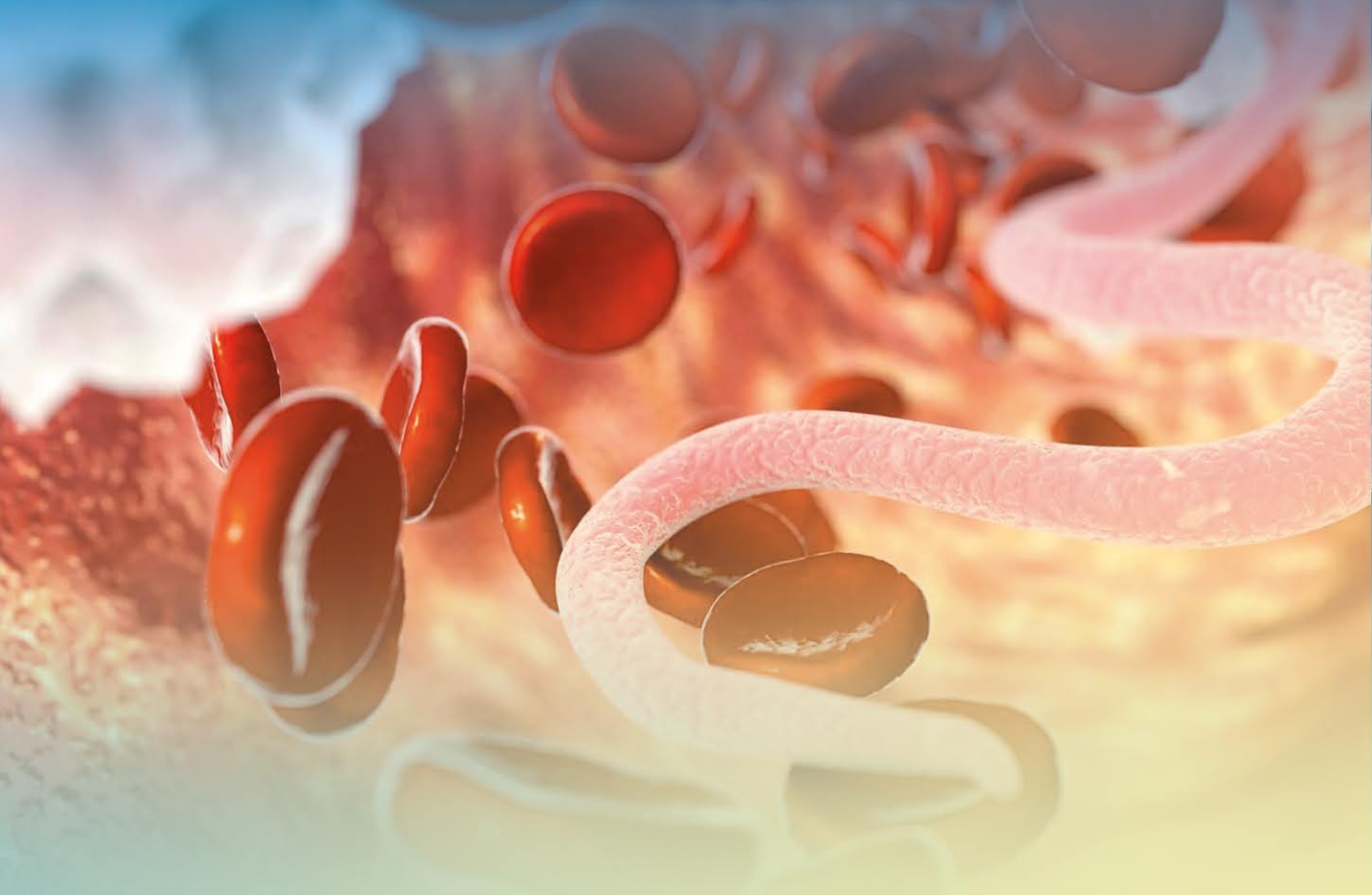
MINISTRY OF HEALTH AND SPORTS

World Health Organization
Myanmar

NATIONAL STRATEGIC PLAN FOR THE ELIMINATION OF LYMPHATIC FILARIASIS IN MYANMAR, 2017-2020



2019

National Strategic Plan for the Elimination of Lymphatic Filariasis in Myanmar, 2017-2020

July 2019

Foreword

Lymphatic Filariasis (LF) is a significant public health problem in South-east Asia region including Myanmar. The disease is a major cause of disability and social and economic deprivation. Out of 74 districts in Myanmar, 45 are endemic for the disease and 40 million people are at risk of infection. LF is one of the WHO South East Asia Regional filariasis programme.

Myanmar launched a National Programme to Eliminate Lymphatic Filariasis (NPELF) in the year 2001, with the support of WHO. In 2017, all implementing units covered at least 5 rounds of successful MDA. The Vector Borne Disease Control Programme has developed its first ever LF elimination plan in line with the WHO SEARO target of LF elimination by 2020. It provides a broad plan of action to achieve the goal of LF elimination in Myanmar by 2020 and to overcome the challenges encountered in the program. The plan has been prepared following the through national programme review for LF.

We appreciate Vector Borne Disease Control Programme under Department of Public Health for their hard work and efforts to develop such a very important and timely 'National Strategic Plan for Elimination of LF in Myanmar'. We would like to express our special thanks to WHO for their technical support for LF situation analysis and the development of this plan.

We hope the plan will act as a guide to support planning and implementation of LF activities and be an advocacy tool for internal and external resource mobilization. We also expect that all partners and stakeholders will use this strategy for programme planning and implementation for elimination of Lymphatic Filariasis from Myanmar.

Table of Contents

Foreword

It was a long felt need to develop the strategy for dengue prevention and control in Myanmar. In fact, this has been developed for the first time in the history of Vector Borne Disease Control Programme in the country.

There is a long history of dengue in our country. In 1960, sporadic cases of dengue had been reported. First dengue outbreak occurred in 1970 in Yangon with 1,654 cases and 91 deaths. Since then there were frequent reported outbreaks of the disease in different urban areas of the country. Initially it was limited to the urban areas and later on, it started to spread towards rural areas also. It is one of the major public health problems in the country. The trend of the disease is on the increase and in 2015 all States/Regions reported dengue cases. It is a notifiable disease and all health facilities irrespective of public or private should report the cases.

We would like to thank the leadership of Vector Borne Disease Control Programme under the Department of Public Health to develop such a timely costed 'National Strategic Plan for Dengue Prevention and Control 2016-2020'. We would like to express our thanks to the drafting group who worked tirelessly to develop this costed plan. Special thanks also go to WHO for their technical assistance in the development of this plan.

We hope the plan will act as a guide to support planning and implementation and be an advocacy tool to secure funding, both domestic and external. We also expect that all partners and stakeholders will use this strategy for programme planning and implementation.

Abbreviations

Ag	Antigen
DEC	Diethylcarbamazine
DoE	Department of Education
DFID	United Kingdom Department of International Development
EU	Evaluation Unit
GDP	Gross Domestic Product
IEC	Information, Education and Communication
IU	Implementation Unit
LF	Lymphatic Filariasis
MDA	Mass Drug Administration
Mf	Microfilaria
M & E	Monitoring and Evaluation
MOHS	Ministry of Health and Sports
MMDP	Morbidity Management and Disability Prevention
NVBDCP	National Vector Borne Disease Control Programme
NTD	Neglected Tropical Diseases
NPELF	National Programme to Eliminate Lymphatic Filariasis
RHC	Rural Health Centre
SHC	Sub-Rural Health Centre
SEARO	South-east Asia Regional Office
TAS	Transmission Assessment Survey
TMO	Township Medical Officer
USAID	United States Agency for International Development
WHO	World Health Organization
FTS	Filaria test Strip
CNTD	Community Neglected Tropical Disease
STH	Soil transmitted Helminthiasis
GNNTD	Global Network for Neglected Tropical Diseases
UHC	Universal Health Coverage
PHC	Primary Heath Care
SAE	Severe Adverse Event

Executive Summary

Lymphatic Filariasis (LF) is a significant public health problem in South-east Asia region. Nine countries of the region are endemic and account for 58.7% of the global population at risk of LF infection. The disease is a major cause of disability and social and economic deprivation. Myanmar is one of the large countries in the region impacted by LF. Of the 74 districts, 45 are endemic for the disease and 40 million people were at risk of infection in the country. The disease is more wide spread in Magway, Sagaing and Mandalay regions.

Earlier, efforts to control LF in Myanmar were very minimum. Nevertheless, launching of the Global Programme to Eliminate LF (GPELF) by the World Health Organization (WHO) provided a good opportunity to Myanmar and other countries of the region to control/ eliminate the disease. The core strategies of GPELF are (a) annual single dose mass drug administration (MDA) to interrupt transmission and (b) morbidity management and disability prevention (MMDP) to alleviate suffering in chronic patients. GPELF consists of (i) mapping of endemic areas (ii) implementation of 5-6 rounds of MDA supported by Monitoring and Evaluation (M & E) (iii) surveys to assess transmission interruption and stop MDA and (iv) post-MDA surveillance for LF elimination validation and (v) post-validation surveillance for LF elimination verification. The drugs recommended for MDA were combination of diethylcarbamazine (DEC) plus Albendazole in South-east Asia region. The target date set by WHO for global elimination of LF as a public health problem is 2020.

As many other countries, Myanmar also launched a National Programme to Eliminate LF (NPELF) in the year 2001, when the MDA programme was launched in two districts. In 2002, the programme was expanded to cover 10 districts, located in Magway and Sagaing regions. By 2004, MDA was in place in 22 of the 45 endemic districts. Around this time, further expansion of the programme was constrained by bottlenecks in DEC supplies. However, the programme was expanded to all endemic districts by 2013. MDA continues to be the major activity of the programme.

Highly endemic regions of Magway and Sagaing received 5-16 rounds of MDA by 2018 and Mandalay 6-11 rounds. Relatively low endemic states – Rakhine and Chin – completed 6-12 rounds of MDA. Seven other endemic regions, with relatively very low baseline Mf prevalence, completed 6 rounds of MDA as 2018. Recent Monitoring and & Evaluation (M & E) data show that the antigen (Ag) prevalence was in the range of 5.0% to 15.0% in the three highly endemic regions in 2015, by when these regions received 5-16 rounds of MDA. In eight states/regions, where the baseline Mf prevalence was very low and 6 rounds of MDA were implemented, M & E activities are to be undertaken. So far, 5 districts completed and stopped MDA, after implementing the transmission assessment surveys (TAS).

The current challenges for the programme include (a) it operates under the circumstances of low priority and meagre resources (b) advocacy, political commitment and partnerships are sub-optimal (c) MDA is implemented with no well-defined leadership at various levels amidst other competing health priorities (d) M & E is undermined and its quality a concern (e) MMDP activities are a low priority, due to more focus on MDA (f) data collection, management and record maintenance are inadequate.

In the light of the target date of 2020 set by the WHO, a national strategic plan for the elimination of LF (2017-2020) is prepared. It provides a broad plan of action to achieve the goal of LF elimination by 2020 in Myanmar. The major objectives of the strategic plan are:

1. To enhance political and policy makers' commitment to the programme through advocacy measures
2. To achieve transmission interruption in all districts by strengthening MDA programme at state/ regional, township and community level
3. To strengthen M & E and surveillance measures and capacity building
4. To expand MMDP activities to provide services to all people affected by chronic disease
5. To build partnerships and mobilize resources for effective implementation of programme activities
6. To establish and operationalize a clean and efficient data management system

Objective 1 envisages strengthening of advocacy among political class, policy makers and other stakeholders and establishment of robust national and regional Taskforce to monitor and guide the programme and improvement of ownership of the programme.

Objective 2 calls for strengthening of MDA through better programme management at state/ regional and township level, social mobilization, good training and improvement in implementation of the programme at community level, with major focus on drug distributor-household interaction and ensuring compliance with treatment.

Objective 3 deals with the imperative of strengthening the M & E procedure and improving the quality and capacity and timely implementation of activities to strengthen the decision making process, such as stopping the MDA.

Objective 4 highlights the need for expanding the MMDP activities to all endemic districts, which constitute the second pillar of the programme, through the disease burden data updating, training, health facility strengthening and capacity building.

Objective 5 underlines securing adequate funding for the programme through consistent efforts from the MOHS and other internal sources and international organizations and

building partnerships with various stakeholders to guide the programme.

Objective 6 focuses on the crucial need for careful organization, management and dissemination of data for informed decision making and documenting the evidence for elimination of LF.

In this strategic plan, a plan of activities for 2017-2020 is outlined, on the basis of current MDA and LF prevalence situation in different districts. It is envisaged that the National Vector Borne Disease Control Programme (NVBDCP) will take the lead, effectively involve the states and regions in implementation of the strategic plan and programme. A concerted and coordinated action during the next four years (2017-2020) is required to stop MDA in the entire country, complete M & E and surveillance in most of the districts and scale up MMDP, leading to elimination of LF in Myanmar by 2020.

1. Myanmar overview

The Republic of the Union of Myanmar is a prominent South-east Asian country. The country was formerly known as Burma. It is bordered by China, Bangladesh, India, China, Lao PDR and Thailand. It has a coast line of 1,930 Kms. Myanmar consists of (i) the Western Hill Region (ii) the Central Valley Region and the (iii) Eastern Hill Region. Many mountain ranges exist within Myanmar, all of which run north-to-south from the Himalayas. The mountain chains divide Myanmar's three river systems, which are the Ayeyarwady, Thanlwin and the Sittaung rivers. The Ayeyarwady River is Myanmar's longest river, nearly 2,170 kilometres long. Fertile lands exist in the valleys between the mountain chains. The majority of Myanmar's population lives in the Ayeyarwady valley. Forest covers more than 50% of Myanmar's land area. The climate in Myanmar is subequatorial with monsoon features. The Northern regions of Myanmar are the coolest, with average temperatures of 21 °C. Coastal and delta regions have an average maximum temperature of 32 °C.

The area of Myanmar is 676,578 sq kms. According to census of 2014, the population of the country was 51,419,420 million people and its 76 per square kilometre, among the lowest in Southeast Asia. The Bamar form about 68% of the population. The other population groups include the Shan, Kachin Kayah, Kayin, Chin, Mon, Rakhine, Shan, overseas Chinese and Indians. Myanmar is ethnically diverse, with 135 distinct ethnic groups. Buddhists constitute 87.9% of the population.

Myanmar consists of 7 regions and 7 states (Figure 1), which are further organized into districts, townships, towns and cities. Regions are predominantly inhabited by the dominant ethnic group and states by ethnic minorities. The townships and towns/cities are organized into wards. The administrative units include 74 districts, 330 townships,

13,620 village tracts and 63,938 villages (Table 1). The average number of villages per district is 876, and the average population size is 0.71 million. Townships are administrative units smaller than the district and each township serves 50-100 villages. Nay Pyi Taw is the capital city. Yangon, with a population of 5.21 million, is the largest city, followed by Mandalay, with a population of 1.23 million.

Myanmar is a developing country. Limited educated workforce skilled in modern technology hinders Myanmar's economy, although recent reforms aim to make this a thing of the past. The adult literacy rate is >90% in 2011. The infrastructure is relatively less developed. The total nominal Gross Domestic Product (GDP) is US$ 68.28 billion and per capita GDP is US$ 1,306 in 2016. The major agricultural product is rice, which covers about 60% of the country's total cultivated land area.

Figure 1. Map showing different regions and states of Myanmar

Table 1. Administrative divisions of Myanmar

No.	Region/ State	Dis-trict	Town-ship	Sub-town-ship	Town	Ward	Village -tract	Village
1	Kachin State	4	18	11	29	152	597	2582
2	Kayah State	2	7	1	8	31	74	511
3	Kayin State	4	7	9	18	84	376	2063
4	Chin State	3	9	4	13	40	470	1346
5	Sagaing Region	10	37	8	46	228	1761	6004

No.	Region/ State	Dis-trict	Town-ship	Sub-town-ship	Town	Ward	Village -tract	Village
6	Tanintharyi Region	3	10	6	16	83	264	1230
7	Bago Region	4	28	-	41	282	1420	6509
8	Magway Region	5	25	1	27	166	1539	4795
9	Mandalay Region	7	28	2	28	270	1416	4781
10	Mon State	2	10	2	14	90	377	1178
11	Rakhine State	5	17	3	21	138	1036	3760
12	Yangon Region	4	45	1	21	742	619	2129
13	Shan State	13	55	29	84	498	1566	14351
14	Ayeyarwady Region	6	26	7	39	273	1919	11903
15	Naypyitaw	2	8	-	8	56	186	796
	Total	**74**	**330**	**84**	**413**	**3133**	**13620**	**63938**

2. Health system

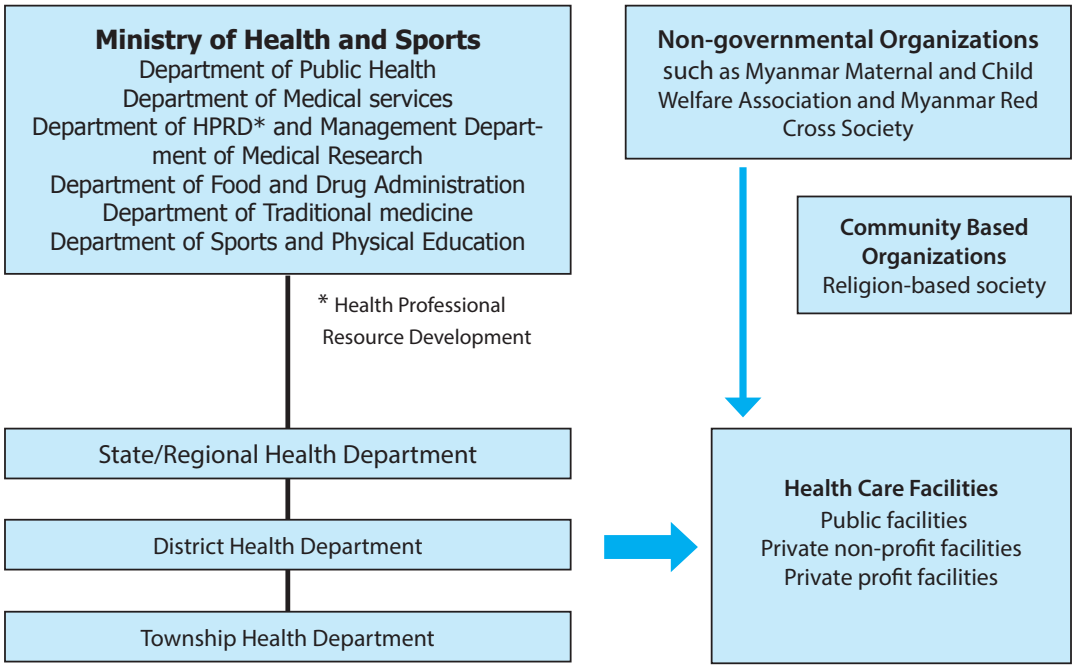
The Government of Myanmar has committed, despite a lot of constraints itself to "the uplift of the health, fitness and educational standards of the entire nation". Myanmar is a heterogeneous country and there are several obstacles to the provision of health services to the entire country. The general state of health care in Myanmar has been improving. Although the healthcare system consists of public and private sectors both in the aspects of finance and supply, MOHS remains the major provider of healthcare services. There are 7 departments in the MOHS, which facilitate all aspects of health for the whole population (Figure 2).

The Department of Public Health (DPH) provides primary healthcare and basic health services; nutrition promotion, environmental sanitation, maternal and child health, school health, and health education. Under DPH, the Disease Control Division and Central Epidemiology Unit cover prevention and control of infectious diseases, disease surveillance, outbreak investigations, and capacity building. The Department of Medical Services provides effective treatments and rehabilitation services. Curative services are provided by various categories of health facilities under the control of the Department. The Department of Health Professional Resource Development and Management is mainly responsible for training and production of all categories of health personnel, except for traditional medicine personnel, to attain equitable healthcare for the whole population. The Department of Medical Research conducts national surveys and research for evidence-based medicine and policy making. The Department of Food and Drug Administration ensures safe food, drugs and medical equipment, and cosmetics. The Department of Traditional Medicine provides healthcare with traditional medicine,

as well as training of traditional medicine personnel. There were 6,963 private traditional practitioners in 2014. Most of them were trained at the Institute of Traditional Medicine until 2001, and at the University of Traditional Medicine from 2002 onwards.

Based on the Census 2014, the crude birth rate in the previous one year was 18.9 per 1,000 population. The annual population growth rate was estimated to be 0.89% between 2003 and 2014. The birth rate has been falling over the years. The 2010 maternal mortality rate per 100,000 live births for Myanmar is 240, compared to 219.3 in 2008 and 662 in 1990. The under 5 mortality rate, per 1,000 live births is 73 and the neonatal mortality as a percentage of under 5's mortality is 47. Malaria is the leading cause of morbidity and mortality in the country. Dengue, LF and JE are the other common mosquito borne diseases.

Figure 2. Structure of MOHS



The health departments at the state/region level are charged with planning, coordinating, supervising and monitoring the health departments at district and township levels. Implementation of curative and preventive health services is undertaken by township health departments, each of which serves 100,000-200,000 people and is headed by a Township Medical Officer (TMO). There are also station hospitals situated in strategic areas of the townships and four to five Rural Health Centres (RHCs) and Urban Health Centres. At the level below each RHC, on an average, are four to five Sub-rural Health Centres (SHCs), each staffed by a midwife and a public health supervisor of grade (2). Each SHC provides health-care services to a cluster of five to ten villages in which there are usually

voluntary health workers (auxiliary midwives and community health workers). Health staff at the community level provide promotive, preventive, curative and rehabilitative services using the PHC approach. Both auxiliary midwives and community health workers are volunteers and receive no remuneration. Volunteers and members of local NGOs and faith-based organizations are also active in the field of health. For example, the Myanmar Maternal and Child Welfare Association and Myanmar Red Cross Society have members from many villages. With the support from health committees and local administrative authorities, these members can be mobilized to assist and promote the delivery of health-care services in the villages they live in. As of 2014, there were 87 Primary and Secondary Health Centres and 1,684 RHCs (Table 2). The health system strength includes 31,542 medical doctors (13,099 public doctors and 18,443 private doctors, 29,532 nurses and 21,435 midwives (Table 3). The government spends only 2.3% of the country's GDP on health care.

Table 2. Public health facilities in Myanmar, 2014

Facility	Number
Curative and rehabilitative services	1,056
General hospitals (up to 2,000 beds)	4
Specialist/teaching hospitals (100–1,200 beds)	50
Regional/state/district hospitals (200–500 beds)	55
Township hospitals (25–100 beds)	330
Station hospitals (16–25 beds)	617
Preventive and public health services	2,199
Primary and secondary health centers	87
Maternal and child health centers	348
Rural health centers	1,684
School health teams	80
Traditional medicine	259
Traditional medicine hospitals	16
Traditional medicine clinics	243

Source: Data from Health in Myanmar 2014

Table 3. Healthcare professionals in Myanmar

Professionals	2009–10	2011–12	2013–14
	N	N	N
Medical doctor	24,536	28,077	31,542
Public*	9,728	11,675	13,099
Private	14,808	16,402	18,443
Nurse	24,242	26,928	29,532
Midwife	19,051	20,044	21,435
Pharmacist**	1,998	2,405	2,553
Medical technologist**	2,085	2,458	2,604
Dentist	2,308	2,770	3,219
Public*	703	774	782
Private	1,605	1,996	2,437
Dental nurse	262	316	357
Traditional medical practitioner	6,627	6,752	6,963
Public*	890	885	1,048
Private	5,737	5,867	5,915
Lady health visitor	3,278	3,371	3,467
Health assistant	1,845	1,893	2,062
Health supervisor	2,174	2,330	5,650

Source: Data from Health in Myanmar 2014. * Includes those who had a part time job in private facilities.

The main international organizations providing technical and financial assistances to promote the health status of Myanmar people are:

- WHO
- United Nations Children's Fund
- United Nations Development Programme
- United Nations Population Fund
- The Japan International Cooperation Agency
- Asia Development Bank (ADB)
- World Bank
- Three Millennium Development Goal Fund

- The United Nations Office on Drugs and Crime
- United States Agency for International Development (USAID)
- Australian Aid for International Development
- United Kingdom Department of International Development (DFID)
- Korea International Cooperation Agency
- Thailand International Cooperation Agency

In addition, 57 international non-governmental organizations working in Myanmar, as well as national non-governmental organizations such as the Myanmar Women's Affairs Federation and the Myanmar Red Cross Society, are listed in a governmental report. The list includes five Japanese organizations; the Japan Heart, the Japanese Organization for International Cooperation in Family Planning, the Japan International Medical Cooperation Organization, the Peoples' Hope Japan, and the Save the Children Japan.

3. Lymphatic filariasis in Myanmar

Myanmar is endemic for LF caused by *Wuchereria bancrofti* and transmitted by *Culex quinquefasciatus*. Prevalence of *B. malayi* was also reported in 1944, but further information is very scanty. LF is believed to be widely distributed in the country. During 1960-1965, Mf rate in the range of 0.6% to 4.7% was recorded in 14 districts of Myanmar by a survey team appointed by Directorate of Health services (Table 4). Under different studies, the prevalence of microfilaria (Mf) and/or antigenaemia has been recorded in various parts of the country. The district-wise Mf rates are summarized in Table 5.

Table 4. Mf rate observed in 14 districts of Myanmar in 1960-1965

District	Number of blood smears examined	Mf rate (%)
Rangoon	185,093	4.7
Bassein	31,524	3.5
Hmawbi	36,803	2.4
Mergui	31,147	4.2
Tavoy	24,932	2.8
Hanthawaddy	54,223	1.4
Kyaukpyu	21,479	4.5
Akyab	65,864	2.6
Toungoo	44,449	1.6

District	Number of blood smears examined	Mf rate (%)
Thaton	55,270	1.2
Moulmein	101,043	3.0
Pegu	117,034	0.8
Prome	82,064	1.9
Sandoway	29,333	0.6

Source: General Administrative Department, Government of Myanmar

Table 5. Mf rates observed in different states/divisions of Myanmar (2007 by WHO)

>10% Mf rate	5-10% Mf rate	1-5% Mf rate
Magway division	Mon state	Yangon division
Mandalay division	Bago division	Ayeyarwady division
Sagaing division	Tanintharyi division	Kayin state
Rakhine state		

Source: WHO, 2007

The Karen Department of Health and Welfare recorded Ag prevalence of 42% (n=600) to 46% (n=100) in Karen state.

A filariasis research unit was set up in Rangoon in 1962 by WHO. The unit undertook extensive studies on bionomics of *C. quinquefasciatus* and transmission dynamics of LF.

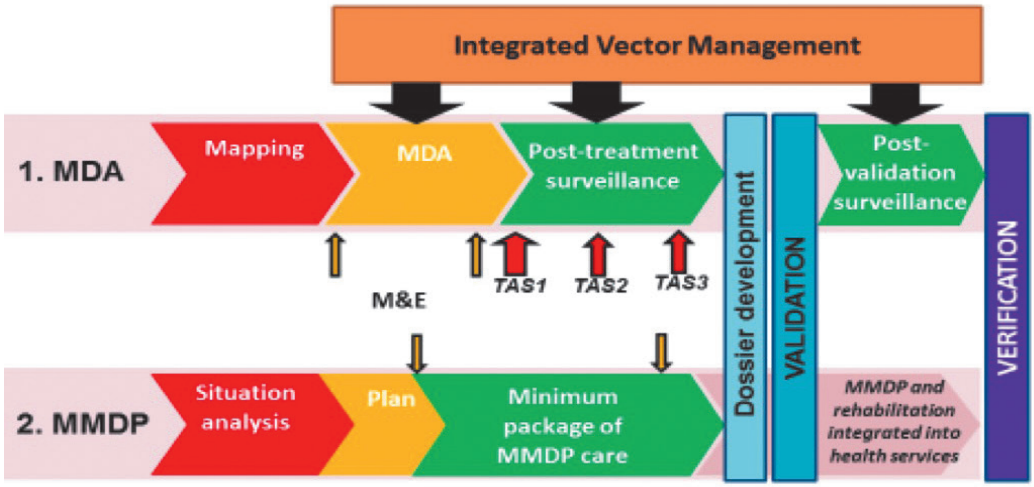
4. LF elimination programme

Responding to the global initiative to eliminate LF, Myanmar also initiated the LF elimination programme. The programme had initiated various activities as envisaged by the GPELF towards elimination of LF since 2001.

4.1. The GPELF frame work

In the year 2000, the WHO launched a GPELF and this provided a significant impetus to the affected countries to combat the disease. The goal of GPELF is to eliminate LF from all endemic countries by 2020. It recommends all endemic countries implement a two pronged strategy to eliminate LF and it consists of (a) transmission interruption through annual effective MDA for 5-6 years and (b) MMDP through lymphoedema alleviation measures and hydrocele surgery. The strategy encompasses robust M & E, post-MDA surveillance and post-validation surveillance measures (Figure 3).

Figure 3. Structure and components of GPELF



4.2. The Myanmar NPELF (2001-2018)

GPELF provided an excellent opportunity to several countries including Myanmar to eliminate LF as a public health problem, through establishment of partnerships and initiating national programmes to eliminate LF. To begin with, the NPELF of Myanmar had utilized the historical evidence and knowledge and available data to demarcate the endemic areas and prepare "Filaria maps". These maps highlighted that the peninsular region and the central inland areas are endemic for LF. The eastern and western parts of the country are free from LF (Figure 4a).

The LF situation in Myanmar had been assessed in a multi-site WHO/TDR study in 1998. Seventy randomly selected townships from 14 districts across the country were assessed for LF Ag prevalence. Using the Ag prevalence data, a contour LF map of the country was prepared. The map confirms that the western and eastern parts of the country are free from LF and the central and peninsular parts are endemic. It further highlights that the central parts of the country are highly endemic, with >25% Ag prevalence (Figure 4b).

In Myanmar, 12 of the 14 regions/states and 45 of the 74 districts are endemic for LF. Only the Kayah and Shan states are non-endemic. The total population of the 45 endemic districts was 42.71 million. The average population size of the region and state is approximately 3.29 million and 0.91 million respectively. The population size of the districts ranged from 87,252 (Myawaddy) to 2,139,953 (Yangon East).

After LF mapping, the MOHS initiated the MDA programme to eliminate LF. District has been determined to be the Implementation Unit (IU). The first ever MDA was

implemented in Myanmar in 2001 in two districts viz., Magway and Minbu in Magway region. The programme was extended to 10 districts, located in Magway and Sagaing regions, in 2002. By 2004, MDA programme was in place in 22 of the 45 endemic districts (48% geographical coverage). Most of the 22 districts were with relatively higher burden of LF. Though, plans to scale up MDA to all 45 endemic districts in 2011 and 2012 were unsuccessful due to bottlenecks in DEC procurement, it was accomplished in 2013. The programme focused more on MDA. Regarding MMDP, regional officers, team leaders and malaria assistants were trained under the title of "Training on the treatment and prevention of lymphedema" at 2001 and 2010. As one of MMDP activities, treatment and prevention of lymphedema was updated in ICMV Manual, June 2018.

Highly endemic regions of Magway and Sagaing received 5-13 rounds of MDA by 2017. The third highly endemic region Mandalay covered by 5-7 rounds of MDA. Relatively low endemic states – Rakhine and Chin – completed 6-8 rounds of MDA. Seven other endemic regions, with relatively very low baseline Mf prevalence, completed 3 rounds of MDA.

The highest baseline Mf rate recorded in highly endemic regions was 9.1% in Magway, 15.1% in Sagaing and 14.7% in Mandalay. It was 12.6% in Rakhine state. In the other 9 states/regions, the highest Mf rate observed was 3.2%, with several districts showing <1.0% Mf rate. These prevalence rates were impacted by the MDA programme. However, they continue to be much higher than the threshold level, particularly in the highly endemic regions. The latest M & E data showed that the Ag prevalence was in the range of 5.0% to 15.0% in the three highly endemic regions in 2015, by when various IUs in the regions received 10-11 rounds of MDA. In eight states/regions, where the baseline Mf prevalence was very low and 3 rounds of MDA was implemented, no M & E activity or Mf surveys has been undertaken (Table 6).

There was some progress with implementation of transmission assessment surveys. The M & E and surveillance data show that 3 EUs passed TAS 2, two EUs each passed TAS 2 and 1 EU failed TAS 1.

Currently the programme is facing the following challenges (a) the programme operates and implements various activities under the circumstances of low priority and meagre resource (b) advocacy, political commitment and partnerships are below desirable levels (c) MDA is implemented with no well-defined leadership at various levels amidst other competing health priorities (d) monitoring and evaluation is undermined and its quality a concern (e) MMDP activities are low priority due to more focus on MDA (f) data collection, management and record maintenance receives scarce attention. While several rounds of MDA were implemented in some implementation units, understanding its effectiveness has become difficult due to lack of data on compliance with treatment.

Figure 4a. Filaria map of Myanmar (2001)

*Areas in red indicate endemic districts

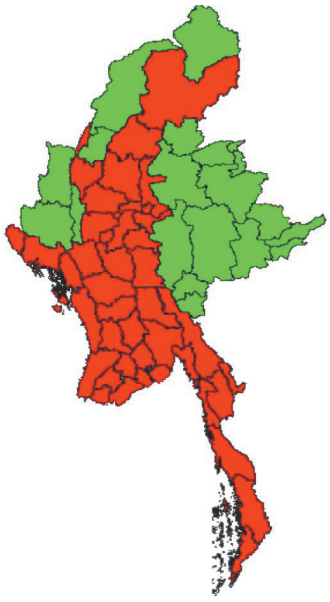


Figure 4b. Prevalence of Ag observed in a TDR study in Myanmar (1998)

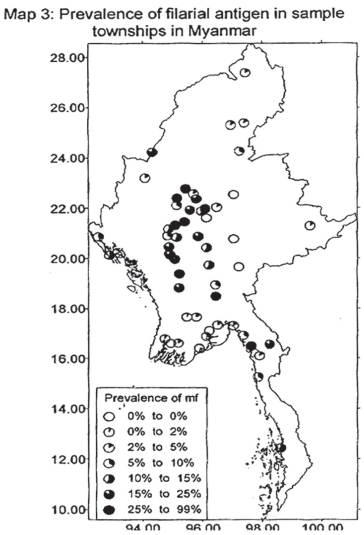


Figure 4c. MDA Situation in Myanmar (2018)

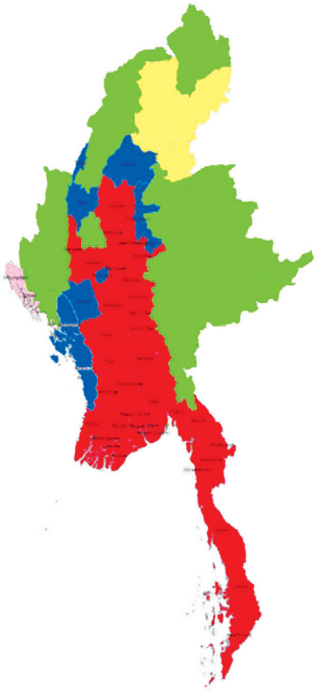


Table 6. Current LF epidemiological situation of the NPELF, Myanmar (2018)

#	Region	Number	Districts	Population 2018	MDA starting year	# of MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status	
								Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	TAS
1	Magway Region	1	Magway	1,233,580	2001	16	1.18-7.10	2011	0.39	2015	-	5	2018	Pre TAS failed
		2	Thayet	737,838	2002	15	6.3	2012	2.98	2015	-	13.1	2018	Pre TAS failed
		3	Minbu	686,999	2001	11	4.3	2012	0.8	2014	0.6	-	2014	TAS 1 passed
		4	Pakokku	1,004,255	2002	15	0.19-9.1	2012	6.6	2015		1513.3	2018	Pre TAS failed
2	Sagaing Region	5	Sagaing	520,399	2002	15	3.0-7.0	2010	0.9	2015	1.28	-	2018	Pre TAS failed
		6	Monywa	757,092	2002	15	5.2-5.5	2012	1.7	2015	-	9.4	2018	Pre TAS failed
		7	Shwebo	1,431,450	2002	15	11.5-15.1	2014	1.89	2015	-	8.8	2016	TAS 1 failed
		8	Katha	860,360	2002	8	0.53-2.6	-	-	2014	0	-	2012 /2014	TAS 1 & 2 passed
		9	Kalay	508,015	2002	8	1	2014	0	-	-	-	2012 /2014	TAS 1 & 2 passed
		10	Tamu	114,827	2002	8	2	2014	0	-	-	-	2012 /2014	TAS 1 & 2 passed
3	Mandalay Region	11	Mandalay	1,725,949	2004	11	0.7-6.8	2011	8.8	2014	1.7	-	2018	Pre TAS passed
		12	Pyin Oo Lwin	996,438	2004	6	0.2-0.4	2011	0.2	2014	0.33	-	2014	TAS 1 passed
		13	Kyaukse	739,315	2004	11	5.47-14.7	2011	3.71	2014	2.1	-	2018	Pre TAS failed
		14	Yame'Thin	508,000	2004	11	2.9-6.0	2014	0.19	2016	-	6.35	2018	Pre TAS failed
		15	Myingyan	1,055,371	2004	11	3.4-13.3	2011	4.6	2014	3.2	-	2018	Pre TAS failed
		16	Meiktila	880,802	2004	11	1.67-7.2	2011	4.56	2014	1.9	-	2018	Pre TAS failed
		17	Nyaung U	239,713	2004	8	2.8-7.4	2008	0.4	2014	1.3	-	2016	TAS 1 passed

#	Region	Num-ber	Districts	Population 2018	MDA starting year	# of MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status	
								Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	TAS
4	Nay Pyi Taw	18	Nay Pyi Taw 1	1,158367	2004	11	-	2014	0.5	2016	-	1.5	2018	Pre TAS failed
		19	Nay Pyi Taw 2		2004	11	-	-	-		-	0.62	2018	Pre TAS failed
5	Rakhine State	20	Sittway*	537,300	2004	6	1.4-12.6	-	-	2010	0.8	-	-	-
		21	Maungtaw *	95,985	2004	6	0.16-1.7	-	-	2010	0	-	-	-
		22	Kyaukpyu	439,674	2004	6	2.34	2010	0.8	2015	0	-	2017	TAS 1 passed
		23	Thandwe	357,370	2004	6	0	2010	0	2015	0	-	2017	TAS 1 passed
								2010	0	2015	0	-		
6	Chin State	24	Mindat (Paletwa)	212,255	2004	12	1.38-1.59	2003	1.38	2007	0.2	-	2018	Pre TAS passed
7	Mon State	25	Mawlamyine	1,229,966	2013	6	0.83-2.5	2006	0.83	2013	0	-	2018	Pre TAS passed
		26	Thaton	820,316	2013	6	0.8-3.2	2006	3.2	2013	0.17	-	2018	Pre TAS passed
8	Bago Region	27	Bago	1,768,335	2013	6	0.4-2.8	2005	2.8	2013	0	-	2018	Pre TAS passed
		28	Toungoo	1,122,679	2013	6	0.76-1.18	2005	0.7	2013	0.19	-	2018	Pre TAS passed
		29	Tharyarwaddy	1,061,467	2013	6	0			2013	0	-	2018	Pre TAS passed
		30	Pyay	910,974	2013	6	0.58-0.59	2005	2.0	2013	0.39	-	2018	Pre TAS failed
9	Ayeyarwady Region	31	Pathein	1,627,586	2013	6	2.4	2004	2.4	2013	0	-	2018	Pre TAS passed
		32	Hinthada	1,136,653	2013	6	1.43	2005	1.43	2013	0	-	2018	Pre TAS passed
		33	Myaungmya	780,576	2013	6	0.59	2005	0.59	2013	0.3	-	2018	Pre TAS passed
		34	Phyapon	1,031,320	2013	6	0.0-0.8	2004	0	2013	0	-	2018	Pre TAS passed
		35	Maubin	973,098	2013	6	0	2005	0	2013	0	-	2018	Pre TAS passed

#	Region	Num-ber	Districts	Population 2018	MDA starting year	# of MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status	
								Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	TAS
10	Tanintharyi Region	36	Dawei	492,277	2013	6	0.59-1.8	2008	1.8	2013	0.6	-	2018	Pre TAS passed
		37	Myeik	692,880	2013	6	0.2-0.4	2008	0.6	2013	0	-	2018	Pre TAS failed
		38	Kawthaung	221,277	2013	6	0.2-0.4	2008	1.4	-	-	-	2018	Pre TAS passed
11	Kachin State	39	Myitkyina	531,873	Non-endemic	0	0.14	-	-	2015	0	-	2016	Mini TAS passed
		40	Bhamaw*	346,503	Non-endemic	0	0.09	-	-	2015	0	-	2016	Mini TAS passed
12	Kayin State	41	Hpa-An	783,101	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS passed
		42	Kawkareik	474,089	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS passed
		43	Myawady	210,695	2013	6	0.1	2012	0.19	-	-	-	2018	Pre TAS passed
13	Yangon Region	44	East Yangon	2,364,536	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS passed
		45	West Yangon	969,364	2013	6	0.0-0.1	2012	0.19	-	-	-	2018	Pre TAS passed
		46	North Yangon	2,605,021	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS passed
		47	South Yangon	1,416,154	2013	6	0.4-0.4	2012	0.4	-	-	-	2018	Pre TAS passed

*Administrative units where some people were not enumerated

5. Myanmar LF Strategic plan (2017-2020)

Vision

Elimination of LF as a public health problem

Goal

To implement effective intervention and surveillance measures to achieve transmission interruption in all districts and expand MMDP services to all chronic patients by 2020.

Objectives

The strategic plan objectives are:

Objective 1	To enhance political and policy makers' commitment to the programme through advocacy measures
Objective 2	To achieve transmission interruption in all districts by strengthening MDA programme at state/regional, township and community level
Objective 3	To strengthen M & E and surveillance measures and capacity building
Objective 4	To expand MMDP activities to provide services to all people affected by chronic disease
Objective 5	To build partnerships and mobilize resources for effective implementation of programme activities
Objective 6	To establish and operationalize a clean and efficient data management system to monitor the progress of the programme

The strategies to realize different objectives are summarized in Figure 5.

Objective 1: To Enhance political and policy makers' commitment to the programme through advocacy measures

The NPELF involves a national campaign and it targets 42.71 million population i.e. 78% of the total population of the country. Such a large national campaign requires active support and involvement of the political establishment, policy makers and health administrators. Steps should be taken to engage them and ensure and sustain their active support for the programme until the final milestone is reached.

Strategy 1.1. Strengthening of advocacy for the programme

The scale of the NPELF is large and it requires consistent and full support of the political leadership and establishment. Such support should be ensured through strengthening of advocacy for the programme among ministers, bureaucrats and policy makers. Myanmar's and the region's commitment to World Health Assembly resolution (WHA 50.29), global activism against NTDs, explicit mentioning of Neglected Tropical Diseases (NTD) control and elimination in the UN sustainable development goals, commitment of donor countries and their leaders, involvement and support of Gates Foundation, the G 7 Leaders' declaration, the London declaration, Pharma industry support, returns on investment in the programme, contribution to poverty reduction and LF-free future generation, should be used as advocacy tools for continuous political support and commitment.

The honourable health minister or health secretary may be guided to chair the planning meetings of the MDA campaign. Whenever opportunities arise, the progress of the programme should be presented to or shared with political leaders. A national campaign like NPELF requires an inter-sectoral approach. Hence the higher officials of the Department of Education (DoE), Information, Social Welfare and Religious affairs should be appraised of the programme goals and strategy and their support for the programme enlisted. These steps are equally important at regional level and should be adopted to provide broad based support to the programme.

Strategy 1.2. Establishment of a National and a Regional Task Force

A National Task Force should be established by the MOHS to guide the implementation of the NPELF. The Secretary, MOHS, should act as the chairman of the Task Force, which should be located in the MOHS. The Task Force should have a member-secretary and he/she convey the meetings and take follow-up action on the recommendations. The national programme manager is an ideal choice for the member-secretary position. The Task Force may have 6-8 members and should include the Director-General, DPH and the Director, Disease Control. The other members can be drawn from among health planners,

regional Directors of the Public Health Department and epidemiologists and sociologists from educational and research institutions. The key activities of the Task Force should be as follows:

- Strengthen political will and policy makers' support to the programme
- Solicit and obtain the support of other ministries, departments, NGOs, industry
- Coordinate with Regional Task Force
- Mobilize financial resources
- Monitor and evaluate programme implementation and progress
- The Task Force should meet at least twice a year and a small core group meet as frequently as possible or as and when necessary

Strategy 1.3. Improvement of ownership of the programme

The programme should be led and implemented by country's Public Health Department, with significant involvement of civil society. They Public Health Department at central, state/regional and township level should give due priority for the NPELF, considering the target date of 2020. They should work together and create an environment for active participation in the programme of public health staff from regional to township to village level. The goal of 'LF elimination by 2020' should be popularized among health staff, along with its incumbent benefits to the affected poor communities and prestige to the country. The public health staff should be guided to own the programme through evoking the pride involved in implementing the largest ever public health intervention (MDA) in the country, eliminating an age old disease and its positive impact on health system and extrapolating the experience to other similar disease elimination programmes.

Table 7. Timeline for advocacy activities

Activity	Target Year			
	2017	2018	2019	2020
Establishment of National task force and task force in each region/state	▬			
Advocacy meetings with political class and policy makers at national and provincial level	▬	▬	▬	▬
Steps to improve the ownership of the programme among public health staff	▬	▬		

Objective 2: To achieve transmission interruption in all districts by strengthening MDA programme at state/regional, township and community level

MDA is the key strategy to achieve the goal of LF elimination. Its effective implementation is a prerequisite and key task of the programme, as several factors ranging from leadership to distribution of drug to each and every household influence the programme. Hence, each sub-discipline of the MDA programme should be strengthened to ensure desirable outcomes. The most crucial activity is distribution of medicines to each and every household and ensuring consumption of medicines by all eligible members within the household. To ensure this, necessary steps should be taken by the programme at central, state/regional, township and health centre level.

As of 2018, of the 45 endemic districts, 35 districts continue to implement MDA, and, the other 10 districts implemented sufficient number of MDAs, completed TAS/Mini-TAS and stopped MDA. Thus, implementation of MDA requires attention in 35 districts.

Strategy 1.1. Enhancement of programme management

Of the total 74 districts in Myanmar, 45 districts are endemic. These endemic districts are located in 12 of the 14 regions and states and union territory of Nay Pyi Taw. The population of the 47 endemic districts was 42.71 million (2014 census), which requires preventive chemotherapy (treatment during MDA). Thus, the NPELF is a very large campaign and this necessitates good management.

To effectively lead, coordinate and implement the programme of the magnitude, an exclusive and full time national programme manager is very necessary and should be made available. At state/regional level, the chief of the public health department should be designated and effectively function as the state/regional programme manager. The TMO should be the leader and manager of the programme at township level. The RHC staff should be given the full responsibility of the programme implementation in the respective villages. The health workers of the SHC will supervise and implement the programme in respective villages. The duties and responsibilities of the programme managers from central to regional to SHC level should be well defined. The programme managers at all levels should provide effective leadership and supervision and ensure robust implementation of the MDA programme, resulting in effective (>65%) treatment coverage.

Preparations for the programme implementation should be started sufficiently in advance each year. Meetings at central, state/regional and township level should be held to review the preparations, implementation process and preparedness to deal with SAE.

The support of all the programme managers should be enlisted and their participation in the meetings ensured. Public health experts, particularly those involved in mass intervention campaigns, may be invited to such meetings and their inputs solicited.

The major focus of the programme managers should be:

- Provide effective leadership and supervision
- Emphasize on good planning of the MDA programme at every level
- Ensure effective implementation of MDA
- Coordinate the programme well to achieve >65% treatment coverage

Strategy 1.2. Implementation of social mobilization strategies

Social mobilization in NPELF context is the process of bringing partners together to enhance awareness of and demand for treatment under the MDA programme, to assist in the delivery of drugs/treatment and to strengthen community participation for sustainability. Partners include policy-makers, opinion leaders, NGOs, religious leaders or groups, the media, the private sector, communities and individuals. Social mobilization brings a consensus among all sections of the community about the importance of the MDA programme.

Steps should be taken to improve the peoples' awareness and knowledge, through information, education and communication (IEC) campaign, of the NPELF and the benefits of the MDA. The campaign should be in conformity with local cultural beliefs and general population attitude towards health services. Information may be disseminated through print material, print media, TV advertisements, TV talk shows and radio announcements. Often, strategies that focus only on information distribution and communication are inadequate to sufficiently mobilize and engage a community. In addition to IEC campaign, it is imperative that the local health workers and volunteers involve influential community members, religious and political leaders, and informal networks and engage women and youth, as these people have the capacity to change attitudes towards MDA programme and raise awareness about key issues. While centralized planning and implementation of social mobilization activities are useful, it is heavy involvement of health workers and community volunteers and efforts at community level that will yield maximum benefits for the MDA programme.

The national and local media should be sensitized about the programme and involved to cover the campaign objectively. Particularly, the media should be educated about the safety of the treatment and extent and nature of adverse reactions.

Strategy 1.3. Improvement of MDA training

The health workers and community volunteers (as well as drug distributors) should be trained well on NPELF. Training should be imparted at township and health centre level, using appropriate training material. It should focus on the objectives of the programme, brief epidemiology of LF, the rationale of MDA, safety of drugs, side effects, details of implementation of MDA programme in communities that include the need to implement social mobilization strategies, making repeated visits to households, distribute drugs to each household and ensure treatment of every member (see below), and record maintenance and data transfer. Role plays may be used to train the drug distributors. The services of resource persons may be utilized for such training programme. A one-page information sheet may be provided to drug distributers or teams on robust implementation of MDA activity. Any doubts of the trainees on the programme should be addressed and clarified.

Strategy 1.4. Improvement of MDA implementation at community level

Effective implementation of MDA at community level is very critical, as it determines the treatment coverage. Treatment coverage influences the outcome of the MDA programme, in terms of decline in Mf and Ag prevalence.

All the drug distributors –the health workers and **community volunteers - should be empowered to be knowledgeable** on the purpose and importance of the MDA programme. They should have a minimum knowledge on the drugs distributed in the community. When required, drug distributors should be able to explain to community members the rationale of MDA and why they should participate in the programme.

Micro-planning of the programme should be undertaken at village level. As part of micro-planning, the following information should be prepared for each village and kept ready at health centre and village level prior to the commencement of the MDA programme: (a) total population and eligible population (b) quantity of drugs required (c) list of drug distributors (d) number of households allocated for each drug distributor (f) duration and dates of drug distribution (g) name of supervisor. The micro-planning process should include discussions/details on effective implementation of MDA in each village, with well-defined responsibilities for drug distributors and supervisory staff.

Prior to the MDA programme and on the basis of the population size of each village, the **drugs required for each village/community** under its domain should be estimated by the health centre. The drug requirement estimates should be submitted to the central programme through TMO and state/regional Public Health Department. When the drugs are made available, they should be stored in a secure place in the village/health centre.

For the effective implementation of the MDA programme, the health workers and volunteers should **take the village leadership into confidence**. Prior to the drug distribution, they should meet the village leader and other prominent people and appraise them of the MDA programme to be implemented. Their support should be sought for the programme and mobilizing the community to participate in MDA programme. After concluding the programme, the leaders should be met and their contribution acknowledged.

As detailed in the micro-plan, the health centres and the health workers should **recruit adequate number of community volunteers** to support the health staff in drug distribution and/or deploy them as drug distributors themselves. Each drug distributor should be allocated not more than 50 households (250 household members) to distribute the drugs. One or two days prior to drug distribution, the drug distributor should visit all the households and give information on drug distribution, particularly the time and day of drug distribution. He should request the household member to be available to receive the drugs and undergo treatment on the designated day. Most importantly, they should allay the fears of people about side effects of treatment.

In each village, the drug distributors should **work for at least 3 days to distribute the drugs**. The drug distribution should be undertaken during the time of the day, when most of the household members are available at home. On Day 1 of the programme, they should make the first visit to each and every household allocated to them, contact household members and administer the drugs to each one of them. As much as possible, the members should be made to consume the drugs in the presence of drug distributors i.e. administering directly observed treatment. They should make the second visit on Day 2 and the drug administration activity should be continued, with focus on contacting and administering the drugs to those who were absent on Day 1. After a few days, the drug distributors should make the third visit to all those households where drug administration was incomplete. During this visit, all the members who were absent on Day 1 and Day 2, should be contacted and administered the drugs. Thus, these repeated visits will ensure development of rapport between drug distributors and community members and ensure treatment of all community members. The most important aspect of this drug distribution process is compliance with treatment i.e. ensuring each person not only provided with drugs but also undergoes treatment.

The drug distributors should **be prepared to deal with side effects**, most of which are mild in nature. Those who report mild side effects during the drug distribution activity should be reassured and given simple medication according to signs and symptoms. Those with severe side effects should be referred to the health worker. The health worker should do the needful to manage the side effects and he/she may refer the affected to health centre or hospital, if necessary.

In each village, drugs should be distributed using **Family registers** prepared for the programme or similar other record sheets, as directed by the programme. In the registers or record sheets, the name, sex and age details should be included for all members of each household. Against each name, it should be scored if the family received the drug (Yes) or not (No) and whether he/she consumed the drug (Yes) or not (No). These data should be recorded carefully and clearly. The data records from all drug distributor should be brought together for each village and the data consolidated for each village. The following data are important for each village: (a) the number of people in the village (b) number of people given drugs and (c) number of people consumed the drug and (d) reported treatment coverage (number of people consuming the drug/total population) (d) number of people excluded from treatment and (e) the number of people who developed side effect. The data records and the consolidated data of each village should be sent to the health centre. Then, the data should be consolidated for each health centre.

The **consolidated data** from each village and health centre should be submitted to Township programme manager. The latter will forward the data to the state/regional programme manager, who will consolidate the data for the entire state/region and submit the same to the central programme manager.Treatment coverage is an important indicator of effective implementation of the MDA programme.

In order to understand the treatment coverage, the programme should **implement treatment coverage surveys** in one district in each region/state or at least one district each in five regions every year. The programme should enlist the participation of independent bodies such as academic institutions, research organizations etc. to carry out the surveys. These surveys should be done within one of month of MDA implementation. The surveyed coverage data should be compared with reported coverage and the discrepancies between the two, if any, should be analysed, discussed and corrective steps taken. The surveyed coverage methodology is available in the following publication:

Lymphatic filariasis: monitoring and epidemiological assessment of mass drug administration — A manual for national elimination programmes.

Editors: Dr K. Ichimori/Lymphatic filariasis, WHO reference number: WHO/HTM/NTD/PCT/2011.4 (http://apps.who.int/iris/bitstream/10665/44580/1/9789241501484_eng.pdf)

After concluding the MDA, each drug distributor should hand over the **balance drugs** to the health workers, who will deposit such drugs with the health centre.

The health workers should meet all community volunteers and acknowledge their contribution to the programme. The village leader or health centre may issue merit

certificates to drug distributors in recognition of their contribution to the programme. The district level programme manager will share the information on MDA (such as treatment coverage) with all health centres and other major participants in the programme (such as NGOs) and solicit their participation in the programme next year.

Table 8. Steps for improvement of MDA across 35 districts

Steps for MDA improvement	Implementation
1. Drug supply	-Adequate quantities of drugs should be supplied to all health centres sufficiently in advance
2. Drug distributors	-Select drug distributors and prepare a list for each village -Select a supervisor for the entire village
3. Drug distributor training	-Impart good training on MDA to all drug distributors of PHC, RHC, SHCs, UHCs and township hospital
4. Engage community	-Take the village leadership, religious leaders and other prominent people into confidence -Seek their help to mobilize people to participate in MDA
5. Drug distribution	-Should include house to house visits by drug distributors and give drugs in all households -Distributors should make at least 3 visits over 3 days to each household to ensure to contact each and every member -Undertake drug distribution during the time, when most household members are available at home.
6. Directly observed treatment	-Ensure that all recipients of the drugs will undergo treatment -Drug distributors should ensure, as much as possible, directly observed treatment and encourage people to consume the drug under their supervision
7. Limited households per drug distributor	-To ensure directly observed treatment, and, repeated visits to households to make contact with all people, each drug distributor will be allotted not more than 50 households or 250 people for drug distribution and administration

Steps for MDA improvement	Implementation
8. Drug distributor's repeated visits to households	-In order to ensure directly observed treatment, drug distributors will visit households repeatedly to establish contact with all household members and treat them directly
9. Appropriate drug distribution time	-Drug will be distributed when people return home from work and most of the household members are likely to be available at home (such as evening hours)
10. Effective management of adverse events	-People affected with adverse events will be provided with supportive treatment and followed up for 2-3 days, to allay the fear
11. Involvement of NGOs	-A partnership with NGOs working in health sector will be established and their support and involvement in MDA programme will be solicited
12. Information and communication campaign	-The MDA programme will be preceded by intensive information and communication campaign
13. Acknowledgment of drug distributor's contributions to the programme	-At the end of MDA, all the drug distributors will be honoured by the community leader and health worker with merit certificate
14. Information sharing	-The district programme manager will share the information on the progress of the programme with all health centres and NGOs

Objective 3: To strengthen M & E and surveillance measures and capacity building

M & E and surveillance is an integral and important component of the NPELF. The purpose of monitoring is routine collection and analysis of data that pertain to the delivery of services (i.e. MDA) and evaluation measures the extent to which monitoring goals are being reached. The M & E framework of the NPELF is given in Figure 6. The M & E primarily focuses on Mf/Ag prevalence in sentinel and spot-check sites and TAS 1. It includes baseline data collection, mid-term evaluation (optional) and pre-TAS evaluation in sentinel and spot-check sites. In the EUs that achieved below threshold level Mf or Ag prevalence in the pre-TAS survey, TAS 1 is conducted to take a decision on stopping the MDA. MDA is stopped if the district passes TAS 1.

As of 2016, in the 41 districts that are under MDA, sentinel site and spot-check surveys are being carried out. In the other 6 districts, TAS 1 was completed in 4 districts and mini-

TAS undertaken in 2 districts. All the 6 districts passed TAS1/Mini-TAS and stopped the MDA programme.

Strategy 3.1. Streamlining of M & E and surveillance activities

As M & E is required in 41 districts and it involves labour, travel and other logistics, an M & E plan of action should be prepared every year. Under the plan, the MDA data reviewed, eligible districts for M & E surveys identified, survey dates determined and survey preparations put in place. Care should be taken to implement the M & E activities in each eligible district duly and on time and strictly following the guidelines envisaged by the WHO. Delays in M & E of sentinel sites and spot-check sites and TAS should be avoided. Such delays may result in undervaluing the impact of MDA and its continuation beyond requirement.

The pre-TAS sentinel and spot-check site surveys are crucial and should be done in accordance with recommended guidelines. Ensuring the good quality of surveys is important, as their outcome will determine if the EU is ready for TAS 1. If the sentinel and spot-check sites record LF prevalence less than the threshold level of 1.0% Mf or Ag prevalence, the EU becomes eligible for TAS. Poor quality pre-TAS surveys often result in either under estimation or over estimation of Mf or Ag prevalence, leading to incorrect decision on EU's eligibility for TAS.

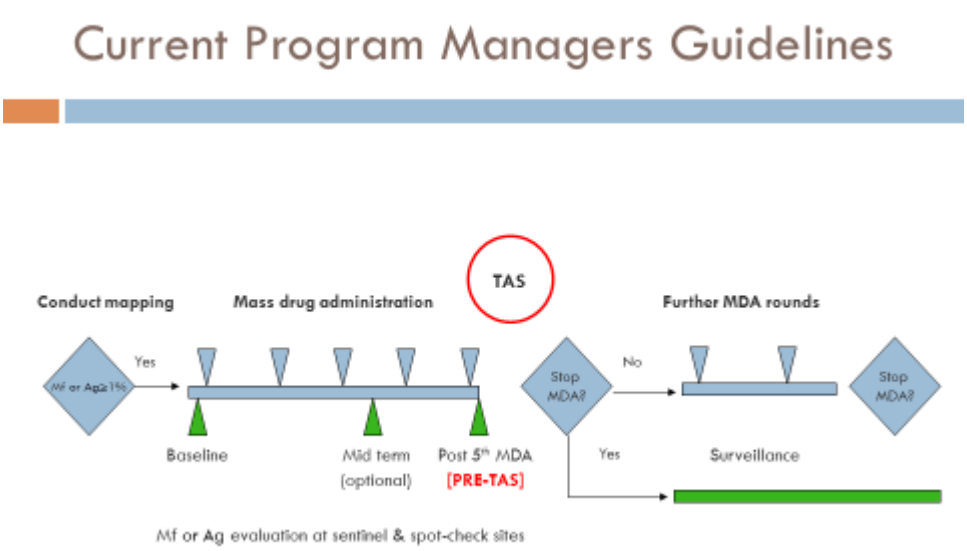
In the eligible EUs, TAS should be implemented on time i.e. soon after pre-TAS surveys. Each EU should meet the following criteria to implement the TAS:

- **At least five MDA rounds**
- **Effective epidemiological treatment coverage** of >65% in each round of MDA
- **Sentinel site**: Mf prevalence <1% or Ag prevalence <2% after 5th effective MDA
- **Spot check site**: Mf prevalence <1% or Ag prevalence <2% after 5th effective MDA

Further, currently, it is mandatory to secure the approval of WHO/SEARO to conduct TAS in the TAS-ready districts. The approval is obtained by submitting the details of MDA and pre-TAS data in 'Pre-TAS data collection form' (Annexure 1) to the SEARO. SEARO reviews the data and advise the programme on proceeding to conduct TAS 1 in an EU.

Note: Ag rates decrease more slowly than mf rates and will likely underestimate the effects of MDA

Figure 6. Scheme of M & E and surveillance of NPELF



The TAS outcome determines the eligibility of the EU to stop MDA. If the prevalence of Ag is below threshold level or cut-off point in children, then the EU is considered to have passed TAS and becomes eligible to stop MDA. As stopping MDA is an important decision, TAS should also be conducted with utmost care and quality assurance. In case EU fails in TAS 1, MDA should be continued for 2 more years and TAS 1 repeated.

Those EUs that passed TAS 1 progress to surveillance phase. This phase includes TAS 2, which is conducted 2-3 years after TAS 1, and, TAS 3, conducted 2-3 year after TAS 2. The methodology used for TAS 1, TAS 2 and TAS 3 is the same.

TAS is conducted among children of 6-7-year age in communities or schools. Since the school enrolment rate is >75% in Myanmar, school based surveys are preferred choice. The school based surveys should be conducted in collaboration with the DoE. Each year, the programme should brief the Department of primary education at central and regional/state level on the NPELF and the objectives of the surveys. Required permissions should be sought and obtained for surveys from the DoE, at central and state/regional level. The DoE should be guided to instruct all the selected schools to extend support for the surveys.

Details on selection of schools, determination of sample size or number of children to be sampled, blood testing of children using ICT card test etc. are given in:

Lymphatic filariasis: monitoring and epidemiological assessment of mass drug administration — A manual for national elimination programmes. Editors: Dr K. Ichimori/

Lymphatic filariasis, WHO reference number: WHO/HTM/NTD/PCT/2011.4 (http://apps.who.int/iris/bitstream/10665/44580 /1/ 9789241501484_eng.pdf)

At the school level, the survey teams should notify the selected schools about the date of the surveys, number of children to be sampled and facilities required to conduct the surveys. The teams and school teachers should brief the parents and village leadership on the purpose of the surveys.

Each time the pre-TAS and TAS data should be recorded in standard data forms. The data should be entered into computer data base that will have a standard template. Hard copies of the data should be consolidated at health centre level. The copies and consolidated data should be sent to township health centres/hospitals, which should send the data to the regional/state programme manager. In each region/state, the data are entered and maintained in a computer, using standard template. Copies of data sheets and electronic data should be sent to the central programme manager's office, where the data will be updated and maintained in computer data base.

Strategy 3.2. Capacity building

The NPELF involves M & E activities in sentinel and spot-check sites of 41 districts. Required to implement these activities are M & E teams consisting of well-trained technical staff members. Hence, an assessment of the man-power available at central and state/regional level should be made to identify and mobilize adequate number of staff members. Using the past experience, the number of teams and number of days required to complete the surveys in one district should be assessed and M & E activities planned accordingly.

All the staff identified for or involved in the surveys should be trained well in Mf and Ag survey methods and techniques. These include (a) selection of households/participants for the survey (b) blood sampling and preparation of thick smears for Mf detection (c) staining and examination of thick blood smears for Mf (d) preparation of Giemsa or JSB 1 stain (e) blood sampling for Ag assessment and (f) assessment of Ag using FST among participants (e) data recording.

State/regional VBDC laboratories and township hospitals should be strengthened to provide facilities for processing and examining the blood smears. The hospitals/laboratories should have space and equipped with infrastructure such as microscopes, glassware and chemicals and reagents to facilitate processing and examination of blood smears.

The survey teams should notify the community leadership and members about the purpose of the survey and collection of blood samples and their cooperation solicited.

The quality of the surveys should be improved by adopting the proven and recommended survey methodology. The night blood samples for Mf assessment should be collected only after 20.00 hours. From each person, 60 ul of blood sample should be collected and it should be prepared into thick blood smears of 20 ul each. The thick blood smears should be stained and then examined. All the Mf positive blood smears should be re-examined by a senior technician and the result should be confirmed. Ten percent of the negative blood smears should also be re-examined to confirm the results.

Whenever antigenaemia assessment is done using the FTS, in sentinel sites and spot-check sites or among school children as part of TAS, the testing should be done strictly following the guidelines provided by the manufacturers. Particularly, care should be taken to draw correct quantity of blood, depositing the blood in designated place and read the result only after stipulated time.

More details of M & E are given in the following publications:

Lymphatic filariasis: monitoring and epidemiological assessment of mass drug administration — A manual for national elimination programmes. Editors: Dr K. Ichimori/ Lymphatic filariasis, WHO reference number: WHO/HTM/NTD/PCT/2011.4 (http://apps.who.int/iris/bitstream/10665/ 44580/1/9789241501484_eng.pdf)

Table 9. Steps for conducting TAS

Activity	Implementation
Review the MDA data	- Compile/update MDA data that primarily includes number of MDA rounds implemented and treatment coverage for each EU
Identify the EUs eligible for pre-TAS surveys	- Identify the districts that implemented at least 5 rounds of MDA with >65% treatment coverage
Prepare plan for Pre-TAS surveys	- Prepare a time-table for pre-TAS surveys in all eligible EUs - Constitute survey teams - Procure supplies - Arrange logistics
Conduct pre-TAS surveys	- Undertake Mf or Ag surveys in sentinel and spot-check sites, using the recommended methodology - Ensure good quality of surveys is maintained

Activity	Implementation
Determine the EUs eligible for TAS 1	- Analyse the results of pre-TAS surveys - Identify the EUs that showed below threshold level Mf or Ag prevalence in pre-TAS surveys - Compile the data for each successful EU in a standard format - Submit the data to SEARO and get its approval for TAS 1
Prepare plan	- Prepare a time-table for TAS surveys in all eligible EUs - Constitute survey teams - Procure supplies - Arrange logistics - Select schools to be sampled - Determine sample size or number of children to be sampled
Involve DoE	- Brief and enlist the support of DoE in organization of TAS, at central and state/regional level - Get the list from DoE of schools and number of 1st and 2nd grade children for each district
Involve school administration	- Brief the school administration on TAS - Enlist support of school administration for TAS - Establish a small laboratory like facility in school to conduct TAS
Inform community	- Keep community leaders and parents informed of the TAS activity in school
Conduct TAS 1 survey	- Conduct TAS 1 in school by school - Ensure Ag testing using ICT cards or FTS is done accurately - Prepare and maintain data records well
Data consolidation and transfer	- TAS teams should send copies of data records to state/regional Public Health Director and central programme manager

Table 10. Timeline of M & E

Indicator	Target Year			
	2017	2018	2019	2020
National training on Mf surveys & TAS	■			
Regional training on Mf surveys and TAS	■			
Review of MDA data	■	■	■	■
Completion of Pre-TAS surveys in 50% of districts	■			
Completion of Pre-TAS surveys in 80% of districts		■		
Completion of TAS 1 survey in 50% of districts	■	■		
Completion of TAS 1 survey in 80% of districts		■	■	
Completion of TAS 2 survey in about 60% of districts			■	■

Objective 4: To expand MMDP activities to provide services to all people affected by chronic disease

MMDP is the second pillar of the NPELF. The objective of the MMDP is to alleviate the suffering, provide relief and improve quality of life among chronic patients. Patients affected with lymphoedema are trained at health centres and hospitals to practice leg hygiene and other alleviation measures and those affected with hydrocele are counselled and advised to undergo surgical intervention. Due to paucity of resources and higher priority for MDA, the MMDP activities need more focus in Myanmar. However, necessary steps should be taken immediately to initiate the programme first, and, then expand. The following strategies will be implemented to strengthen the MMDP.

Strategy 4.1. Assessment of chronic disease burden

Effective implementation of the MMDP programme requires information on chronic disease burden, distribution and location of patients in each village and district. Necessary steps should be taken to update the chronic disease burden in all endemic districts. Health centres in each district will play the key role in estimating the burden. They should undertake house to house visits in all villages and elicit information from

adult members of households on chronic disease within the family. Using photographs of disease condition, members will be encouraged to provide information on presence of chronic LF - lymphoedema or hydrocele – patients in the family or incidence of acute adenolymphangitis (ADL) episodes. For the affected members, the demographic data and the disease condition and grade should be recorded. Records of patients for each village and health centre should be prepared. Copies of the records will be transferred to township, where the data will be consolidated and sent to state/regional Public Health office to estimate the district level burden.

In resource constrained districts, health workers will approach the key informants, such as village leaders, priests, teachers and social activists in each village to estimate the burden of the disease. Using photographs of disease condition, key informants will be encouraged to provide information on the people affected with chronic disease condition in the community. Lists of patients will be prepared, using key-informant information.

Strategy 4.2. Ensuring quality services to chronic disease patients

The following steps should be taken to ensure quality services to chronic patients and improvement in quality of life. The programme's responsibility to chronic patients in terms of alleviating their disease condition should be emphasized among programme personnel at different levels. The NVBDCP will train the state/regional and township programme managers on their responsibilities to meet the MMDP targets. The LF chronic patients should be provided with quality health services at RHCs, SHCs and Township hospitals. Across the regions/states, the facilities and supplies to the health centres should be improved to provide quality services to lymphoedema and hydrocele patients. All the health centres should be provided with latest guidelines on MMDP services and treatment procedures for acute ADL. The MMDP skills among health workers should be improved through training in each province.

In addition to improved services at health facilities, health workers will reach out to all lymphoedema patients within each health centre catchment area. Using the MMDP guidelines, the health workers will impart training to individuals or groups of lymphoedema patients on management of their condition and prevention of acute ADL attacks. Homebased practice of MMDP measures will be advocated among patients and family members will be encouraged to support patients undertaking self-care. The medical officers will periodically review the progress of the activity.

People affected with acute disease conditions will be given standard treatment at all health centres. The patients will be counselled on the steps for prevention of ADL episodes and its benefits in terms of stopping progression of the chronic disease condition.

Strategy 4.3: Promotion of LF hydrocele surgeries among patients

The following steps may be taken to promote hydrocele surgeries in all endemic regions/ states. The regional/state programme managers and medical officers will be notified on the importance of hydrocoelectomy and the need to reduce hydrocele burden, as part of MMDP services, under the NPELF. The health centres will facilitate hydrocele surgeries through guidance and counselling of the patients and family members. At least one or two hospitals in each endemic district will be identified and their infrastructure, supplies and facilities strengthened to undertake hydrocele surgeries. These hospitals will give high priority for hydrocele surgeries.

Table 11. Timeline of implementation of MMDP activities

Indicator	Target Year			
	2017	2018	2019	2020
Sensitization of state/regional and provincial programme managers on strategic importance of MMDP activities	■	■		
Training programme on disease burden updating and MMDP in high burden districts	■	■		
Training programme on disease burden updating and MMDP in low burden districts		■	■	
Piloting disease burden updating in one district	■			
Chronic disease burden updating		■	■	
Improvement of MMDP infrastructure, with priority on high disease burden provinces		■	■	■
Introduction and implementation of improved MMDP services		■	■	■
Review of progress of national MMDP implementation			■	

Objective 5. To build partnerships and mobilize resources for effective implementation of programme activities

Development of sustainable partnership, with mutual respect as the core principle, is essential for planning the programme, mobilize resources, organize training programmes, implement M & E and surveillance and capacity building. All efforts must be made by the programme to forge partnership with national and international organizations. All steps need to be taken to mobilize enough resources to secure the implementation of the

programme until the final goal is reached.

5.1. Partnership

The national health authorities should play the key role in forging the partnership. To begin with, they should well define the objectives and structure of the programme and ensure effective participation of health centres and health workers and communities in the programme. Support of various other ministries is necessary, as they have the potential to contribute to strengthen the programme. MoE has an important role to play in organizing and conducting TAS and integrating STH control programme with NPELF. Ministry of Social Welfare can improve participation of women in the programme. Ministry of Labour can mobilize the workforce to participate in the MDA programme.

Efforts should be made to enlist the support of the local NGOs. Several international organizations have been playing an important role in support of NPELF in several countries. The MOHS should establish partnership with organizations such as DFID, GNNTD, JICA, USAID, WHO, SEARO and academic institutions such as CNTD, Liverpool, UK, and, NTD Support Centre, Atlanta, and, donors such as SmithKline Beecham.

5.2. Resource mobilization

Mobilizing sufficient funds from state/regional and national governments to enhance the programme implementation that include MDA, M & E, post-MDA surveillance and MMDP activities over the next four years to scale up M & E and surveillance is a major priority of the programme. Hence, the investment required year by year and for 2016-2020 period should be prepared and updated from time to time. In conformity with the international policy framework of increasing local funding, the Myanmar NPELF should initiate steps and mobilize the investment required. The NPELF should engage and work with Department of Public Health to mobilize entire funding from local sources. In addition, steps will be taken and plans prepared to approach the current and prospective donors and international agencies for additional resources required to deploy new diagnostic tools, intensify MMDP activities and improve data management systems. A list of potential donors, national and Multi-national companies should be prepared and an advocacy campaign launched among them to raise their awareness about the NPELF and elicit support. Reports on progress of the programmes will be prepared and shared with local donors and international stakeholders such as GNNTD, DFID, USAID, RTI International, Washington, Centre for Neglected Tropical Diseases, Liverpool, UK, GlaxoSmithKline and WHO/SEARO and other Non-Governmental Developmental Organizations.

Investment required

The annual investment required in various activities of the NPELF is summarized for

2018-2020 in Table 2. A bulk of this investment is required to procure the anti-filarial drug DEC, which is used in MDA programme.

The annual investment required is Kyats 733 **Million** in 2018.

Table 12. Investment required for NPELF, Myanmar

Item	Investment required in USD			
	2019	2020	2021	2022
Procurement of DEC	22300			
MDA – Orientation of health staff	63695			
Social mobilization	35000			
M & E Diagnostic kits Supplies Survey related	39000			
MMDP	10000			
Hydrocoelectomy	25000			
Capacity building	18152.9			
IEC Material	111465			
Policy workshops	5000			
Partnership	11000			
Misc. (Freight)	15000			
Administrative support	10000			
Total	**365612.9**			

Objective 6. To establish and operationalize a clean and efficient data management system to monitor the progress of the programme

Good data management practices are vital for the programme as the data are collected from as many as 47 districts over a period of 20 years and the range of data varies widely. It should be ensured and care taken to keep the data records and data files safely. These records and data are crucial for decision making, timely action, down scaling intervention and surveillance measures. They constitute the backbone of the LF elimination validation dossier, which should be prepared and submitted at the end of the programme by each endemic country.

6.1. Data management system

An Information Technology specialist should be engaged to develop a data management system. He should study the programme structure and the details of data collection, data transfer and importance and utility of various sets of data and data presented in annual reports of the programme. He should also review the dossier templates and details of data required for dossier preparation. The final objective of the exercise is to build a simple computer based data management system that is user-friendly and robust.

6.2. Skill development

The personnel responsible for data management at district, state/regional and national level may be provided hands on training to improve their skills in data management. Such skill development will be useful also to manage the data pertaining to other NTDs also.

The programme includes a large data set that consists of detailed information on activities of the programme from 47 LF endemic districts. These data are crucial for decision making, timely action, down scaling intervention and surveillance measures and preparation of disease elimination dossiers. Importance should be given for timely data collection and analysis, to facilitate decision making. The health workers should be sensitized to maintain the quality of data collection.

The MDA, M&E and TAS data collected over the last 15 years will be collated at district level and will be consolidated at state/regional and central level. The progress of the surveillance and its outcomes will be closely monitored and analysed and corrective measures taken promptly.

6. Strategic Plan Implementation

At national level, the VBDCP should lead the advocacy campaign, engage the political class and government ministries to secure government commitment and financial and other resources (Objective 1). The sub-national programme managers should lead the advocacy campaign at state/regional and district level and identify the local NGOs and work with them for effective implementation of intervention measures. It will interact with industry to generate its support to the programmes. The VBDCP should work towards strengthening partnership with local and international organization and mobilize adequate resources for the programme (Objective 5).

The central VBDCP should discuss the strategic plan and work closely with regional and township programme managers to implement the plan. It should prioritize the districts that require capacity strengthening and additional resources to implement effectively

the MDA (Objective 2), M & E and surveillance activities (Objective 3).

The VBDCP should conduct **state/regional meetings** and discuss with respective state/regional and township programme managers on logistic and additional resource required to implement the strategic plan. The concerned regional meetings should discuss the issues related to effective MDA implementation and transmission interruption in districts that have been showing persistent infection and M & E and surveillance and good data management.

State/Regional workshops should be conducted for state/regional and respective district programme managers and other important stakeholders to develop plans for implementation of the MDA and surveillance activities and effective MDA. Best practices and experiences from other countries and research studies should be shared and discussed, while preparing the plans.

The district programme managers will conduct **district workshops** for medical officers of the townships and other stakeholders to finalize the plans to implement MDA and M & E and surveillance activities throughout the district. They should also enlist the support of NGOs and partners to implement various programme activities.

Each RHC/UHC will conduct **meeting of the focal points of the SHCs** to explain the objectives of the MDA and M & E and surveillance. During the meeting, detailed plans will be discussed and finalized to implement the activities at the village/community level. SHCs will be encouraged to interact with community leaders and NGOs to enlist their support for MDA activities. Their staff will involve the local youth and volunteers for effective distribution of drugs.

The progress of the plan implementation will be reviewed on yearly basis and corrective steps initiated by VBDCP. It will take necessary steps to ensure data quality, data management and data transfer.

The district level implementation of important activities is summarized in Tables 13 and 14.

7. Expected outcome

Implementation of effective MDA, with good planning and supervision and focus on drug distribution and compliance with treatment, in the districts with persistent infection will result in better compliance with treatment and effective treatment coverage. This will result in reducing the Mf and Ag prevalence to below threshold level in the districts. This will enable realizing the goal of transmission interruption and stopping the MDA in the

entire Myanmar by 2018-2019 (Tables 3 and 4).

Regular monitoring the implementation of MDA, and prompt implementation of TAS 1, TAS 2 and TAS 3 will lead to scaling down of MDA and surveillance activities. This will enable the programme to focus more in problem areas such as persistent infection. And, pass in TAS 3 enables the districts to declare elimination of LF and institute post-TAS surveillance (Tables 3 and 4).

Expansion of the morbidity management will lead to better services to the chronic patients at health centres and township hospitals. These services will enable the lymphoedema patients to manage their disease condition better and prevent acute ADL episodes. The opportunities for hydrocelectomy will improve, which will enable the reversal of the disease condition. Overall, MMDP, when put in place in all districts, will alleviate the suffering in chronic patients and improve the quality of life across all districts in the country. This is critical for the success of the LFEP and required to meet the criterion of LF elimination from a country.

The NPELF will enable the health workers to gain rich experience and the health system will be benefited in terms of implementing large scale public health interventions and undertaking extensive surveillance activities. The experience will be very useful in the elimination of other NTDs and vector-borne diseases.

The National LF elimination strategic plan and its implementation will ensure meeting the goals set by the SEARO and WHO and contribute to elimination of LF from Myanmar.

Table 13. Current situation and plan of activities (2019-2022) in high endemicity Regions and States of Myanmar

Magway Region

#	Region	#	District	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Outcome	2019	2020	2021	2022
1	Magway Region	1	Magway	2001	16	1.18-7.10	2011	0.39	2015	-	5.0	2018	Pre TAS failed	MDA	Pre TAS	TAS 1	Post TAS surveillance
		2	Thayet	2002	15	6.3	2012	2.98	2015	-	13.3	2018	Pre TAS failed	MDA	Pre TAS	TAS 1	Post TAS surveillance
		3	Minbu	2001	11	4.3	2012	0.8	2014	0.6	-	2014	TAS 1 passed	TAS 2	Post TAS surveillance	TAS 3	Post TAS surveillance
		4	Pakokku	2002	15	0.19-9.1	2012	6.6	2015		15.0	2018	Pre TAS failed	MDA	Pre TAS		Post TAS surveillance

#	Region	#	Districts	MDA starting year	# MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Outcome	2019	2020	2021	2022
2	Sagaing Region	5	Sagaing	2002	15	3.0-7.0	2010	2	2015	1.28	-	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS1	Post TAS surveillance
		6	Monywa	2002	15	5.2-5.5	2012	0	2015	-	9.4	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS1	Post TAS surveillance
		7	Shwebo	2002	15	11.5-15.1	2014	1.89	2015	-	8.8	2016	TAS 1 failed	MDA	MDA Pre-TAS	TAS1	Post TAS surveillance
		8	Katha	2002	8	0.53-2.6	-	-	2014	0	-	2012 2014	TAS 1 passed TAS 2 passed	TAS 3	Post-TAS surveillance	Post-TAS surveillance	Post TAS surveillance
		9	Kale	2002	8		2014	0	-	-	-	2012 2014	TAS 1 passed TAS 2 passed	TAS 3	Post-TAS surveillance	Post-TAS surveillance	Post TAS surveillance
		10	Tamu	2002	8		2014	0	-	-	-	2012 2014	TAS 1 passed TAS 2 passed	TAS 3	Post-TAS surveillance	Post-TAS surveillance	Post TAS surveillance

Mandalay Region

#	Region	#	Districts	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2019	2020	2021	2022
3	Mandalay Region	11	Mandalay	2004	11	0.7-6.8	2011	8.8	2014	0.2	-	2018	Pre TAS passed	MDA TAS 1	Post-TAS surveillance	TAS 2	Post-TAS surveillance
		12	Pyin Oo Lwin	2004	6	0.2-0.4	2011	0.2	2014	0.33	-	2014-	TAS 1 Passed	TAS 2	Post-TAS surveillance	TAS 3	Post-TAS surveillance
		13	Kyaukse	2004	11	5.47-14.7	2008	3.71	2014	0.3	-	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS 1	Post-TAS surveillance
		14	Yamethin	2004	11	2.9-6.0	2014	0.19	2016	-	6.35	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS 1	Post-TAS surveillance
		15	Myingyan	2004	11	3.4-13.3	2011	4.6	2014	3.2	-	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS 1	Post-TAS surveillance
		16	Meikhtila	2004	11	1.67-7.2	2011	4.56	2014	1.9	-	2018	Pre TAS failed	MDA	MDA Pre-TAS	TAS 1	Post-TAS surveillance
		17	Nyaung-U	2004	8	2.8-7.4	2008	0.4	2014	1.3	-	2016	TAS 1 passed	TAS 2	Post-TAS surveillance	TAS 3	Post-TAS surveillance

Table 14. Current situation and plan of activities (2019-2020) in moderate endemicity Regions and States of Myanmar

Naypyitaw

#	Region	#	Districts	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	**Year**	Result	2019	2020	2021	2022
5	Naypyitaw	18	Naypyitaw1	2004	11	-	2014	0.5	2016	-	1.5	2017	Pre TAS failed	MDA	Pre TAS	TAS 1	Post TAS surveillance
		19	Naypyitaw 2	2004	11	-	-	-	-	-	-	-	-	MDA	Pre TAS	TAS 1	Post TAS surveillance

Rakhine State

5	Rakhine State	20	Sittwe	2004	6	1.4-12.6	-	-	2010	0.8	-	2017	Pre TAS failed	MDA	Pre TAS	TAS 1	Post TAS surveillance
		21	Maungdaw	2004	6	0.16-1.7	-	-	2010	0	-	-	-	MDA	Pre TAS	TAS 1	Post TAS surveillance
		22	Kyauk Phyu	2004	6	2.34	2010	0.8	2015	0	-	2017	TAS 1 passed-	Post TAS surveillance	TAS 2	Post TAS surveillance	TAS 3
		23	Thandwe	2004	6	0	2010	0	2015	0	-	2017	TAS 1 passed-	Post TAS surveillance	TAS 2	Post TAS surveillance	TAS 3

Chin State

#	Region	#	Districts	MDA starting year	#MDAs by January 2019	Range of base-line Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2019	2020	2021	2022
6	Chin State	24	Paletwa	2004	12	1.38 -1.59	2003	1.38	2007	0.2	-	2018	Pre TAS passed	TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance

Mon State

7	Mon State	25	Maw-lamyaing	2013	6	0.83-2.5	2006	0.83	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		26	Thaton	2013	6	0.8-3.2	2006	3.2	2013	0.17	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance

Bago Region

8	Bago Region	27	Bago	2013	6	0.4-2.8	2005	2.8	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		28	Taung Oo	2013	6	0.76-1.18	2009	0.19	2013	0.19	-	2018-	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		29	Tharra-waddy	2013	6		2009	0	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		30	Pyay	2013	6	0.58-0.59	2009	0.39	2013	0.39	-	2018	Pre TAS Failed	MDA	MDA Pre-TAS	TAS 1	Post TAS surveil-lance

Ayeyarwady Region

#	Region	Number	Districts	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2019	2020	2021	2022
9	Ayeyarwady Region	31	Pathine	2013	6	2.4	2004	2.4	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		32	Hinthada	2013	6	1.43	2005	1.3	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		33	Myaungmya	2013	6	0.59	2005	0.59	2013	0.3	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		34	Pyapon	2013	6	0.0-0.8	2004	0	2005	0.8	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		35	Maubin	2013	6	0	2001	0	2013	0	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance

Tanintharyi Region

#	Region	#	Districts	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2017	2018	2019	2020
10	Tanin-thayi Region	36	Dawei	2013	6	0.59-1.8	2008	1.8	2013	0.6	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		37	Myeik	2013	6	0.2-0.4	2008	0.6	2013	0	-	2018	Pre TAS failed	MDA	MDA Pre TAS	TAS 1	Post TAS surveil-lance
		38	Kawthoung	2013	6	0.2-0.4	2008	1.4	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance

Kayin State

#	Region	#	Districts	MDA starting year	#MDAs by Jan-uary 2019	Range of base-line Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2017	2018	2019	2020
12	Kayin State	41	Hpa-an	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		42	Kawkareik	2013	6	0.0-0.0	2012	0	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance
		43	Myawaddy	2013	6	0.1	2012	0.19	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveil-lance	TAS 2	Post TAS surveil-lance

Yangon Region

#	Region	#	Districts	MDA starting year	#MDAs by January 2019	Range of baseline Mf rate	Results of latest two surveys in sentinel & SC sites					TAS status		Activities to be implemented			
							Year	Highest Mf rate observed	Year	Highest Mf rate observed	Highest Ag rate observed	Year	Result	2017	2018	2019	2020
13	Yangon Region	44	Yangon East	2013	6	0.0-0.0	2012	0.00	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		45	Yangon West	2013	6	0.0-0.1	2012	0.40	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		46	Yangon North	2013	6	0.0-0.0	2012	0.00	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance
		47	Yangon South	2013	6	0.4-0.4	2012	0.19	-	-	-	2018	Pre TAS Passed	MDA TAS 1	Post TAS surveillance	TAS 2	Post TAS surveillance

Annexure 1. A model pre-TAS data collection form

Country name		**SriLanka**		
Number of endemic Implementation Units (IUs) in the country				**8**
Number of non-endemic IUs in the country				**17**
Evaluation Unit[1] (EU) composition	Name	**Kalutara**		
	Number of IUs in the EU			**2**
	Names of the IUs 1 2 3	**Kalutara** **Gampaha**		
Total population of EU				**1182772**
Area of EU (Km^2)				**6000**
Year of first MDA in the EU				**2001**
Reported MDA coverage and assessed consumption in the latest MDA and 4 previous rounds	Number of MDAs in the EU			**7**
	Year	Year	Reported coverage (%)	Assessed consumption (%)
	Latest	2006	79.9	Not available
	Previous round No. ……..	2005	85.0	Not available
	Previous round No. ……..	2004	89.9	87.1
	Previous round No. ……..	2003	91.8	80.4
	Previous round No. ……..	2002	80.5	Not available
Pre- TAS Surveys in Sentinel sites (SS) & spot-check sites (SC) surveys (baseline and post "n"th MDA)[2]	Baseline year			2002
	Baseline Mf prevalence			0.04
	Baseline Antigenemia (Ag by ICT) prevalence			na
	Most recent survey year			2006
	Most recent survey: Number of peopole sampled in SS			500
	Most recent survey: Mf prevalence in SS			0.003
	Most recent survey: Ag prevalence in SS			na
	Most recent survey: Number of people sampled in SC			502
	Most recent survey: Mf prevalence in SC			0
	Most recent survey: Ag prevalence in SC			na

[1] **EU: Evaluation Unit; can be comprised of multiple IUs, but the total poulation should no more than 2 million**
[2] **If more than 1 SS and/or 1 SC, use the worst case scenario (the site with highest prevalence)**