategies	Activities	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
(i) HEALTH PROMOTION	Advocacy and funding	Organize workshop for identification of behavioral problems related SCH and STH											
	Intensify multi-sectorial actions	Development and Production of Social mobilization campaign material											
	Advocacy and funding	Distribution of Social mobilization-campaign material and Dissemination											
	Encourage country and community ownership	National-central Advocacy campaign											
		Regional Advocacy Meetings											



Republic of Cameroon
Ministry of Public Health
National Programme for the Control of Schistosomiasis and Intestinal
Helminthiasis
Site Web : www.pnlshi.org
E-mail: pnlshi@schisto.com