Final Version

Malaria National Strategic Plan

2015-2020

Creating Sustainable Impact

National Malaria Control Programme (NMCP)
Communicable Disease Control Division
Directorate General of Health Services
Ministry of Health & Family Welfare
Bangladesh

Foreword

This is indeed, a great pleasure to learn that the National Malaria Control Programme, Bangladesh has drafted the "National Strategic Plan 2015-2020" aiming at achieving the goal of malaria elimination-'zero case and zero death' by 2020 in the country. The vision that refers herein, is reaching eventually a status of 'Malaria free Bangladesh'. This goal also aligns with the overall development goals of the Government of the People's Republic of Bangladesh in general, and the health sector goals in particular, for creating conditions whereby its people have the opportunity to reach and maintain the highest attainable level of health as a fundamental human right and social justice. With this end in view, Government is committed to establish a people oriented and responsive health care services, addressing the needs of women, children, adolescents, the elderly, the poor and the marginalized, through developing an effective, efficient and sustainable health care delivery system managed by skilled and efficient human resources.

As in other tropical countries of the region, malaria continued as one of the major public health problems in Bangladesh especially in the border districts facing eastern states of India and part of Myanmar. However, over the implementation of the previous strategies, the increase in resources available for malaria control globally (viz. from Global Fund) resulted in scaling up of malaria control interventions such as early diagnosis with Rapid Tests (RDT) and effective treatment with Artimisinine Combination Therapy (ACT); and long-lasting insecticide treated nets for reducing risk of transmission among the population at risk. As a result Bangladesh national Malaria Control Programme has achieved significant progress in reducing the burden of malaria and at this stage has planned to shift from 'control to stratified and phased elimination' by 2020.

The National Malaria Strategic Plan 2015-2020 is based on and carries forward an inclusive partnership between the Ministry of Health and Family Welfare and the BRAC-led 21 Member NGO's consortium for its implementation with technical support from WHO and other partners, home and abroad. This strategic document is the product of extensive consultation and collaboration with all stakeholders and establishes the strategic framework for delivery of malaria elimination interventions, along with monitoring and evaluating performances.

This strategic plan 2015-2020 encompasses all out efforts of the National Malaria Control Programme (NMCP) and all other stakeholders, by shifting the focus to achieving the goal of malaria elimination by 2020, aligning with the overall developmental goals of the Government of Bangladesh linking with "Vision 2021". It is envisioned that this strategic document will provide necessary framework and directions for the multi-sector approach towards malaria elimination enabling the country to move towards the vision of "A Malaria-free Bangladesh".

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Abbreviations and Acronyms

ACT	Artemisinin-based Combination Therapy
BCC	Behavior Change Communication
BRAC	Bangladesh Rural Advancement Committee
BSE	Blood Slide Examination
BRAC SK	BRAC Shasthya Kormi
BRAC SS	BRAC Shasthya Shebika
CCM	Country Coordinating Mechanism
CDC	Communicable Disease Control
CHTDF	Chittagong Hill Tract Development Facility
CMSD	Central Medical Store Depot
CQ	Chloroquine
DC	Disease Control
DDT	Ddichlorodiphenyl Trichloroethane
DGHS	Directorate General of Health Services
DRS	District Reserve Stores
EDPT	Early Diagnosis & Prompt Treatment
GFATM	Global Fund to Fight AIDS, Tuberculosis & Malaria
GoB	Government of Bangladesh
HA	Health Assistant
HH	Household
HMIS	Health Management Information System
HPNSDP	Health, Population, Nutrition Sector Development Programme
ICDDR,B	International Centre for Diarrhoeal Diseases Research, Bangladesh
IEC	Information, Education & Communication
IEDCR	Institute of Epidemiology, Disease Control & Research
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Nets
IVM	Integrated Vector Management
KAP	Knowledge, Attitudes & Practice
LLIN	Long-Lasting Insecticidal Nets
M&E	Monitoring & Evaluation
M&PDC	Malaria & Parasitic Disease Control
MDG	Millennium Development Goal
MDR	Multi-Drug Resistant
MEP	Malaria Eradication Programme
MIS	Malaria Information System
MO	Medical Officer
MoH&FW	Ministry of Health & Family Welfare
MoU	Memorandum of Understanding

MRG	Malaria Research Group
NGO	Non-Governmental Organization
NIPSOM	National Institute of Preventive & Social Medicine
NMCP	National Malaria Control Programme
NPO	National Professional Officer(of WHO)
PHC	Primary Health Care
PPE	Personal Protective Equipment
PPP	Public–Private Partnership
PQ	Primaquine
PR	Principal Recipient
PSM	Procurement & Supply-Chain Management
QA	Quality Assurance
QC	Quality Control
RDT	Rapid Diagnostic Test
SR	Sub-Recipient
SEAR	South-East Asia Region (of WHO)
SSF	Single Stream Funding (of GF)
UZHC	Upazila Health Complex
VPP	Voluntary Pooled Procurement (of GFATM)
WHO	World Health Organization

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Executive Summary

Malaria is one of the public health problems in Bangladesh. Out of 64 districts in the country, malaria is endemic in 13 districts and 13.25 million people are at risk of the disease. The three Hill Tract Districts (Bandarban, Khagrachari and Rangamati) and Cox's Bazar district reported 92 percent of the malaria cases and 80 percent of malaria deaths in 2013. Both P.falciparum and P. vivax malaria are prevalent in the country of which the proportion of reported P. falciparum infection is 96% of the total cases in the country. Bangladesh adopted the World Declaration of Malaria Control in 1994, and in 1999, with the launch of the Global Roll Back Malaria Initiative embarked on a course of enhanced malaria control. The country received two grants from the GFATM, one in 2007 (Round 6), with which began the scaling up of malaria control interventions, and another in 2009 (Round 9) to further expand intervention coverage. Malaria control operations are thus supported financially largely by the GFATM and the Health, Population, Nutrition Sector Development Programme (HPNSDP) and technically by the World Health Organization.

Tthe National Malaria Control Programme pursued its malaria control interventions with a view to its long term goal of reducing the malaria morbidity and mortality until the disease is no longer a public health problem. The malaria control partnerships with various donors and organizations, namely GFATM, BRAC led NGO consortium and WHO have been key to the successful implementation of various strategies and interventions, including LLIN distribution, early diagnosis and effective treatment using RDT and ACT and information, education and communication campaigns for mass awareness of the community.

From 2007 onwards Bangladesh has vastly expanded health services for malaria prevention and treatment in endemic areas, to people at risk of malaria. This has been achieved as a collaboration between the MOH&FW and a Consortium of 21 NGOs led by BRAC, by establishing an effective network of community level intervention delivery programmes. These community operations are based on: i) the use of rapid diagnostic tests supplemented by microscopy for diagnosis of patients, and effective medicines for the treatment of malaria; ii) providing long-lasting insecticidal bed nets to people living in endemic areas; and iii) implementing Advocacy, Communication and Social Mobilization (ACSM) programmes for creating impact.

The country is now well on it's way to reaching population coverage targets set by the programme. These intervention scale-up efforts, which began in 2007-2008, are beginning to show impact and according to national surveillance data, the malaria incidence has decreased from 84,690 cases in 2008 to 26,891 cases in 2013, having a 68.2% reduction in case incidence. Malaria deaths have also decreased countrywide, as has the case fatality rate of *P.falciparum* malaria, indicating that early diagnosis and effective treatment of *P.falciparum* at the community level is having an impact. However, in some of the high-endemic hill tract forest areas malaria cases have not decreased largely, indicating that transmission has not been reduced in these areas to the same extent. A reasonably high coverage with LLINs have been

achieved over the past 3 years, and diagnostic and treatment services have been extended to the community level but they have not had a uniform impact everywhere.

Notably, two programme reviews were conducted: i) Malaria Programme Review (MPR) in June 2011; and ii) Mid-Term Review of Malaria programme Performances (MTR) in April 2014. Findings of these reviews suggest that although a significant impact has been made by expansion of the current strategies applying interventions in a blanket manner, this alone is not likely to lead to further reductions in malaria transmission. A change in strategic direction for malaria control is now warranted to embark on a locally driven micro-epidemiology-based strategy, using specific information on the prevalence and vector biology using multiple vector control interventions, and directed towards individual risk behaviours of different categories of people. This will require malaria information at the district, upazila and the village levels for planning and implementing interventions towards achieving the target of phased elimination in low to moderate endemic districts.

While the country has adopted state-of-the art malaria diagnosis and treatment strategies, the review revealed some gaps in a few areas e.g, to have a policy on integrated vector management; and an evidence-based BCC strategy. Mono-valent RDTs were used and *P. vivax* cases were under diagnosed. However, NMCP has already introduced pan-RDTs in the programme and primaquine is added for treatment of uncomplicated *P.falciparum* malaria as transmission blocking agent which is highly recommended. A key to achieving further reductions in malaria would require a rigorous surveillance system, and the capability to provide an analytical feedback mechanism to strategic planning on a regular basis. The reviews also recommended stronger quality control of commodities and services, and more stringent regulation on health care practices for malaria.

The existing National Strategic Plan 2008-2015 envisaged 60% reduction of malaria morbidity and mortality (compared to baseline 2005) by 2015 with the specific objectives of: i) providing early diagnosis and prompt treatment (EDPT) with effective drugs to 90% of malaria patients; ii) ensuring effective malaria prevention to 100% population at risk in five high endemic districts and 80% in the remaining eight districts; iii) providing pre-referral treatment and timely referral of 90% of severe malaria cases; iv) strengthening surveillance, establishing Rapid Response Team (RRT) for containment of outbreaks; vi) promoting community participation, partnership with NGOs and private sector and vi) strengthening management capacity, M&E and Procurement and Supply Management (PSM) systems in the National Malaria Control Programme.

Largely, National Malaria Control Programme has been successful in achieving the set objectives and targets as revealed in the Malaria Programme Review (MPR) in June 2011 and the Mid-Term Review (MTR) in April 2014. The MPR and MTR highlighted programmatic strengths, weaknesses and gaps to address for creating a sustainable impact in malaria control through stratified micro-planning based on evidences that will support further reducing disease burden in low malaria endemic districts as against a blanket approach to implementation of malaria interventions, countrywide.

The Malaria Strategic Plan (2015- 2020) provides the framework and technical guidance for the National Malaria Control Programme (NMCP) to plan and implement interventions for achieving pre-determined goals, objectives and targets. The goal is "To have achieved '*zero indigenous transmission*' and *'zero death'* aiming malaria elimination in Bangladesh, by 2020.

The Malaria National Strategic Plan (2015–2020) has been developed through a multi-stakeholder and multi-sector participatory approach in line with recommendations from the

Malaria Programme Review (MPR) and the Mid-Term Review (MTR) of the National Malaria Control Programme (NMCP) conducted by national and international experts, during June 2011 and April 2014, respectively. Moreover, the paradigm shift due to epidemiological changes; the gradual shrinking of the malaria map in low transmission districts; and the need for re-orientation of the malaria control programme towards stratified and phased elimination of malaria in Bangladesh have been considered.

Some differences from the previous strategies therefore are the scale up and consolidation of malaria control interventions including disease and vector surveillance; improved programme planning and targeted implementation towards elimination; strengthening monitoring and evaluation; enhancing collaboration and partnerships among GoB-NGO consortium; and effective community partnership. The goals and objectives of the National strategic Plan are aligned to overall health sector development strategies of the country and emphasize the use of *state of the art* technologies for malaria elimination; in line with regional and global malaria control strategies, in particular.

Vision, Mission, Goal and Objectives of Strategic Plan (2015-2020)

Vision: Malaria-free Bangladesh

> *The vision envisages a future 'Malaria-free status of Bangladesh´ and refers to a major difference to the people's life and the societies living with the risk of malaria. The vision will focus on reducing poverty by preventing malaria morbidity and deaths.*

Mission:

> *The National Malaria Control Programme (NMCP), Bangladesh aims to achieve malaria elimination ('zero indigenous transmission' and 'zero deaths') by ensuring equitable and universal accesses to effective preventive and curative services to all 'at risk population' through concerted efforts of the GoB, NGOs, Private sectors, and the community. Achieving the goal of 'Malaria Free Bangladesh' will contribute to poverty alleviation as the poorest of the poor segment of the population are largely the victim of malaria.*

Goal: By 2020, to have achieved '*zero indigenous transmission*' and *'zero death'* aiming malaria elimination in Bangladesh

> *The goal aims at attaining a status of malaria elimination by 2020, referring to reorientation of the control interventions in phased and stratified manner for addressing: four low endemic districts; expansion to the moderate endemic districts; and intensified efforts in high endemic districts; with a view to achieving eventual malaria elimination status in Bangladesh.*

Strategic Objectives:

Objective 1: To achieve 100% coverage of *'at risk'* population with appropriate malaria preventive interventions by 2018

Implementation Approaches and Strategies:

During implementing Global Fund supported proposal of Round-6 and Round-9, the National Malaria Control Programme has achieved remarkable success in scaling up diagnostic and treatment services and reducing malaria incidence remarkably. However, 100% coverage by appropriate and effective preventive methods for the population at risk is yet to be achieved. As per the current policy, the LLINs coverage in three CHT districts was targeted to be 100%; and other moderate and low endemic district by 80% using both ITNs and LLINs. Under the present National Strategy, the 100% coverage by LLINs and ITNs remains as the main stay and other vector control interventions to support achieving zero transmission should include: i) Selective Indoor Residual Spray (IRS); ii) Larval Source Reduction (LSR); and micro-environmental management by the community under IVM approach; and iii) intensive IEC/BCC activities for mass awareness of the community. The following interventions need to be considered:

- Procurement and distribution of LLINs (@1 net per 1.8 Population) and ensuring use for maximizing personal protection and reducing risk of malaria transmission;
- Treatment and re-treatment of community owned nets;
- Indoor Residual Spray (IRS) in selected areas based on case-reporting and investigation for reducing local transmission;
- Larval source reduction and environmental management using IVM approach in partnerships with the community;
- Special measures for protecting high risk groups (Jhum Cultivators, forest goers, tourists, and tropical aggregation of labour forces in development project areas etc);
- Malaria Free Towns

Major Intervention Areas:

- Procurement and distribution of LLINs (@1 net per 1.8 Population) and ensuring use for maximizing personal protection and reducing risk of malaria transmission;
- Treatment and re-treatment of community owned nets;
- Indoor Residual Spray (IRS) in selected areas based on case-reporting and investigation for reducing local transmission;
- Larval source reduction and environmental management using IVM approach in partnerships with the community;
- Special measures for protecting high risk groups (Jhum Cultivators, forest goers, tea gardens workers, tourists, and tropical aggregation of labour forces in development project areas etc);
- Malaria Free Towns

Objective 2: To have 100% malaria patients receiving early and quality diagnosis (RDT or Microscopy) and effective treatment by 2018

Implementation Approaches and Strategies:

The National Malaria Control Programme needs to emphasize the "*Test, Treat and Track"* principles and ensure that 100% malaria patients are diagnosed and treated within 24 Hrs of the onset of the disease. The routine surveillance data on species indicates that more than 90% of the cases are *P. falciparum* infections and as such *P. vivax* diagnosis may not have adequate attention. The pan-RDT has been introduced recently to diagnose both *P. falciparum* and *P.*

vivax simultaneously. The microscopy centers (83 from GoB and additional 121 from NGOs) are still not enough to cater the need for early detection of cases and with the progress in elimination, the need for microscopy has to be further emphasized.

Engagement of 800 Community Clinics located in the malaria endemic districts may have an additional advantage in scaling up diagnosis and treatment provisions, close to the community. Intensive efforts to be taken to reach the hard-to-reach areas through operating mobile clinics, and deployment of additional trained health workers. Necessary support from the Army Medical Core (AMC) and Border Guard, Bangladesh (BGB) may be sought wherever AMC and BGB have their installations for extending such help. The following areas to be taken into account:

- Provision of Pan-RDT and microscopy centers closer to the community;
- Establishing facilities for molecular diagnosis of malaria in selected laboratories;
- Trained Lab. Technologists and QA system for microscopy and RDT;
- Uninterrupted supplies of RDT, ACT and other health products;
- Utilization of Community Clinics (800 CCs in malaria endemic areas);
- Intensified efforts for remote and hard to reach areas (Mobile clinics, additional community health workers);
- Additional support from Armed Forces; Border Guard Bangladesh (BGB); and private sector;
- Case based reporting, follow up and investigation of each death;
- Monitoring drug resistance with special reference to tracking Artemisinin resistance using 'state of art technologies' and in collaboration with expert organizations and institutions in and outside country.

Major Intervention Areas:

- Strengthening capacity for malaria diagnosis and treatment;
- Increasing access to diagnosis and treatment by GoB and private sectors (PPP);
- Strengthening referral and deployment of pre-referral treatment;
- Strengthening Community Clinics and community systems for malaria prevention, management and referral;
- Engaging RMNH, private sectors and NGOs in malaria management

Objective 3: To continue strengthening of programme management towards elimination by 2020

Implementation Approaches and Strategies:

As the National Malaria Control Programme needs to embark on phased elimination, the present capacity should have to be strengthened to ensure proper planning and effective implementation. The following areas are critically important:

- Geographical Reconnaissance (GR) of villages/households and mapping of malaria endemic areas as per micro-stratification to introduce area specific interventions;
- Target based approach to planning and prioritizing the most at risk populations and adapting sound strategies to address local needs;
- Deployment and development of additional Human Resources at central, district and

below levels. Appropriately trained vector specialists to be in place.
- Functioning of effective partnerships and collaboration;
- Health system and community system strengthening;
- Re-orientation of National Malaria Control Programme towards pre-elimination and elimination in phased manner

Major Intervention Areas:

- Micro-planning for phased elimination in low transmission districts;
- Human resources and infrastructure;
- Improved performance monitoring system at all levels;
- Reinforced GoB-NGO partnerships and institutional linkages;
- Investing in community system strengthening.

Objective 4: To continue strengthening of disease and vector surveillance, Monitoring and Evaluation towards malaria elimination

The present capacity of National Malaria Control Programme in areas of disease and vector surveillance, Monitoring and Evaluation is weak which needs to be enhanced. The following steps should have to be taken:

Implementation Approaches and Strategies:

- Strengthen central and district team for malaria surveillance, M&E and operational research;
- Improve Entomological surveillance to include studies of vector biology; effective vector control interventions; and monitoring vector resistance to insecticides;
- Evidence based interventions targeting elimination;
- Introduce electronic data base and web-based reporting;
- Integrated Communicable Disease Surveillance linked to HMIS;
- Regular monitoring and periodic evaluation of the programme performance

Major Intervention Areas:

- Strengthened malaria surveillance, M&E and operational research;
- Strengthen Entomological surveillance
- Routine monitoring of Key Performance Indicators (KPI);
- Electronic data base and web-based reporting; and
- Integrating Communicable Disease Surveillance to HMIS

Objective 5: To intensify Advocacy, Communication and Social Mobilization (ACSM) for malaria elimination

Implementation Approaches and Strategies:

Community empowerment is the key to successful programme implementation and creatinf sustainable impact. Mass awareness of the population at risk should be continued and intensified through intensive IEC using appropriate methods, materials and tools. For a sustainable impact, a well-planned ACSM is instrumental for ensuring community participation

in malaria control. The following elements of ACSM should guide to effective mass awareness campaign:

- Development and use of appropriate ACSM materials and tool;
- Using local cultural and ethnic norms and practices for target population;
- Coordination and collaboration among health and related sectors;
- Multi-sectoral approach to remove cultural and ethnic barriers in communications;
- Intensive IEC/BCC activities for mass awareness of the community in partnerships with NGO, private sectors, other agencies and local authorities.
- School-based initiative for child-to-child communication ("Little Doctor" approach) for dissemination of messages.
- Creating evidence for effectiveness of IEC/BCC methods;

Major Intervention Areas:

- Development of appropriate ACSM strategies;
- Development, printing and dissemination of appropriate ACSM materials;
- Post marketing surveys for effectiveness of IEC/BCC methods;
- Mult-sectoral approach for reducing cultural/ethnic barriers in communications;
- Operational research in ACSM

Bangladesh will embark on a stratified phased elimination during the implementation period of this current strategic plan 2015-2020. Of the 13 endemic districts four have already reached pre-elimination since last three years and progressively the National Malaria Control Programme will plan and implement the elimination strategies in all endemic districts. A systematic programme reorientation and action planning (Business Plan) will follow to achieve set objectives, targets and the goal for elimination.

The Annual Action Plan (Business plan) should be developed address the following issues:

- Set Annual targets aligned to the vision, mission, goals and objectives. These targets to have a breakdown structure to districts, upazilas, unions, and villages with time bound approach to achievement (preferably annual targets);

- Micro-stratification of malaria endemic areas based on evidence based set of epidemiological data; adequate information on entomological parameters related vector bionomics; and population characteristics keeping in pace with the updated evidences from the field and progress of implementation (quarterly and annually);

- Introduce case-based surveillance and investigation of each case (and death) for deployment of vector control measures (Focal IRS @ 60 HHS around each case reported; and additional interventions e.g. larval source reduction; Mass Drug Administration-MDA etc.);

- Intensify early diagnosis and treatment (within 24 Hours of manifestation of symptoms) and deployment of appropriate pre-referral treatment for severe malaria;

- Strengthen referral services and equip selected district hospitals in high endemic areas to ensure proper management of severe malaria cases (including patients requiring ICU services);

- Appropriate attention to diagnose and treat *P. vivax* malaria cases and ensuring treatment compliance with gametocidal drugs (PQ 14 days) to prevent relapse and recrudescence of *P. vivax* malaria;

- Establish Rapid Response Team (RRT) at all endemic districts to ensure immediate interventions to case reports along with vector control measures to cut off local transmission;

- Introduce periodic evaluations, annual reviews and independent Mid-Term and Final Programme Performance Reviews (MPR) to track progress of malaria control and elimination;

- Centrally, the National Malaria Control Programme (NMCP) to be further strengthened with additional Technical Manpower to coup up with increased responsibilities for a shift from control to elimination. Special emphasis to be given to strengthen monitoring of drugs and insecticide resistance through establishing sentinel sites and using WHO recommended strategies.

An effective partnership exists between MOH&FW and the BRAC-led 21 Member NGOs' consortium which has led to achieving the scale-up of diagnosis and treatment services, distribution of LLINs and the BCC programmes, largely through the work of the NGO partners. There had been technical inputs from a group of institutions and organizations helping in conducting studies and operational researches for new strategies and adopting effective tools for malaria elimination. Given that malaria is strongly linked to local environmental factors, to peoples livelihoods and behaviour, and is tightly linked to poverty, further achievements in malaria elimination in the country will require greater inter-sectoral collaborations within and outside government sectors (Local government, education, Social welfare, Forestry, Armed Services, Tea-estates, and Private sector health services). Such critical inter-sectoral collaborations need to be defined at national and district levels, and incorporated into the malaria elimination strategies and annual operational plans, accordingly.

As current intervention scale-up efforts lead to a lowering of malaria transmission, the National Malaria Control Programme need to move to a more epidemiology-based elimination strategies away from blanket operations, and will require appropriate professional expertise within the MOH&FW at all levels. Based on the experiences and lessons learnt the National Malaria Control Programme needs to pursue time-bound and target based malaria elimination interventions for reaching ultimate status of malaria elimination. Moreover, the detailed Action Plans to be developed and implemented with a view to achieving annual targets, based on stratification of malaria endemic areas to achieve eventual status **of 'Malaria free Bangladesh'** as envisioned in this plan.

SECTION-1

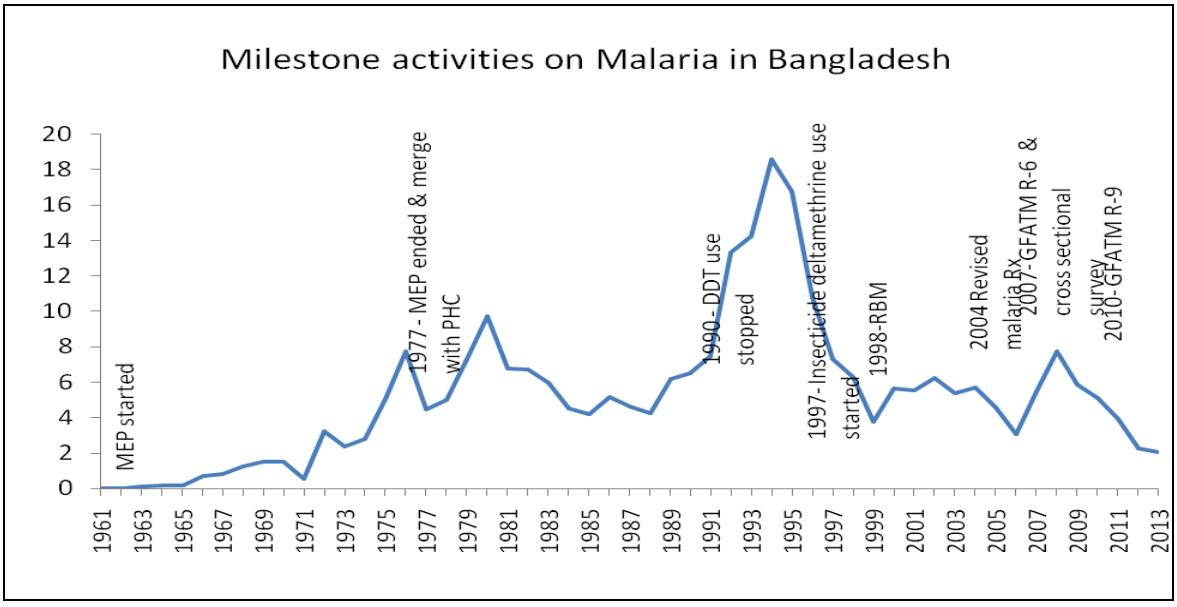
Introduction and Background

1.1. Introduction

Malaria is one of the major public health problems in Bangladesh. Out of 64 districts in the country 13 border districts in the east and northeast facing the eastern states of India and a small territory of Myanmar are in high endemic malaria zones, reporting about 98% of the total malaria cases every year. During the Malaria Eradication Programme (MEP) malaria was nearly eradicated in the late 1960s but never disappeared. The resurgence started since mid 1980s and scaled up in many parts of the country assuming an epidemic proportion in many parts of the hilly and forested areas including the foothills. These areas are still with increased transmission potentials, due to prevailing vector prevalence, geo-physical condition and climate, and presence of some 'Hot-spots' with perennial transmission round the year.

Historically, the malaria control programme in Bangladesh had four phases: i) Malaria Eradication Programme (in early 1960s; ii) Malaria Control Programme (1977-1994); iii) Revised Malaria Control Strategies (RMCS-1994); and iv) Continuation of RMCS with updated strategies until today. Bangladesh endorsed and implemented the World Declaration on the Control of Malaria and the Revised Malaria Control Strategy (RMCS) formulating the guidelines and strategies in line with Global and Regional strategies since 1994.The diagram below (Fig-1) describes the chronological programme aspects of malaria control and the milestone activities:

Fig-1: Malaria Programme in Bangladesh-Milestone Activities



Currently, the estimated population at risk is 13.25 million (BBS: Census 2011) inhabited in these 13 high endemic districts. The National Malaria Control Programme (NMCP) is

responsible for implementing malaria control interventions through Primary Health Care (PHC) approach under the Directorate of Communicable Disease Control. With the aim of achieving a malaria elimination status by 2020, the NMCP is pursuing the strategies of: i) universal access to early diagnosis and case management with effective drugs; ii) high coverage and promotion of use of Long Lasting Insecticidal Nets (LLINs) for malaria prevention and transmission risk reduction for the at risk population; iii) strengthening disease and vector surveillance, and Monitoring & Evaluation (M&E); iv) Advocacy, Communication and Social Mobilization (ACSM); v) collaboration and partnerships with NGOs, private sector and the community at large; and vi) essential operational research for new tools and appropriate approaches for creating effective and sustainable impact.

The Malaria National Strategic Plan 2015-2020 (NSP) encompasses the updated policies and strategic approaches to malaria elimination focusing on adoption of *state of the art* technologies and evidence-based information, in the country context. As a dynamic document this is expected to serve the purpose of guiding malaria elimination initiatives of the Government, donor agencies, and implementing partners (NGOs, private sectors, and other multi-sector stakeholders) for a comprehensive approach to reaching the goal of malaria elimination status of Bangladesh, in the near future.

1.2. Bangladesh Country Profile

Bangladesh with its rich historical and cultural tradition emerged as an independent nation in December 1971 through a heroic war of liberation. Located in the middle of a deltaic plain, Bangladesh has a total land mass of 147,570 sq.km stretching over 20º34' and 26º38' north latitude and 80º01' and 92º41' east longitude with a total population of 152.5 million (Census 2012). Bangladesh is surrounded in three sides by India and a small part of Myanmar in the east and the Bay of Bengal lies in the south. The country has a network of rivers like the mighty rivers '*Padma', 'Megna'* and *'Jamuna'* and their numerous tributaries. Seasonal floods, rainfall, tidal bores, cyclones, warm temperature and humidity characterize the tropical monsoon climate of the country.

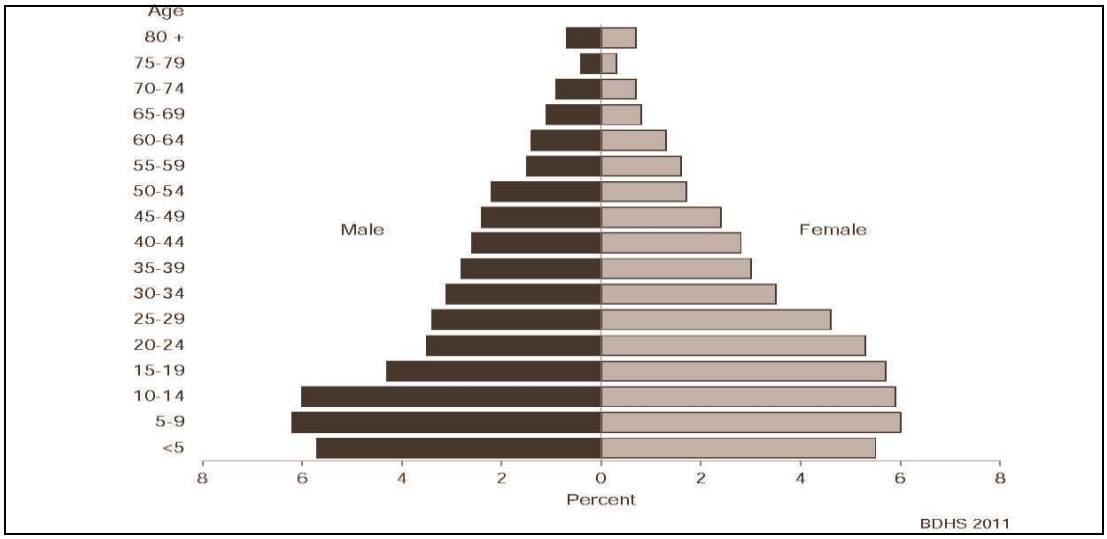
Administratively, the country is divided into 7 Divisions, 64 Districts, 485 Upazilas (Sub-districts), and 4,498 Unions. The country has an agro-based economy and agriculture sector contributes to about 33% of GDP employing about 65% of the labour forces. The country has made significant economic progress over the past decades with the Annual GDP growth averages of 6.5% in the recent years and its per capita income brought to US$ 1,070 ((BBS 2012/13).

1.3. Demography

Bangladesh, with a large population is one of the most-densely populated countries in the world having a population density of 1,050 per sq. km (Global Health Observatory 2012) and an annual population growth rate of 1.37% (SVRS 2011). The diagram below depicts the demographic transition and its wide-based population pyramid (Fig-2) with a large cohort of youth population to be entering their reproductive age, and as such expected significant decrease in population may not be in the coming decades.

The crude birth and death rates are: 19.2/1,000 and 5.5/1,000 population, respectively (Health Bulletin 2013; MIS, DGHS (www.dghs.gov.bd) and Life expectancy at birth is 66.7 years. The age structure is 0-14 years 34.6%; 15-64 years 61.4%; and 65 years and above is 4%. The sex ratio is 105 males to 100 female remains almost static without a significant change over last few years. As in other countries, the Bangladesh population is aging overtime due to decreasing fertility rate (6.3 births per woman in 1975 to 2.3 in 2011) and increasing life expectancy at birth of 69 years in 2011 (BDHS 2011).

Fig-2: Bangladesh Population Pyramid



Malaria affects all age groups and both males and females. However, adult males are commonly affected mainly due to occupations and behavior that put them at increased risk of being bitten by malaria vectors. Pregnant women and children <5 years are biologically at higher risk and they tend to develop more severe malaria due to low levels of immunity. Thus, in high transmission areas, these groups should be given priority for interventions to prevent and treat if afflicted with malarial infections. A remarkable shift from high burden of communicable diseases to increased burden of non-communicable diseases is observed as a result of significant reduction and control of communicable diseases.

The "Follow up Malaria Prevalence Survey 2013" (Draft Final Report) revealed that median family size is 5 in both CHT and non-CHT areas. Average number of family members was 5.3 (±2) with 0.6 (±0.7) belonging to less than 5 years of age. Average monthly income range was between BDT 5,000-10,000 per month in most of the surveyed houses (53.4%). Majority of the houses were classified as 'Kaccha' (82.3%) followed by 'semi-paka' (11.6%). A very few 'jupri (thatched) houses' (0.2%) were noticed. In CHT areas a significant number (>11%) of 'Macha' houses (elevated floors) were seen.

The Table below has some detailed information on the socio-demographic and economic characteristics of the study households.

Table-1: Socio-demographic characteristics of study HHs N (%)

Parameters	CHT	Non-CHT	Over all
Nos. Family member			
≤5	1510 (67.1)	4238 (56.5)	5748 (59.0)
>5	740 (32.9)	3262 (43.5)	4002 (41.0)
Median family size	5.0	5.0	5.0
Mean Nos. family Members			
< 5 years (mean ± sd)	0.5 ± 0.7	0.6 ± 0.8	0.6 ± 0.7
5-14 years (mean ± sd)	1.1 ± 1.0	1.4 ± 1.2	1.3 ± 1.2
>15 years (mean ± sd)	3.4 ± 1.5	3.5 ± 1.7	3.5 ± 1.6
Monthly income (BDT)			
≤ 5000	745 (33.1)	2150 (28.7)	2895 (29.7)
5,000-10,000	1171 (52.0)	4040 (53.9)	5211 (53.4)
> 10,000	338 (14.8)	1310 (17.5)	1644 (16.9)
Monthly income (mean ± sd)	**7904.66±5413.71**	**8624.83±6610.82**	**8458.64±6361.59**
Types of house			
Kachha	1741 (77.4)	6279 (83.7)	8020 (82.3)
Semi-pacha	194 (8.6)	933 (12.4)	1127 (11.6)
Pacha	59 (2.6)	265 (3.5)	324 (3.3)
Macha	255 (11.3)	5 (0.1)	260 (2.7)
Jhupri	1 (0.0)	18 (0.2)	19 (0.2)
Number of febrile patient	142 (6.3)	583 (7.8)	725 (7.4)
Number of pregnant women	106 (5.0)	386 (5.1)	492 (5.0)

(Source: Follow up Malaria Prevalence Survey 2013 Draft Final Report)

1.4. Climate, ecosystems and environment

Bangladesh lies between $20^0$34' and $26^0$38' north latitude and 88^0 01' and $92^0$41' east longitude. From the east to the north and the west, Bangladesh has its borders with the Indian states of Mizoram, Tripura, Assam, Meghalaya and West Bengal. It has a small inter-country border with Myanmar in the east. The southern deltaic region faces the Bay of Bengal. Bangladesh mostly comprises of low, flat alluvial plains, intersected by numerous rivers and rivulets, canals, swamps and marshy lands. Hilly and forested areas cover the east and north-eastern border region of the country.

Bangladesh has a tropical monsoon climate. The average rainfall varies from 119 to 348 cm. The alluvial soil of Bangladesh is continuously enriched by heavy silt-deposits during the rainy season. The total forest area covers about 8 percent of the land area. With the Global Climate Change Bangladesh is likely to be more affected and there might be increased prevalence of

vector borne diseases. The country is prone to natural disasters, floods, cyclones, tidal bores, etc. and faces the consequences of such disasters almost every year. Any outbreak of malaria may give rise disastrous condition due to highly dense population (980/sq. km). The border-belt areas in the north and northeast have an epidemic potential for malaria. The similar terrain and geo-physical condition that exist across the borders have posed increased threat to malaria transmission due trans-border population movements.

1.5. Health and socio-economic Indices

The country has its shared goals of overall socio-economic development linked to the MDG (MDG-6-Target-6C)-"to have halted by 2015 and begun to reverse the incidence of malaria and major diseases". Malaria elimination thus, have priorities of Bangladesh including control of other Neglected Tropical Diseases (NTDs) linked to poverty reduction. Malaria victims are the poorest segment of the populations and so malaria control have bearings on poverty reduction. The Table below gives a brief scenario of the health and socio-economic indicators:

Table-2: Health and socio-economic Indices

Parameters	Values (Source)
Population (million)	152.5
Sex ratio (Males/100 Females)	105.0
Life Expectancy at Birth (in years)	66.78
Crude birth rate per 1,000 population	19.2
Crude death rate per 1,000 population	5.5
Literacy rate (7+ years)	Male 58,4%; Female 53,2%
GNP growth rate (%)	6,3% (World Bank 2013)
Poverty rate (national)	26% (World Bank 2013)
Average household income (Tk)	11,479
Under five mortality rate (per 1,000 live births)	53 (BDHS 2011; 41 (UNICEF 2013)
Infant mortality rate (per 1,000 live births)	43 (BDHS 2011; 33 (UNICEF 2013)
Maternal mortality rate (per 100,000 live births)	194 (BMMS 2010)
No. of Registered Physicians (2013)	51,993
No. of Registered Nurses (2013)	25,018
Population per Physicians	2,785
Physicians to Nurse ratio	2.07 :1

Source: Health Bulletin 2013; MIS, DGHS (www.dghs.gov.bd)

Bangladesh has achieved commendable success in most of the key health indicators and has shown a progressive decline in major communicable disease incidences, over last few years.

1.6. Achievements of National Malaria Control Programme

Reduction in Malaria Burden: Malaria control efforts have been augmented since successive implementation of Round-6 and 9 GFATM proposals during 2007-2013, in collaboration with NGO-PR (BRAC-led 21 NGO's consortium). Initially, there was an increase in number of cases due to scaling up of interventions; introduction of RDT for diagnosis, and ACT for treatment of *P. falciparum* cases. Thereafter, a steady decline is noted from 84,690 cases in 2008 to 26,891 cases in 2013, having a 68.2% reduction in case incidence. The total deaths came down to 15 in 2013 as against 154 in 2008 showing 90.2 % reduction. However, the proportion of *P. falciparum* malaria has been found to be rather increased (96%) due to wide scale use of monovalent Pf-RDT and limited use of microscopy for diagnosis of *P. vivax*.

Further scaling up of diagnosis and treatment of malaria has been attempted by bring all the Community Clinics (n=800) in malaria endemic areas to conduct RDT and providing treatment with ACT to all positive cases. Community Clinic is the lowest level static health facility established for an average of 6,000 population to provide basic outdoor services for communicable and non-communicable diseases including malaria through a team of three health workers- community health care provider (CHCP), health assistant (HA), family welfare assistant (FWA). Population coverage of malaria diagnosis is quite high (more than 80%) but still there are some pockets in hard-to-reach areas in the three Hill Tract Districts.

Four districts (Mymensingh, Netrakona, Sherpur and Kurigram) with eight endemic upazilas have low transmission of malaria and have shown <5% malaria positivity rates (RDT and Microscopy) over last three years. These districts currently may be considered for adopting elimination strategies. The NMCP should have phased targets of elimination for these districts and gradually expanding to the other moderate endemic areas in near future.

Coverage by ITN/LLINs: A high coverage by LLINs/ITNs has been achieved as targeted 100% coverage by LLINs in three CHT districts and 80% coverage in other low and moderate endemic areas since 2007 till 2014. LLINs were distributed @ of 2 Nets per household based on the findings that the average HH size is nearly 5 members per Household. Intensive IEC/BCC was done by NGO workers for promotion of use of LLINs/ITNs and as such this intervention has shown significant impact in reducing malaria transmission.

Partnership and Collaboration: Coordination between GoB and NGO Consortium led by BRAC (NGO-PR) is a unique example of harmonized effective programme implementation. This coordination helped in increased access to and provision of services to the door step of the at risk population. While the GoB has the prime role of coordination, there is a well planned business plan on sharing basis for augmenting each others' support during implementation of the activities for malaria control. In addition, with the stewardship of Directorate of Disease Control and the Ministry of Health and Family Welfare relevant expert organizations and institutions are engaged to provide technical support to the malaria programme.

The World Health Organization (WHO) extends continued technical backstop services in matters related to development and updating of normative guidelines, tools and strategies and

more critical areas of drugs and insecticide resistance monitoring, programme evaluations and international and cross-border collaboration.

However, the private sector and civil society organizations yet to be more closely involved to support NMCP moving towards malaria pre-elimination and elimination, in a phased manner. The inclusion of the community at all levels should be the mainstay and adequate budgetary allocations for community systems strengthening are imperative. Well-designed partnerships with print and electronic media will contribute to augmented Advocacy, Communication and Social Mobilization (ACMS) efforts on a long term sustainable basis. Inter-sectoral engagement in malaria control within and outside the governmental sectors need to be ensured. Malaria is deeply entrenched in the environment, in people's livelihoods and behaviour, and is linked to poverty and as such effective inter-sectoral collaborations need to be defined at national and district levels, and incorporated into the malaria control strategies, at all levels..

SECTION-2

Institutional Framework of National Malaria Control Programme (NMCP)

2.1. National Health Policies and Health Sector Strategies

The Government of Bangladesh (GoB) commits to create conditions whereby its people have the opportunity to reach and maintain the highest attainable level of health as a fundamental human right and social justice. GoB has targeted to achieve MDG 4, 5, 6 and part of the MDG 1 and 8 and also health related vision 2021 through implementing the Health Population Nutrition Sector Development Programme (HPNSDP). Government intends to establish a people oriented responsive health care system emphasizing the needs of women, children, adolescent, elderly, the poor and the marginalized segment of the population through developing an effective, efficient and sustainable health service delivery system. The Health Population Nutrition Sector Development Programme (HPNSDP) has the vision is to see the people healthier, happier and economically productive to make Bangladesh a middle income country by 2021.

Under HPNSDP scaling up of services for achieving MDG targets 1, 4, 5 and 6 by 2015 and expanding access to health services for priority communicable and non communicable diseases have due emphasis. Revitalizing the Community Clinic based services as part of a functional Upazila Health System (UHS) has been underscored. Strengthening overall health system governance, a sound Monitoring and Evaluation System and health equity for the poor and marginalized population is also given due consideration. For increasing coverage and quality of services, coordination with other intra and inter-sectoral and private sector service providers have been encouraged by GoB.

2.2. Health Care Delivery System

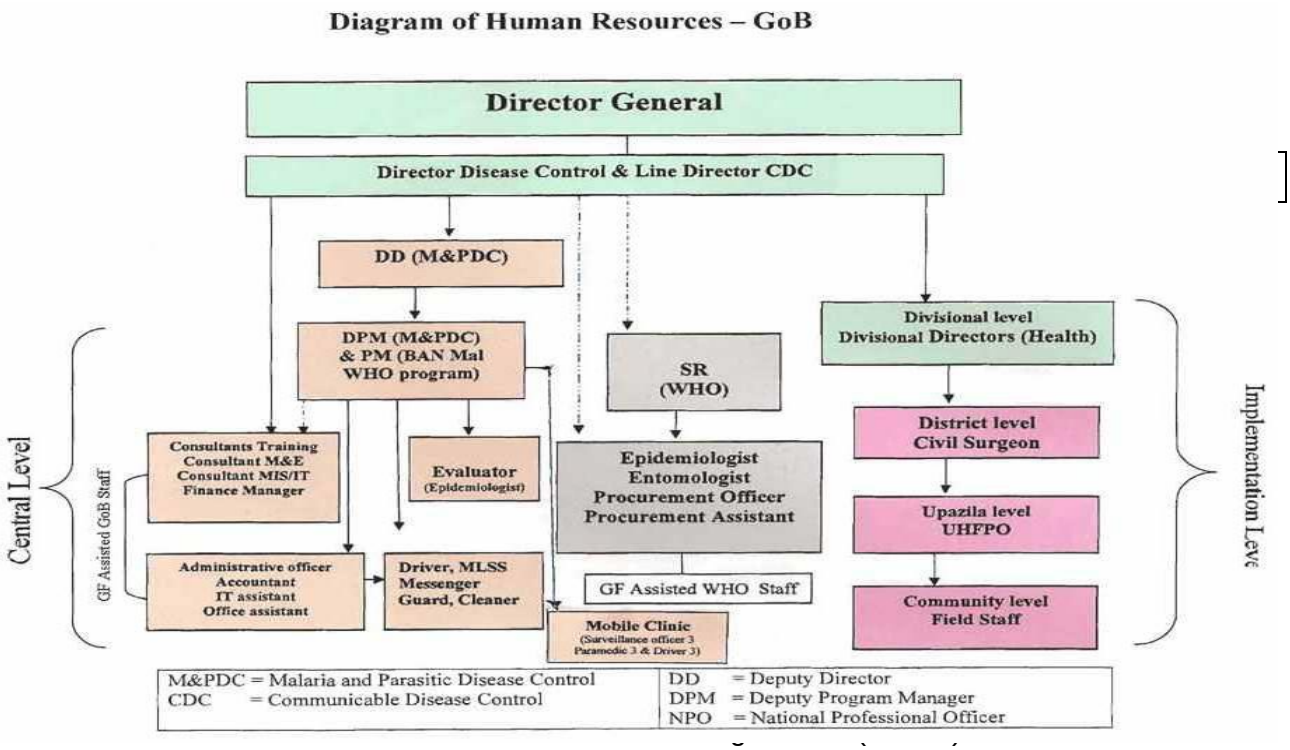
The Constitution of the People's Republic of Bangladesh ensured that "Health is the basic right of every citizen of the Republic" as health is fundamental to human development. Bangladesh is committed to achieving the millennium development goals (MDGs) by 2015 and has been pursuing various programmes to translate the MDGs into reality. Administratively the country is divided into 7 Divisions, 64 Districts, 7 City Corporations, 308 Municipalities, 483 Upazila (Sub-districts) and 4500 Unions. Bangladesh has a comprehensive network of health infrastructures stretched up to the union level. The three tier-health services delivery system in the country (Primary, Secondary and Tertiary) follows the decentralized administrative system. The communicable diseases control programmes are implemented through the district health systems. The upazila health complexes are the main focus for implementing the target based malaria control activities and both GoB and NGO partners are jointly responsible for providing the preventive and curative services to the entire population at risk. A reasonable sensitive surveillance, monitoring and evaluation system is in place for assessing programme performances at monthly, quarterly and annual intervals. Recently, the Community Clinics are also brought to the loop and electronic devices are deployed for improving reporting and disease surveillance, linked to HMIS.

Bangladesh has a health system, which is dominated by the public sector, and the private sector is run by local entrepreneurs, NGOs and international organizations. In the public sector, the Ministry of Health and Family Welfare is the lead organization for policy formulation, planning and decision making at macro and micro levels. Under the Ministry of Health four Directorates i.e., Directorate General of Health Services, Directorate General of Family Planning, Directorate of Nursing Services and Directorate General of Drug Administration are providing health care services to the citizens. Since independence Bangladesh has made significant progress in health outcomes and the government has been pursuing a policy of health development that ensures provision of basic services to the entire population, particularly to the under-served population in the rural areas. Moreover, Non Government Organizations (NGOs) are significant and growing sources of HNP services in both rural and urban areas.

2.3. Organizational set up of the NMCP

Currently malaria control programmes are implemented under the stewardship of Director, Disease Control in DGHS. The GoB-NGO Partnership between NMCP and the BRAC-led NGO Consortium has shown credible outcome for the malaria control services at the door-step of the at risk population. Overall planning, implementation, monitoring and evaluation functions for NMCP are done at the central level. At the district and upazila levels malaria control activities are implemented through the district health system. In each upazila there are union health centers to serve 25,000 to 30,000 populations. Government has deployed graduate doctors at the union health facilities and has made operational over 13,000 Community Clinics (each to serve @ 6,000 populations). The diagram below depicts the organizational set of NMCP under Directorate General of Health Services (DGHS).

Fig-3: Organogram of NMCP, DGHS



Disease Control Division of the Directorate General of Health Services (DGHS) is responsible for planning and implementing malaria control activities. All disease control activities are implemented under the direct supervision of the Director, Disease Control (DC). The Director, Disease Control is the Line Director for CDC for the Health Population and Nutrition Sector Development Programme (HNPNSDP) and bears the overall responsibilities of planning and implementing communicable disease control programmes.

The NMCP has three main sections such as Epidemiology (Programme implementation; operations and assessment); Entomology; and Laboratory (Central Malaria Reference Laboratory). Bangladesh secured Round 6 and Round 9 GFATM grants for malaria control and is implementing them together with a BRAC-led NGO consortium (composed of 21 NGOs) as partners. Malaria Control programme is being implemented using the existing GoB health infrastructures at the district, upazila and community levels. The need for capacity building of different categories of staff under GoB is important for smooth and effective implementation of the programme to achieve planned results.

A good health care infrastructure network is in place which facilitates programme planning and implementation from the central to the community levels and the involvement of the Community Clinics add to the universal access to malaria control interventions, close to the community. Field workers are multipurpose workers, usually from their own locality and NGO workers, mostly females from the community have comparative advantages for facilitating access to and utilization of services by the communities. The health care providers are given training as soon as NMCP has identified deficiencies, in particular areas supported by GFATM and obtaining technical assistance from WHO.

Human resource is a critical issue and vacancies of medical officers, staff nurses, laboratory technologists, entomologists and ento-technicians, and supervisory tiers of personnel (HI and AHIs) are reported in the high endemic CHT districts. Shortage of staff and rapid turnover pose a threat to programme implementation. Inadequate number of HR in hard-to-reach and remote areas and staff motivation is low due to poor career plan, incentive package, and residential facilities. Entomologists are not recruited to fill up vacant posts for long time and experts are not available to conduct vector biology and other highly technical studies to provide technical inputs for vector control and transmission risk reduction, based on evidences. NGO health workers are the main community level service providers and GoB service providers have limited involvement and as such effective supervision is also not in place, particularly in remote areas.

The NMCP needs additional technical support to strengthen the programme planning and implementation at central level. Existing vacancies of medical officers, staff nurses, laboratory technologists, entomologists and ento-technicians, and supervisory tiers of personnel (HI and AHIs) are to be filled up on an urgent basis. Periodic refresher training of all categories of staff is instrumental to gear up implementation and improve quality of services at all levels. Community clinics and Union Health Centers although established in hard-to-reach areas, these need to be strengthened for providing malaria control services effectively.

2.4. Health sector priorities & synergies with malaria programme

The Sector programme (HPNSDP) provides more focus on improving health services and strengthening Health Systems which are interdependent and mutually reinforcing. These services aim at improving priority health services in order to accelerate the achievement of the

health related MDGs. These components add increased attention to Maternal, Neonatal, Child, Reproductive and Adolescent Health; Communicable and non-communicable Diseases; Climate Change and Health Protection; Disease Surveillance; and Behavior Change Communication (BCC) related programmes.

As the communicable diseases control programmes are implemented through the integrated PHC system at the district, upazila and blow, there are programme coordination and synergies, for their approach to implementation. At the community level programme activities are delivered through multipurpose health workers and have shared values in related fields of training, job-orientations and responsibilities. The Ministry of Health & Family Welfare collaboration with the Ministry of Social Welfare (MOSW), Ministry of Chittagong Hill Tract Affairs (MOCHTA), the CHT Board, the NGOs and the private sector. Essential Services Package (ESP) are provided in the difficult to reach areas through appropriate arrangements with NGOs/CBOs to overcome shortage of public sector human resources on the basis of comparative advantages and effective collaboration.

Internal coordination among programmes for mainstreaming gender, equity and value for the voices of the people living with diseases, are always emphasized. Where ever possible, HIV, TB-Leprosy, Visceral Leishmaniasis, and Lymphatic Filariasis elimination programmes are considered for synergistic interventions along with malaria control and elimination interventions at various levels.

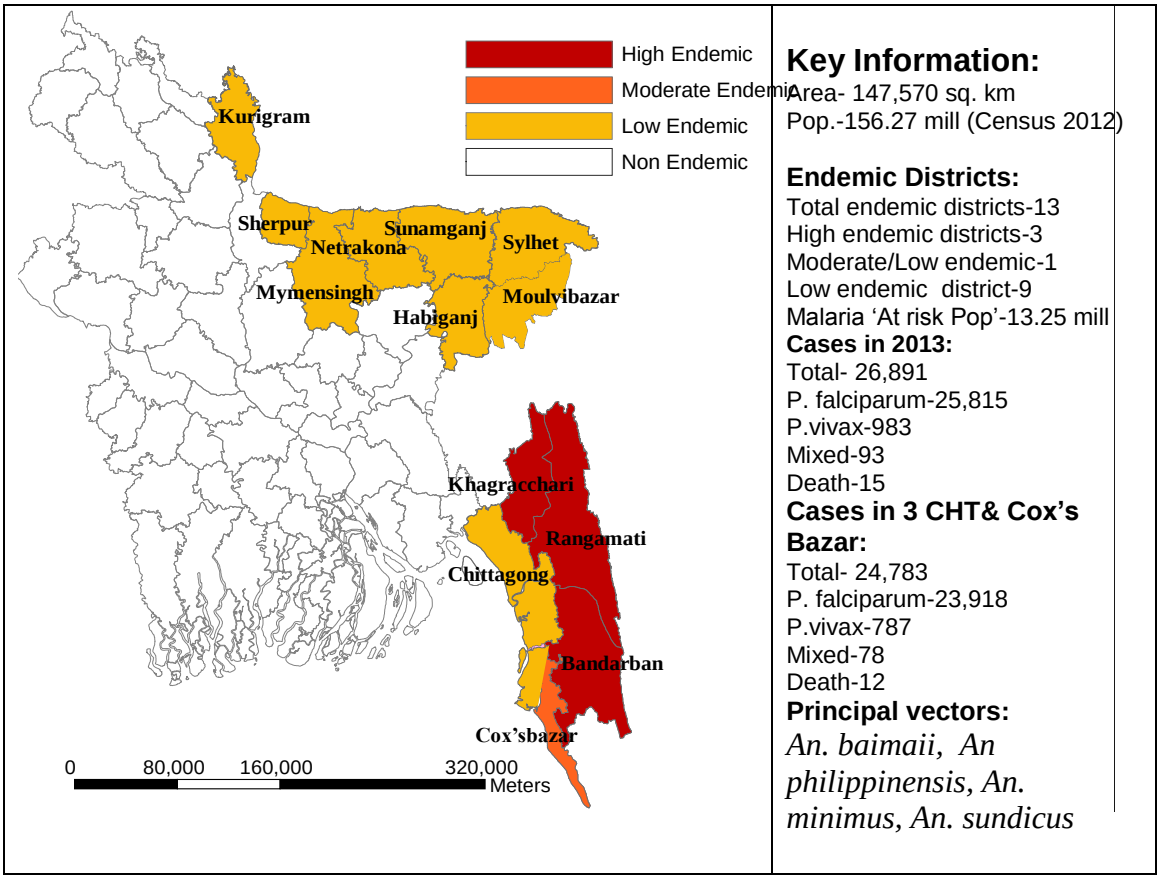
SECTION-3

Malaria Situation in Bangladesh

3.1. Epidemiology, Disease burden and Trend

Malaria is endemic in 13 eastern and north-eastern border belt districts of the country with variable transmission potentials (high, moderate and low). A total of 13.25 million people are at risk of malaria inhabited in those districts. In 2013 the prevalence rate of malaria was found to be 0.7% in these districts. About 80% of the total cases are reported from the three Chittagong Hill Tract (CHT) districts (Rangamati, Khagrachari and Banderban) including Chittagong and the coastal district Cox's Bazar. The CHT districts have perennial transmission throughout the year due to the geo-physical location in the hilly, forested and the foot-hills, climate, and other favourable conditions for the vector species *An. baimi (dirus), An. minimus and An. philippinensis.* The map of Bangladesh blow shows the malaria endemic areas (high, moderate, low, pre-elimination districts, and malaria free) based on available epidemiological data.

Fig-4: Map of Bangladesh showing Malaria Endemic Areas

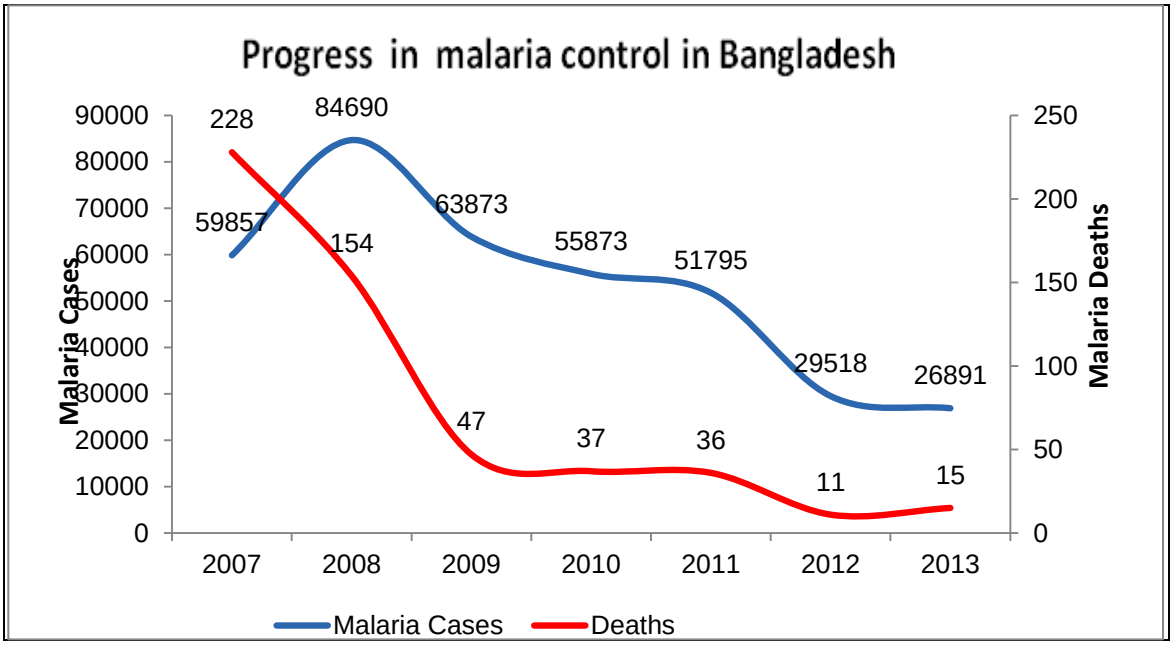


Total population of the three CHT districts is 1.6 million. The indigenous population constitutes about 50% of the total population in these districts. The tribal hamlets are in clusters in the

remote hills and foothills and some are hard-to-reach due to lack of communication. Most of the houses are thatched built with indigenous material e.g. bamboo, wood etc. and these houses seldom have any protection against the vector mosquitoes and thus peoples are vulnerable to malaria infection. The aggregation of laborers for development work sometimes further aggravates the malaria situation in these areas. Settlers coming from the plain areas of the country in the CHT districts are non-immune and more prone to get malaria infection. Traditional *'Jhum cultivators'*, forest goers, refugees, travelers from non-endemic areas, and mobile population are the most-at-risk groups due to lack of adequate protection for mosquito bites and adoption of personal protection measures. There are also higher risk of malaria transmission in the border areas, due to cross-border movement/migration across international boundaries with eastern states of India and part of Myanmar.

Four districts (Mymensingh, Netrakona, Sherpur and Kurigram) with eight endemic upazilas have low transmission of malaria and have shown <5% malaria positivity rates (RDT and Microscopy) over last three years. These districts currently may be considered for adopting pre-elimination strategies. The NMCP should have phased targets of elimination for these districts and gradually expanding to the other moderate endemic areas in near future. There is significant progress in malaria control in Bangladesh during the period from 2008 to 2013 showing a progressive decline in total cases and deaths. The graph below shows the epidemiological trend of case incidence and deaths 2007-2013.

Fig-5 : Malaria cases and deaths from 2007 to 2013



The NMCP had the GFATM support since 2007 and there was an increase in number of cases due to scaling up of interventions; introduction of RDR for diagnosis, and ACT for treatment of *P. falciparum* cases. Thereafter, a steady decline is noted from 84,690 cases in 2008 to 26,891 cases in 2013, having a 68.2% reduction in case incidence. The total deaths came down to 15 in 2013 as against 154 in 2008 showing 90.2 % reduction.

3.2. Stratification of Malaria Endemic Districts

The table below shows District-wise epidemiological data of the 13 endemic districts for three consecutive years for a comparison based on total cases, Pf %, and Annual Parasite Incidence (API). The five districts (3 CHT districts and Chittagong and Cox's Bazar) had reported API 7.36, 4.02 and 3.77 respectively in 2011, 2012 and 2013.

Table-3: District-wise Epidemiological data (13 Districts, 2011-2013)

District		Pop.	2011			2012			2013		
			Total Cases	Pf %	API	Total Cases	Pf %	API	Total Cases	Pf %	API
3 CHT Districts,Chittagong and Cox's Bazar	Khagrachari	613,917	12,952	98%	21.09	5,997	96%	9.77	4,096	98%	6.67
	Rangamati	595,979	13,669	95%	22.93	7,981	97%	13.39	7,976	99%	13.38
	Bandarban	388,335	16,097	97%	41.45	8,461	96%	21.79	9,459	97%	24.36
	Cox's-bazar	1,843,493	5,472	91%	2.97	3,888	90%	2.11	3,252	89%	1.76
	Chittagong	3,296,471	1,415	89%	0.43	1,095	91%	0.33	648	93%	0.20
Sub-Total		**6,738,195**	**49,605**	**98%**	**7.36**	**27,422**	**96%**	**4.06**	**25,431**	**98%**	**3.77**
Pre-Elimination Areas (4 Districts)	Sherpur	420,100	68	69%	0.16	73	63%	0.17	43	72%	0.10
	Mymensingh	486,327	244	97%	0.50	168	99%	0.34	74	97%	0.15
	Netrakona	496,785	270	87%	0.54	285	93%	0.57	199	96%	0.40
	Kurigram	269,790	168	29%	0.62	101	38%	0.37	64	19%	0.24
Sub-Total		**1,673,002**	**750**	**76%**	**0.45**	**627**	**82%**	**0.37**	**380**	**81%**	**0.23**
Other 4 Districts	Sylhet	887,254	444	79%	0.50	436	83%	0.49	360	92%	0.41
	Hobigonj	580,134	65	95%	0.11	72	83%	0.12	34	97%	0.07
	Sunamgonj	1,623,839	461	91%	0.28	540	92%	0.33	488	98%	0.30
	Moulvibazar	1,744,700	448	73%	0.26	421	67%	0.24	198	81%	0.11
Sub-Total other 4 Districts		4,835,927	**1,418**	**91%**	**0.29**	**1,469**	**91%**	**0.30**	**1,080**	**91%**	**0.22**
Grand Total (All 13 Districts)		**13,247,124**	**51,773**	**95%**	**3.91**	**29,518**	**94%**	**2.23**	**26,891**	**96%**	**2.03**

(Source: NMCP Routine Surveillance data)

These districts need intensified malaria control intervention to have achieved remarkable reduction in malaria burden to reach the elimination target by 2020. From these tree high endemic districts a total of 21,531 (over 80% of the total from 13 endemic districts) cases were reported in 2013 having 98% of them *P. falciparum* infections. Certainly, the reduction of malaria burden in the CHT districts is a big challenge.

The four other districts (Sherpur, Mymensingh, Netrakona and Kurigram) have very low API (0.45, 0.37 and 0.23) and are already in the pre-elimination which may reach the elimination

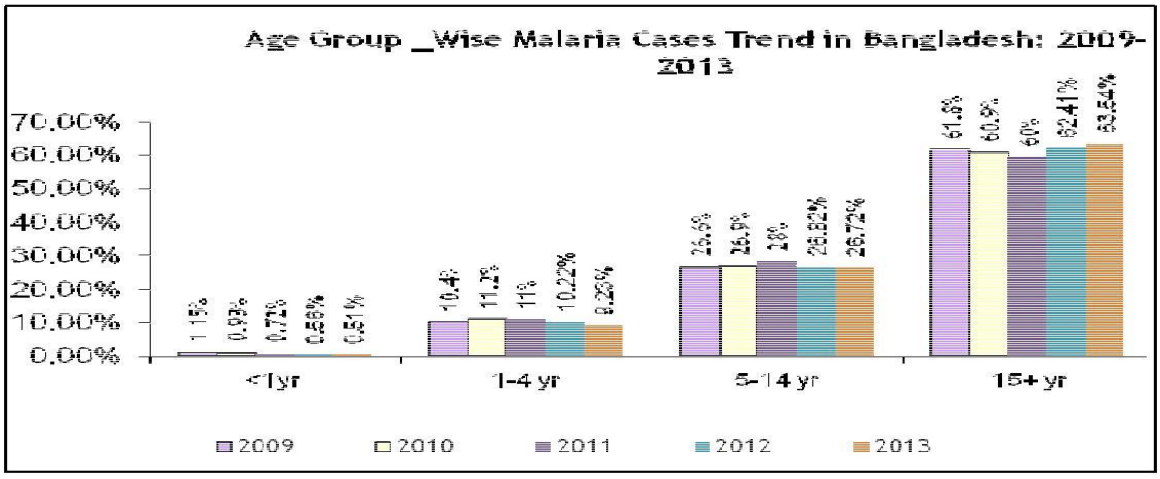
target soon. The other four districts (Sylhet, Hobigonj, Sunamgonj and MoulviBazar) also have low API (0.29, 0.30 and 0.22) which may reach the elimination target with some additional interventions. The National Malaria Control Programme has already taken steps in doing the micro-stratification in these district and are implementing the intensified interventions for achieving phased elimination targets. A case based surveillance is in place and vector control measures for reducing transmission are deployed in and around 60 HHs for focal IRS along with other interventions.

This indicates that a stratified approach to elimination, in phases which will provide the opportunity to achieve the elimination in a wide number of areas are to be planned and implemented for eventual status of elimination in all these districts. However it will need rigorous planning and target based implementation of case finding and treatment, vector control, and intensive IEC/BCC for sustainable impact. Also, a strong surveillance, monitoring and evaluation efforts are instrumental for prevention of re-introduction of new transmission and maintaining *'zero case and zero deaths' once the areas are brought under elimination.*

A shift in paradigm is noted that about 95% cases detected are *P. falciparum* infections. However, the *P. vivax* diagnosis needs to be strengthened and institute more efforts for treatment in order to address this problem. There is a wide variation in malaria incidence between the sexes and across age groups. During the 2008-2013, males consistently had more positive diagnoses than females; adult age group suffered more than the other age groups but the incidence of cases in three age groups (0-4yr, 5-15yr and 15+ yrs) were almost same.

There is a high degree of heterogeneity in malaria cases distribution between the sexes and across age groups in Bangladesh. During the 2008-2013 periods, males consistently show more positive diagnoses than females and with increasing trends over the years(Figure 4).Pregnant women constitute 1% of malaria cases in recent years.

Fig-6: Age Distribution of malaria cases



Bangladesh is also on track to achieving the malaria MDGs Goals, and Targets. The Table below shows the status of MDG goals and targets related to malaria in 2012-13 as compared to baseline 2008.

Table-4: Malaria MDG Goals and Targets

MDG Goals, Targets and Indicators	Baseline 2008	Current Status (2012-2013)	Target 2015
6.6a: Prevalence of Malaria per 100,000 population	776	203	310
6.6b: Deaths of Malaria per 100,000 population	1.4	0.1	0.6
6.7: Proportion of children U-5 sleeping under insecticide treated bed nets	81%	90.1%	90%
6.8: Proportion of children U-5 who are treated with appropriate anti malarial drugs	60%	96%	90%

3.3. Population at Risk

The total population at risk of malaria in the 13 endemic districts is approximately 13.25 million. (Ref: NMCP Routine Surveillance data) and the List is attached as Annex-1. About 80% of the cases of malaria in Bangladesh are reported from the three CHT districts with a total population of about 1.6 million. The indigenous population constitutes about 50% of the total population in CHT districts. The tribal hamlets are in clusters in the remote hills and foothills. Most of the houses are thatched built with indigenous material e.g. bamboo, wood etc. and these houses seldom have any protection against the vector mosquitoes. The peoples are vulnerable to malaria infection. The aggregation of laborers for development work sometimes further aggravates the malaria situation in these areas. Settlers coming from the plain areas of the country in the hill district are non-immune and more prone to get malaria infection. Seasonal workers such as *'Jhum cultivators'*, forest goers etc. are at high risk group due to staying overnight in open spaces in the forest and hill. There are higher than average levels of malaria in border areas which may be due to migration to and from endemic areas of neighboring India and Myanmar.

Malaria affects all age groups and both males and females; however, adult males are commonly affected mainly due to occupations and behavior that put them at risk of being bitten by malaria vectors. Pregnant women and children <5yrs are biologically at higher risk and they tend to develop more severe malaria due to low level of immunity. Thus, in high transmission areas, these groups should be given priority for interventions. High risk populations, thus includes: i) Young children, particularly under <5 yr children, ii) Pregnant women, iii) Travelers from non-endemic areas, iv) People from non-endemic areas residing for a long time and returning home, v) 'Jhum cultivators' and forest goers, Tea estates; vi) Refugees and mobile population, and vi) People with HIV/AIDS and TB (for co-infections, if any).

3.4. Diagnosis and Management of Malaria

Malaria microscopy and RDT are the main tools for diagnosis in Bangladesh. Microscopy is usually used at static health facilities (n=83) and new microscopy centers (n=121) whereas RDT is used at the community level and in hospitals during odd hours. Initially *P. falciparum* specific

RDT was used which was replaced by Pan RDT very recently. RDT started to use in a mass scale from 2008 under the support of GFATM funding under round 6. At the community level 'ShayasthoKarmi' (health worker) and 'Shayastho Shebika' (community volunteer) of NGOs are responsible for diagnosis and treatment of uncomplicated malaria. The GoB Health Workers are also responsible for diagnosis and treatment of uncomplicated malaria using Pan RDT. Both GoB and NGO workers are responsible for providing pre-referral treatment of severe malaria with Injection quinine and/or rectal artisunate during referral.

There has been significant reduction of number of cases and deaths due to malaria over last few years. However, the proportion of P. falciparum malaria has been found to be rather increased (96%) due to wide scale use of mono-valent Pf-RDT and limited use of microscopy for diagnosis of P. vivax. In fact 7,303 cases were diagnosed by microscopy in 2013 of whom 953 were P. vivax infection out of total 26,891 reported cases. Introduction of Pan RDT is an important step as it would help to diagnose *P. vivax* cases in the community and will help to provide treatment as well.

A major breakthrough in escalating further, the diagnosis may be to bring all the Community Clinics (n=800) in malaria endemic areas to conduct RDT. Community Clinic is the lowest level static health facility established for an average of 6,000 population to provide basic outdoor services for communicable and non-communicable diseases including malaria through a team of three health workers- community health care provider (CHCP), health assistant (HA), family welfare assistant (FWA).Population coverage of diagnosis is comprehensive (more than 80%) but still there are some pockets in hard-to-reach areas in the three hill tract districts.

In addition to 83 microscopy centers run by GoB a total of 121 additional microscopy centers were established by NGO consortium at the strategic location in the community. The additional microscopy centers provided an opportunity to fill up the gaps in diagnosis and treatment of malaria and increased accessibility of people in getting confirmed diagnosis and effective treatment. At the sub-district (upazila), district and tertiary level hospitals of GoB, microscopy is the basis of diagnosis during office hours. RDTs are also being done after office hours, during emergency and for indoor patients. Three surveillance medical officers are working in the three hills tract districts who in addition to other activitie, also organize mobile clinics to provide RDT based diagnosis and treatment in hard-to-reach areas.

Pan RDT has been introduced in 2014 which can detect P. falciparum and non-falciparum malaria, cannot detect viax malaria separately. By quality assured microscopy one can differentiate falciparum and vivax malaria. Currently number of microscopy centers are reporting variable proportion of P. vivax and P. falciparum malaria which provides a data of >90% of P. falciparum malaria. This finding does not conform to a ratio of P. falciparum and P. vivax in a situation of reduced falciparum transmission status in malaria endemicity.

There is limited data on status of artemisinin resistance from Bangladesh. Therapeutic efficacy study from three sentinel sites could not detect any failure to 3 day ACT. A study conducted in Bandarban during 2011 found preserved efficacy of 2 mg/kg and 4 mg /kg artesuante (98%, 100%). Bangladesh (Ramu, Coxsbazar) was one of the 15 sites for TRAC which could not detect any failure to artesunate. No Kelch mutation was found either.

3.5. Vectors Prevalence and Transmission Potentials

Malaria transmission in Bangladesh is a complex phenomenon due to the presence of multiple vectors each playing unique role for their vector bionomics and susceptibility to insecticides that

should be taken into account in vector control. There are four primary vectors (*An philippinensis An minimus, An sundaicus and An baimai/An dirus)*, three secondary vectors (*An vagus, An annularis* and *An aconitus)* and at least two suspected vectors (*An maculatus* and *An willmori*)) with potential role in transmission in various parts of the country. These primary vectors of malaria were detected and confirmed since the malaria eradication period.

Table-5: Distribution of An. species in 13 malaria endemic Districts

District	Prevalent An. Species dectected
Cox's Bazar	*An. philippinens, An. vagus, An. sundaicus, An. subpictus, An. maculatus, An. Willmori*
Chittagong	*An. annularis, An.philippinensis, An. vagus*
Moulvibazar	*An. annularis, An. minimus, An. vagus, An. subpictus*
Habigonj	*An. baimaii, An. vagus, An philippinensis, An. minimus*
Sunamgonj	*An. philippinensis, An.annularis, An.vagus, An. maculatus, An. willmori*
Mymensingh	*An. philippinensis, An. vagus, An, maculatus, An willmori*
Netrakona	*An. philippinensis, An.annularis, An.vagus, An. maculatus, An. willmori*
Sherpur	*An. annularis, An.philippinensis, An.vagus*
Kurigram	*An. annulais, An. vagus, An. philippinensis*

Source: Routine Eontomological Surveillance, NMCP-2005-2009

Anminimus is the vector in the foothill of north-eastern border belt of Bangladesh and as well as in whole of o hill district. But this vector species disappear after continuous insecticidal (DDT spraying) pressure during malaria eradication and till date the entomological surveillance and surveys could find its presence in a very insignificant density. This species is highly anthropophilic and endophilic.

Anbaimai (An.dirus) is an important forest vector in the hill district and in forested north-eastern part of the country. It is more an exophagic in nature and altogether exophilic. With the passes of time there has been remarkable deforestation in those areas causing shifting away and or very insignificant presence of this vector, so far revealed from entomological survey and surveillance reports.

An. philippinensis is mostly the vector of plains of Bangladesh. Earlier it was mostly anthropophilic in nature but following continuous pressure of insecticides during eradication it gradually tended to zoophilic nature. Although it was in abundance of potential vector in plain but with increase of agriculture & horticulture following deforestation, the presence of this species significant density has been found in some places of hill districts with high malaria endemicity.

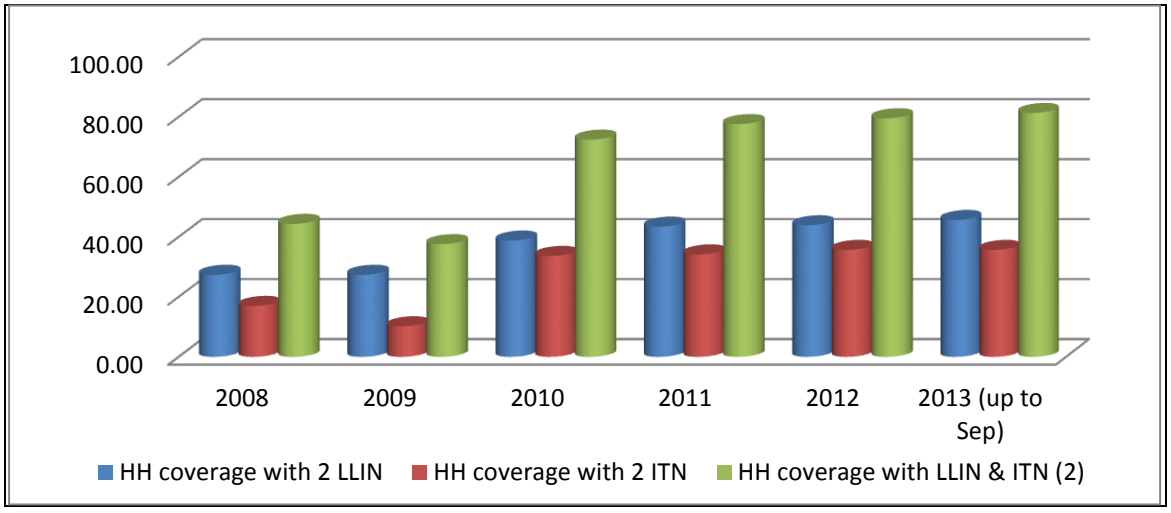
***Ansundaicus*is** known as the vector of costal belt areas in southern part f the country. The density of this vector greatly decreased after continous insecticidal pressure during malaria eradication. Now this vector is found in low density in St. Martin Island & sea shore area of Cox's Bazar.

3.6. LLIN and ITN Coverage for Malaria Prevention

The table below shows the coverage of households with 2 LLIN/ITN in 2013. About 81% households have been covered but the target of coverage of all the malaria endemic areas is not uniform. For the three hill tract districts (Bandarban, Khagrachari and Rangamati) the target is universal coverage (100% by LLINs) and for the rest of the 10 districts the target is 80%.

The Bar Graph shows the coverage of households by LLINs and ITNs. The coverage with 2 LLIN/ITN in 2013 is about 81%. Here the number of households has been taken based on 2001 census (as per the round 6 proposal of global fund). The table also shows the LLIN/ITN coverage of 70% in the year 2013 based on the number of households reported in 2001 (from 2008 – 2010) and 2011 census (2001 – 2013). It means that there are 30% households in the endemic areas still outside the LLIN/ITN coverage. It may be mentioned here that the number of LLINs/ITNs needed has been calculated based on number of households of 2001 census. The target of coverage of all the malaria endemic areas is not also same.

Fig-7: Household Coverage-2 Nets/HH: 2008-2013



For the three hill tract districts (Bandarban, Khagrachari and Rangamati) the target is universal coverage (i,e, 100%) and for the rest of the districts (10 districts) the target is 80%. Intensive IEC for promoting use of LLINs and ITN have been provided and the high coverage in the CHT districts has shown positive impact in reducing the case load.

Treatment and re-treatment of all available community nets (40% of the households have the nets available) in the 8 districts, are done by NMCP and NGOs. Dipping sessions are arranged on pre-announced day and date in the school premises or a open place suitable for treating nets where members of the household come with their washed nets, volunteers in the dipping process, and get their nets treated, dried and ready for use.

3.7. Epidemic Preparedness and Response

While key interventions should be strengthened to eliminate malaria and prevent resurgence, it is prudent to accept reality that outbreaks could occur. Thus, rapid response team to investigate and contain outbreaks need to be established and supporting at district and sub-district level. The National Malaria Control Programme operates Rapid Response Teams at District and Upazila level for containing any reported outbreak (if any) and/or reported cases with immediate measures to diagnose and treat and deploys case investigations and vector control measures. Trained staffs are working in those teams and Standard Operating Procedures (SOP) has been developed and is followed. There is provision of additional buffer stock of drugs, diagnostics and other commodities for these rapid response teams.

3.8. Drug and Insecticide Resistance Monitoring

Monitoring Therapeutic Efficacy Study (TES) of Drugs: One of the important activities of the National Malaria Control Programme is to monitor the efficacy of the antimalarials in use and to have the updated information for revising the antimalaria drug regimen when needed. The NMCP conducts efficacy trails as per WHO protocol and with technical support periodically using sentinel sites. A one-arm, prospective evaluation of the clinical and parasitological response to directly observed treatment for uncomplicated malaria were conducted from November'2011 to May 2012.

The three sentinel sites were identified based on the endemicity of the disease and access to the areas. Sixty individuals as per the study inclusion criteria were enrolled, treated on-site with Artemether-lumefantrine (Coartem), and monitored for a period of 28 days. The follow-up consisted of a fixed schedule of check-up visits and corresponding clinical and laboratory examinations. Study patients were classified as therapeutic failures (early or late) or adequate responders based on the results of these assessments. The proportion of patients experiencing a therapeutic failure during the follow-up period was used to estimate the efficacy of the study drug(s). No treatment failure was noted. There was no serious adverse event in any of the cases and the drug was found to be well tolerated.

A similar TES is on-going in three other sentinel sites currently in the bordering districts of Cox;s bazaar and Banderban for assessing therapeutic efficacy as routine study.

Monitoring of vector resistance to insecticides: DDT was used over 30 years as the only insecticide for residual spraying till it was banned in 1991. Two insecticides; Malathion 57% EC for IRS and Deltamethrin 2.5% EC and 1% SC for treatment of bed-nets have been used for malaria vector control in the country. Insecticide resistance studies are not being carried out regularly due paucity of insecticide impregnated test papers and funding support. However, susceptibility/ insecticide resistance monitoring was carried out in year 2012 and 2013 in selected sites with the support of WHO and the Global Fund. In 2012, study was conducted in Kolmakanda upazilla of Netrokona and sadar upazilla of Rangamati district, while in 2013 such studies were conducted in Durgapur upazila of Netrokona, Alikadam upzilla of Banderban hill district, Banskhali upazilla of district Chittagoang, Rajivpur upzillza of Kurigram district and sadar upzilla of Rangamati hill districts.

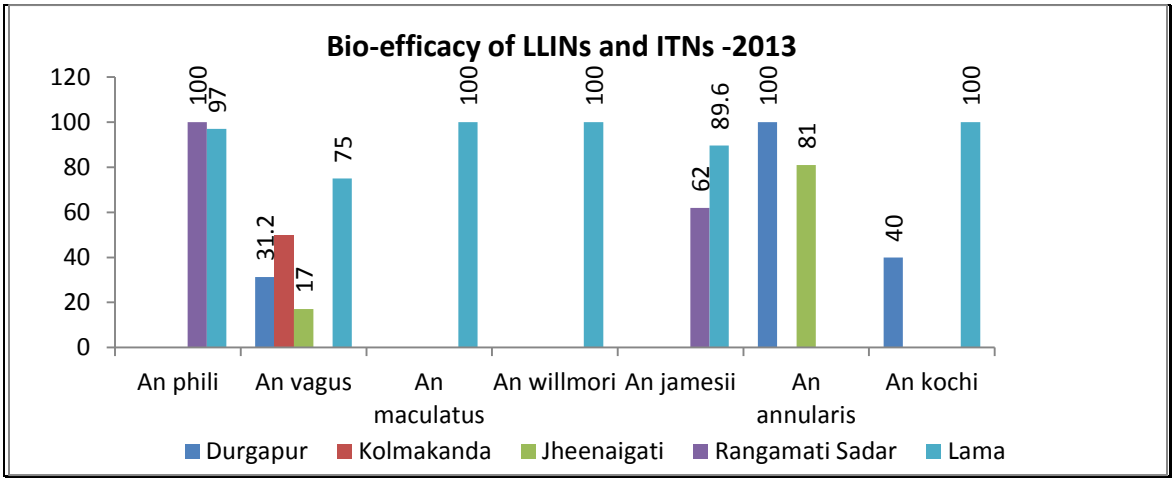
Synthetic pyrethroids and Malathion susceptibility test kits were obtained from SEARO, WHO. The primary vector species An. *philippinensis* was found susceptible while the secondary vector *An. vagus* was found resistant to Deltamethrin 0.05%. The other malaria vectors namely An.

*bama*i, An. *minimus* and An.*sundaicus* could not be tested due to their non-availability. Regular insecticide resistance monitoring should be undertaken by the entomological division of the programme in order to assess the susceptibility status of principal vectors such as An.*minimus* and An. *bamai.*

Bio-assay Test: Bioassay test conducted in various sites as a routine entomological surveillance. The results of the bio-assay test on LLINs and ITNs dipped with K-O-Tab1,2,3 mortality rates of mosquito nets at Durgapur, Jheenaigati, Kolmakanda, Lama, Rangamati Sadar and Jointapur upazila are shown in the Figure below:

The LLIN namely BestNet (manufactured by Netprotect) supplied in 2013. Deltamethrin treated Polyethylene net and normal net dipped with K-O-TAB 1-2-3 (only Durgapur of Netrokona) were tested. The mortality rate for selected were found 36% (polyester) & 31% (Normal net dipped with K O TAB-123) in Durgapur, 52% in Kolmakanda, 19.3% in Jheenaigati,64% in Sadar upazila of Rangamati and 96% in Lama, Bandarban respectively. The lowest mortality rate 19.3% was found in Durgapur, Netrokona and Highest 96% in Lama, Bandarban. (Ref: Figure below):

Fig-8: Mortality of Mosquitoes by Species to LLINs & ITNs



The mortality rate for *An philippinensis* was 100% for Polyethylene nets in all surveyed areas and lowest 17% in Jheenaigati of Sherpur, 31.2% in Durgapur and 50% in Kolmakanda of Netrokona, 75% in Lama of Bandaban respectively. The secondary vector *An. annularis* mortality rate was 100% in Durgapur and 81% in Jheenaigati. In case of *An vagus,* the mortality rate was varied from 17% to 75%. In this study it is shown that the mortality rate for *An vagus* is comparatively low in all areas.

3.9. Surveillance, Monitoring & Evaluation (M&E)

A national surveillance unit is in place at the central level and district and Upazila surveillance unit at the district and Upazila level, respectively. The surveillance unit at National, District and Upazila levels are formed with existing staff from GoB and BRAC. A manual is developed for Strengthening of Surveillance system in Malaria Control Programme in Bangladesh in May 2013.

As part of routine surveillance, a web-based management information system has been introduced up to Upazila Health Complex where both government and NGO reports are collecting and compiling the reports. Upazila Managers collect the monthly reports from respective health facilities and community-based reporting from ShasthyaKormi/ Health Worker and after compiling submit it to the Upazila Health Complex before 15th day of the following month with a copy to district office. At UZHC, the designated statisticians collect report from in-patient and out-patient including emergency department, community clinic, union sub-centre and field report. Reports are also collected from the medical college hospitals, district level hospitals in recent years. Both reports from GO-NGO and from different private hospitals and NGOs working on malaria patient management are directly entered into online web based reporting system in UHC by the Statistician of UHC with the help of Upazila Manager of respective NGO. At district level Medical College Hospitals report are also entered into the web at Civil Surgeon's office.

The routine reporting from the districts and Upazila Health Complexes are not regular and complete and thus NMCP will have to improve routine reporting. Private practitioners and village doctors are oriented on malaria to report or refer the malaria patients to the government/NGO health facilities. But it does not ensure reporting of all malaria cases and death; and particularly private sector's involvement should be strengthened.

This MIS data includes number of blood slide examination and positive cases, identification of *P. falciparum* and *P. vivax* patients, treatment of uncomplicated and severe malaria, and number of community and facility level patient identification through RDT and microscopy. Number of pregnant women and age specific data is taken into account in this report. After some recommendation, both NMCP and BRAC revised monthly MIS reporting format which incorporate training, BCC and preventive measure activities. LLIN distribution and ITN treatment, BCC orientation and Advocacy workshop all are to be reported through MIS format.

In addition to monthly disease specific reporting format, BRAC introduced additional quarterly reporting format to collect malaria related additional data to monitor the progress of planned activities. All NGOs including BRAC district office send quarterly report to BRAC central MIS unit within 15th day of following month after a quarter. Verbal autopsy for every malaria death in the community is being done.

A surveillance system should be sensitive enough to pick up the first few cases with diseases that have epidemic potential. This can be achieved by training all data collectors to recognize cases with reportable diseases. They should also be given guidelines for immediate reporting of a suspected disease outbreak. All reports should have prompt and immediate action by the appropriate health authorities beginning with a preliminary investigation to confirm whether there was really an outbreak. As preparedness for epidemic central rapid response and district and upazila response teams are formed and trained in all districts.

Supervision and monitoring

In addition to routine recording and reporting, regular field supervision and monitoring is carried out with standardized checklists. To monitor and evaluate malaria control activities, a detailed Monitoring and Evaluation (M&E) system has already been developed after a comprehensive national M&E system assessment. The programme is being continuously monitored and evaluated with routine tracking of the key elements of programme performance through health facility observation and surveys, evaluation studies, supportive supervision and data auditing and operational researches.

During the field visit supervisors verify both reported data and reporting quality for key indicators. In addition to MIS data human resources, infrastructure, training/workshop, communication, planning and administration, and LLIN/ITN user were verified. The supervision and monitoring is conducted jointly by government and NGOs and BRAC is responsible for supervision and monitoring of partner NGOs.

Supervision and monitoring by GoB

National Level: Central level staffs (Director, Programme Manager, M&E expert, MIS Consultant, Evaluators) visit the health facilities quarterly, check report and data, gives assistance and feedback according to findings of the visits.

District Level: At the district level, supervisors (Civil Surgeon) and Medical Officers (MO-CS office) supervise and monitor the field level activities according to their respective quarterly action plans. In addition to health facility and microscopic centre visit, they also check community service provisions, patient and beneficiaries and sometimes talk to community people to assess field level activities. Meetings of district level supervisors / managers are being held monthly where findings are being reviewed by Senior Health Officials.

Supervision and monitoring by BRAC (as NGO-PR)

There are three tiers of monitoring and supervision from central to field level. Central level personnel from BRAC monitor each NGO twice a year using a specific checklist. The regional level personnel conduct supervisory visit of each NGO, once in a quarter. During supervisory visits efficiency of human resources, performance of BCC activities, correctness of MIS report, and laboratory performance are observed and analyzed. Programme Organizers of the district conduct in-depth monitoring from community level to upazila level, including health facilities using the specific checklist. Findings of the visit are shared at the field office of respective SRs and a copy of the report is sent to BRAC. In addition BRAC Research and Evaluation Division (RED) and Monitoring Department also evaluate the effectiveness of programme independently, once a year. BRAC sets a plan for Monitoring Officers of SRs to conduct routine monitoring at field level. Monitoring officers submit the report of each quarter to the respective executive directors with a copy to BRAC. Apart from programmatic monitoring, financial audit is done yearly by BRAC Internal Audit Department to ensure transparency at all levels. A reputed audit firm also does external audit annually.

SECTION-4

Framework of the National Malaria Strategic Plan 2015-2020

4.1. Background and Rationale

The National Malaria Strategic 2015-2020 has been developed to provide technical guidance for the work of malaria control and elimination in Bangladesh for the coming years considering the changing landscape of the situation and aligning with the overall development goals of the country. Over the implementation of the previous strategies, the increase in resources available for malaria control globally and in Bangladesh resulted in scaling up of malaria control interventions such as: i) early diagnosis and treatment with effective drugs; ii) high coverage of long-lasting insecticide treated nets; iii) improved surveillance and vector control options; iv) raising mass awareness of the population at risk; and v) effective collaboration and partnerships with NGOs and other multi-sector stakeholders.

As a result of these interventions, the case incidence has a progressive decline and deaths due to malaria have been reduced remarkably over last a few years. However, these gains need to be sustained and enhanced by NMCP and the programme warrants a major shift towards embarking on a stratified phased elimination to eventually achieve the goal of a malaria free Bangladesh, in near future. This is on this background the Malaria National Strategic Plan (2015-2020) has been drafted with essential focus on the stated vision, goals, objectives and targets, to be pursued in the coming years.

4.2. Existing Strategic Plan (2008-14)

The existing National Strategic Plan 2008-2015 envisaged 60% reduction of malaria morbidity and mortality (compared to baseline 2005) by 2015 with the specific objectives of: i) providing early diagnosis and prompt treatment (EDPT) with effective drugs to 90% of malaria patients; ii) ensuring effective malaria prevention to 100% population at risk in five high endemic districts and 80% in the remaining eight districts; iii) providing pre-referral treatment and timely referral of 90% of severe malaria cases; iv) strengthening surveillance, establishing Rapid Response Team (RRT) for containment of outbreaks; vi) promoting community participation, partnership with NGOs and private sector and vi) strengthening management capacity, M&E and Procurement and Supply Management (PSM) systems in the National Malaria Control Programme.

Largely, National Malaria Control Programme has been successful in achieving the set objectives and targets as revealed in the Malaria Programme Review (MPR) in June 2011 and the Mid-Term Review (MTR) in April 2014. The MPR and MTR highlighted programmatic strengths, weaknesses and gaps to address for creating a sustainable impact in malaria control through stratified micro-planning based on evidences that will support further reducing disease burden in low malaria endemic districts as against a blanket approach to implementation of malaria interventions, countrywide.

4.3. National Malaria Strategic Plan (2015-2020)

The Malaria Strategic Plan (2015- 2020) provides the framework and technical guidance for the National Malaria Control Programme (NMCP) to plan and implement interventions for achieving pre-determined goals, objectives and targets. The goal is "To have achieved '*zero indigenous transmission*' and *'zero death'* aiming malaria elimination in Bangladesh, by 2020.

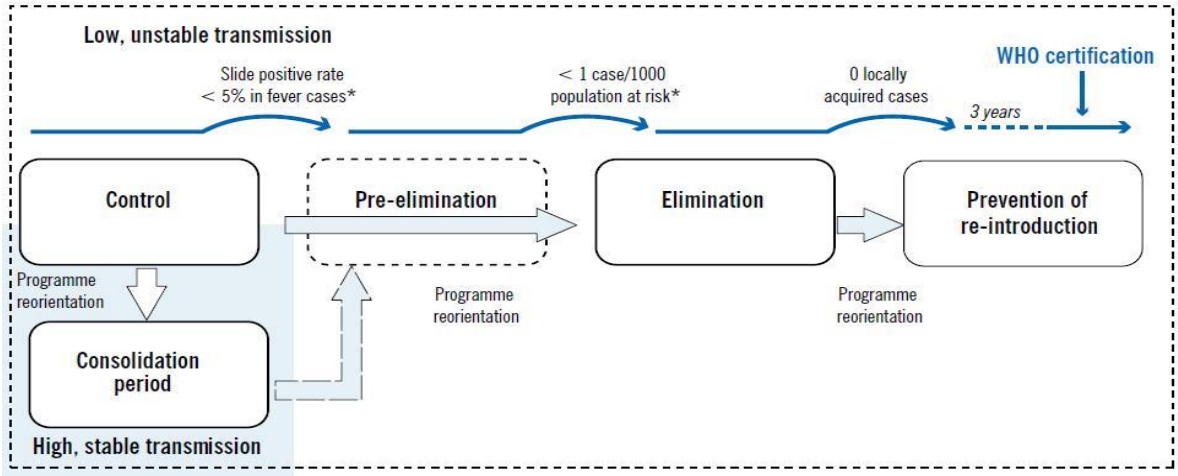
The Malaria National Strategic Plan (2015–2020) has been developed through a multi-stakeholder and multi-sector participatory approach in line with recommendations from the Malaria Programme Review (MPR) and the Mid-Term Review (MTR) of the National Malaria Control Programme (NMCP) conducted during June 2011 and April 2014, respectively. Moreover, the paradigm shift due to epidemiological changes; gradual shrinking of the malaria map in low transmission districts; and the need for re-orientation of the malaria control programme towards stratified and phased elimination in Bangladesh have been considered.

Some differences from the previous strategies therefore are the scale up and consolidation of malaria control interventions including disease and vector surveillance; improved programme planning and targeted implementation towards elimination; strengthening monitoring and evaluation; enhancing collaboration and partnerships among GoB-NGO consortium; and fostering effective community partnership. The goals and objectives of the National strategic Plan are aligned to overall health sector development strategies and emphasized the use of *state of the art* technologies for malaria elimination; in line with regional and global malaria control strategies, in particular.

4.4 The Control to Elimination Continuum

The decisions on the design, structure and systems of the malaria control programme largely depends on the current malaria epidemiology in relation to the set goals and objectives of the programme that envisioned to be achieved. However, the programme is to be grounded on the basis of good surveillance, intelligence on the parasite, vector bionomics, and the characteristics of the risk population and the dynamic changes in the disease burden and trends. A control to elimination continuum is described in the figure below:

Fig-9: Control to Elimination Continuum



In addition, in the early attack phase the key mix of interventions are delivered to ensure universal coverage to rapidly bring down transmission. As the programme moves to consolidation phase with low transmission with malaria foci and then maintenance phase with prevention of reintroduction to sustain elimination, all interventions require to be highly target-based and on case-based surveillance and mapping of the endemic areas.

4.5. Vision, Mission, and Goal of Strategic Plan (2015-2020)

Vision: Malaria-free Bangladesh

The vision envisages a future 'Malaria-free status of Bangladesh´ and refers to a major difference to the people's life and the societies living with the risk of malaria. The vision will focus on reducing poverty by preventing malaria morbidity and deaths.

Mission:

The National Malaria Control Programme (NMCP), Bangladesh aims to achieve malaria elimination ('zero indigenous transmission' and 'zero deaths') by ensuring equitable and universal accesses to effective preventive and curative services to all 'at risk population' through concerted efforts of the GoB, NGOs, Private sectors, and the community. Achieving the goal of 'Malaria Free Bangladesh' will contribute to poverty alleviation as the poorest of the poor segment of the population are largely the victim of malaria.

Goal: By 2020, to have achieved '*zero indigenous transmission*' and *'zero death'* aiming malaria elimination in Bangladesh

The goal aims at attaining a status of malaria elimination by 2020, referring to reorientation of the control interventions in phased and stratified manner for: i) addressing four low endemic districts (Kurigram, Sherpur, Mymensingh and Netrakona); ii) expansion to the moderate endemic districts; and iii) intensified efforts in high endemic districts; for achieving eventual malaria elimination status in Bangladesh.

4.6. Strategic Objectives:

Objective 1: To achieve 100% coverage of *'at risk'* population with appropriate malaria preventive interventions by 2018

Implementation Approaches and Strategies:

During implementing Global Fund supported proposal of Round-6 and Round-9, the National Malaria Control Programme has achieved remarkable success in scaling up diagnostic and treatment services and reduced malaria incidence remarkably. However, 100% coverage by appropriate and effective preventive methods for the population at risk is yet to be achieved. As per the current policy, the LLINs coverage in three CHT districts was targeted to be 100%; and

other moderate and low endemic district by 80% using both ITNs and LLINs. Under the present National Strategy, the 100% coverage by LLINs and ITNs remains as the main stay and other vector control interventions to support achieving zero transmission should include: i) Selective Indoor Residual Spray (IRS); ii) Larval Source Reduction (LSR); and micro-environmental management by the community under IVM approach; and iii) intensive IEC/BCC activities for mass awareness of the community. The following interventions need to be considered:

- Procurement and distribution of LLINs (@1 net per 1.8 Population) and ensuring use for maximizing personal protection and reducing risk of malaria transmission;
- Treatment and re-treatment of community owned nets;
- Indoor Residual Spray (IRS) in selected areas based on case-reporting and investigation for reducing local transmission;
- Larval source reduction and environmental management using IVM approach in partnerships with the community;
- Special measures for protecting high risk groups (Jhum Cultivators, forest goers, tourists, and tropical aggregation of labour forces in development project areas etc);
- Malaria Free Towns

Major Intervention Areas:

- Procurement, distribution and promoting use of LLINs and ITNs;
- Transmission risk reduction: IRS, larval control and environmental management using IVM approach;
- Intensive IEC/BCC and community mobilization;
- Intensify malaria prevention in high risk population *('Hot Pops' and 'Hot Spots');*
- Malaria free towns

Objective 2: To have 100% malaria patients receiving early and quality diagnosis (RDT or Microscopy) and effective treatment by 2018

Implementation Approaches and Strategies:

TheNational Malaria Control Programme needs to emphasize the "*Test, Treat and Track"* principles and ensure that 100% malaria patients are diagnosed and treated within 24-48Hrs of the onset of disease. The routine surveillance data on species indicates that more than 90% of the cases are *P. falciparum* infections ans as such *P. vivax* diagnosis may not have adequate attention. The pan-RDT has been introduced recently to diagnose both *P. falciparum* and *P. vivax* simultaneously. The microscopy centers (80 from GoB and additional 120 from NGOs) are still not enough to cater the need for early detection of cases and with the progress in elimination, the need for microscopy has to be further emphasized.

Engagement of 800 Community Clinics located in the malaria endemic districts may have an additional advantage in scaling up diagnosis and treatment provisions, close to the community. Intensive efforts to be taken to reach the hard-to-reach areas through operating mobile clinics,

and deployment of additional trained health workers. Necessary support from the Army Medical Core (AMC) and Border Guard, Bangladesh (BGB) may be sought wherever AMC and BGB have their installations for extending such help. The following areas to be taken into account:

- Provision of Pan-RDT and microscopy centers closer to the community;
- Trained Lab. Technologists and QA system for microscopy and RDT;
- Uninterrupted supplies of RDT and ACT;
- Utilization of Community Clinics (800 CCs in malaria endemic areas);
- Intensified efforts for remote/hard to reach areas (Mobile clinics, additional community health workers);
- Additional support from Army Medical Core (AMC); Border Guard, Bangladesh (BGB); and private sector;
- Case based reporting, follow up and investigation of each death (Test, Treat and Track);
- Monitoring drug resistance with special reference to tracking Artemisinin resistance using 'state of art technologies' and in collaboration with expert organizations and institutions in and outside country.
- Assessing G6PD deficiency for taking appropriate measures; and explore introduction of new species of malaria parasite (*P. knowlesi*).
- Mass Drug Administration for asymptomatic carriers in high endemic areas to reduce reservoir sources and transmission through piloting in small areas and then scaling up.

Major Intervention Areas:

- Strengthening capacity for malaria diagnosis and treatment;
- Increasing access to diagnosis and treatment by GoB and private sectors (PPP);
- Strengthening referral and deployment of pre-referral treatment;
- Strengthening Community Clinics with trained Service Providers and provision of RDT and ACT in all CCs in malaria endemic areas;
- Community systems strengthening for malaria prevention, management and referral;
- Engaging RMNH, private sectors and NGOs in malaria diagnosis and management

Objective 3: To continue strengthening of programme management towards elimination by 2020

Implementation Approaches and Strategies:

As the National Malaria Control Programme needs to embark on phased elimination, the present capacity should have to be strengthened to ensure proper planning and effective implementation. The following areas are critically important:

- Geographical Reconnaissance (GR) of villages/households and mapping of malaria endemic areas as per micro-stratification to introduce area specific

interventions to achieve the elimination targets with annual break down ;
- Target based approach to planning prioritizing the most at risk populations and adapting sound strategies to address local situation and needs;
- Deployment of additional Human Resources at central and district levels;
- Strengthening Entomology Team, in particular at district and below level;
- Reinforce partnerships and collaboration;
- Investing in health system and community system strengthening;
- Re-orientation of National Malaria Control Programme towards pre-elimination and elimination in phased manner

Major Intervention Areas:

- Micro-planning for phased elimination in low transmission districts;
- Human resources and infrastructure;
- Improved performance monitoring system at all levels;
- Reinforced GoB-NGO partnerships and institutional linkages;
- Investing in community system strengthening.

Objective 4: To continue strengthening of disease and vector surveillance, Monitoring and Evaluation towards malaria elimination

Implementation Approaches and Strategies:

The present capacity of National Malaria Control Programme in areas of disease and vector surveillance, Monitoring and Evaluation is weak which needs to be enhanced. The following steps should have to be taken:

- Strengthen central team for malaria surveillance, M&E and operational research;
- Improve Entomological surveillance to include studies of vector biology; advise on effective vector control interventions; and monitor vector resistance to insecticides;
- To develop indicators and targets, performance framework and monitoring & evaluation;
- Introduce electronic data base and web-based reporting;
- Integrated Communicable Disease Surveillance linked to HMIS;

Major Intervention Areas:

- Strengthened malaria surveillance, M&E and operational research;
- Strengthen Entomological surveillance
- Routine monitoring of Key Performance Indicators (KPI);
- Electronic data base and web-based reporting; and
- Integrating Communicable Disease Surveillance to HMIS
- Mid-Term Reviews and Internal and External Evaluation
- Operations Research

Objective 5: To intensify Advocacy, Communication and Social Mobilization (ACSM) for malaria elimination

Implementation Approaches and Strategies:

Community empowerment is the key to successful programme implementation and creatinf sustainable impact. Mass awareness of the population at risk should be continued and intensified through intensive IEC using appropriate methods, materials and tools. For a sustainable impact, a well-planned ACSM is instrumental for ensuring community participation in malaria control. The following elements of ACSM should guide to effective mass awareness campaign:

- Development and use of appropriate ACSM materials and tool;
- Using local cultural and ethnic norms and practices for target population;
- Coordination between health and related sectors;
- Mult-sectoral approach to remove cultural and ethnic barriers in communications;
- Intensive IEC/BCC activities for mass awareness of the community in partnerships with GoB and NGO consortium led by BRAC and engaging local authorities.
- School-based initiative for child-to-child communication for dissemination of messages for malaria prevention and control.

Major Intervention Areas:

- Development and marketing of appropriate ACSM strategies;
- Post marketing surveys for effectiveness of IEC/BCC methods;
- Mult-sectoral approach for reducing cultural/ethnic barriers in communications;
- Operational research in ACSM

4.7. Programme Re-orientation and Action Plan (Business Plan)

Bangladesh will embark on a stratified phased elimination during the implementation period of this current strategic plan 2015-2020. Of the 13 endemic districts four have already reached pre-elimination since last three years and progressively the National Malaria Control Programme will plan and implement the elimination strategies in all endemic districts. A systematic programme reorientation and action planning (Business Plan) will follow to achieve set objectives, targets and the goal for elimination. The Annual Action Plan (Business plan) should address the following issues:

- Set Annual targets aligned to the vision, mission, goals and objectives. These targets to have a breakdown structure to districts, upazilas, unions, and villages with time bound approach to achievement (preferably annual targets);

- Micro-stratification of malaria endemic areas based on evidence based set of epidemiological data; adequate information on entomological parameters related vector bionomics; and population characteristics keeping in pace with the updated evidences from the field and progress of implementation (quarterly and annually);

- Introduce case-based surveillance and investigation of each case (and death) for deployment of vector control measures (Focal IRS @ 60 HHS around each case reported; and additional interventions e.g. larval source reduction; Mass Drug Administration-MDA etc.);

- Intensify early diagnosis and treatment (within 24 Hours of manifestation of symptoms) and deployment of appropriate pre-referral treatment for severe malaria;

- Strengthen referral services and equip selected district hospitals in high endemic areas to ensure proper management of severe malaria cases (including patients requiring ICU services);

- Appropriate attention to diagnose and treat *P. vivax* malaria cases and ensuring treatment compliance with gametocidal drugs (PQ 14 days) to prevent relapse and recrudescence of *P. vivax* malaria;
- Establish Rapid Response Team (RRT) at all endemic districts to ensure immediate interventions to case reports along with vector control measures to cut off local transmission;

- Introduce periodic evaluations, annual reviews and independent Mid-Term and Final Programme Performance Reviews (MPR) to track progress of malaria control and elimination;

- Centrally, the National Malaria Control Programme (NMCP) to be further strengthened with additional Technical Manpower to coup up with increased responsibilities for a shift from control to elimination. Special emphasis to be given to strengthen monitoring of drugs and insecticide resistance through establishing sentinel sites and using WHO recommended strategies.

Based on the experiences and lessons learnt the National Malaria Control Programme needs to pursue time-bound and target based malaria elimination interventions for reaching ultimate status of malaria elimination. Moreover, the detailed Action Plans to be developed and implemented with a view to achieving annual targets, based on stratification of malaria endemic areas. A careful planning and re-planning is instrumental for the National Malaria Control Programme (NMCP) to achieve eventual status of ‘Malaria free Bangladesh’ as envisioned in this Strategic Plan (2015-2020).

SECTION-5

Financial Plan, Costing and Budgeting

5.1. Malaria Programme Implementation and Financing

Under the stewardship of Ministry of Health and Family Welfare, the National Malaria Control Programme (NMCP) in the Directorate General of Health Services (DGHS) is the sole organization to plan and implement malaria control and elimination activities. The Line Director, Communicable Disease Control (CDC) is the functional Head under the GoB and HPNSDP for malaria control programme including control of other communicable diseases and Neglected Tropical diseases (NTDs). Since 2007, National Malaria Control Programme (NMCP) received GFATM Grants from Round-6 and Round-9 (later merged under SSF) having two Principal Recipients (PR): GoB and NGO-PR (BRAC). The NGO-PR however has 21 Sub-Recipients (SRs). The financing of malaria control programme comes from two major sources: GoB (HPNSDP) and the GFATM. There are other organizations also providing some funds and technical services for implementing malaria programme interventions. The Table below shows a brief statement of fund received from these sources, as of 2014:

Table-6: Fund Received from GFATM, GoB HPNSDP and Other Sources

Fund Received (USD in millions)		
GoB- HPNSD	**2011-2016**	29.70*
GFATM R-6	**2007 -2010**	
	GoB	22.66
	NGO	16.40
GFATM R-9	**2010 -2015**	
	GoB	28.43*
	NGO	15.21*
Others/WHO	**2007-2014**	1.76

*Some funds yet to be disbursed (Source: MTR Report 2013)

The National Malaria Control Programme has received USD 29.70 million from GoB-HPNSDP during 2011-16 and USD 22.66 million from GF during 2010-15. The NGO-PR (BRAC and SRs) received USD 16.40 million and USD 15.21 million from GF, respectively during the period of 2007-2010-2015. For the period 2007-2014 the NMCP also received USD 1.76 million form the WHO regular biennial programmes for malaria control activities.

5.2. Costing and Budgeting of the NSP

Malaria costing, budgeting and financial planning enables the programme to provide detailed costing of activities, mobilize and account for the financing of the malaria strategic plan to attain and sustain universal access, coverage and expected impact. The detailed costing follows the

logical framework by Strategic Objectives (SO); Service Delivery Areas (SDA); and Specific Activities (SA) year by year. This includes costing of commodities, operational cost, human resources and capacity strengthening, including support services e.g. acquisition of assets, transport, logistics and infrastructure etc. The financial plan describes all about the total financial envelope, and the costing tables attached below include costing and budgeting by activities using unit cost and cost comparison.

The costing of activities were considered as per standard rates in government and those for costing of commodities such as RDT, ACT, LLIN, insecticides for IRS, spray equipments, etc. were from rates in previous purchases under VPP of GFATM as compared to unit costs available from local suppliers and regional and international suppliers. The unit cost should be compared from more than three different suppliers based on international standard specifications on commodities for best buys. Other areas of operational service delivery cost such as travel cost and per-diems are best aligned to national Ministry of Health standard rates. Contract staff remunerations and benefits are also best aligned to what is currently in use in the national health programmes of the Ministry of Health. The use of standard operational costs in line with the national health system will allow the programme to be in better position to seek domestic financing and be able to access international financing more effectively for long term sustainability. External budgets from other development partners are considered as additional financing for the plan.

5.3. Quality control of health & other commodities

National quality control unit should be identified and malaria commodity samples should be sent for testing during tendering and for batch quality control during supply and use. The cost of quality control should be borne by the suppliers by ensuing this is included in tender specifications. The use of approved quality controlled malaria commodities should be maintained at all times within the public and private malaria service delivery systems. The national programme should work to support the national regulatory authorities to collect samples from the private market to check for counterfeit products such as antimalarial drugs, rapid test kits, insecticides etc. The PSM plan should make sure that there is identification and consultation of the different stakeholders in developing the PSM plan to ensure that there is always adequate buffer stock of malaria commodities to last more than one malaria season and to cater for unexpected epidemics and emergencies.

5.4. Inventory, stock control and reporting

A specific malaria commodity inventory record or register or stock card should be in place in all storage points and malaria service delivery point regards what has been received, used or given out and balance at hand. A monthly and quarterly malaria commodity reporting system on available stocks from all malaria service delivery point is essential to manage a good malaria PSM plan. This can be a vertical malaria commodity reporting system or could be part of the central commodity reporting system. This stock control and reporting system should be linked with quality control of batches and regular checks on storage conditions and expiry dates and rotation of stocks regards old out and new in. An overall central record should be kept regards when and what type of commodities were sent to where and status of overall national stocks available at any one time.

5.5. The Cost Tables of NSP (2015-2020)

Currently, the NMCP is largely financed by GoB (under HPNSDP); the GFATM; and WHO mainly for technical assistance. These funds are utilized for HR recruitment, HR capacity development, procurement of drugs, diagnostics, LLINs and logistics, and implementing other support strategies (ACSM, surveillance, monitoring and evaluation, etc).

Summary Budget of NSP 2015-2020 (USD Million)

Objectives	Cost for Implementation (FY July– June)				
	2015-16	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Objective1: To achieve 100% coverage of *'at risk'* population with appropriate malaria preventive interventions by 2018	13.160	12.008	8.109	11.192	10.927
Objective 2: To have 100% malaria patients receiving early and quality diagnosis (RDT or Microscopy) and effective treatment by 2018	1.265	1.315	1.396	1.350	1.520
Objective 3: To continue strengthening of programme management towards elimination by 2020	6.021	6.599	7.057	7.854	8.656
Objective 4: To continue strengthening of disease and vector surveillance, Monitoring and Evaluation towards malaria elimination	0.516	0.459	0.520	0.506	0.630
Objective 5: To intensify Advocacy, Communication and Social Mobilization (ACSM) for malaria elimination	4.952	5.178	3.773	5.331	5.475
Totals	**25.916**	**25.561**	**20.857**	**26.234**	**27.209**
GRAND TOTAL:	**125.780**				

The detailed cost calculation in the Excel spreadsheet has been prepared which will be used to develop the Annual Work Plan (Business Plan) for implementing the activities under this National Strategic Plan (2015-2020).

The detailed activities **Cost Tables** under broad service areas in line with the objectives for the National Strategic Plan 2015-2020 is given below.

Cost Tables: National Strategic Plan 2015-2020

Fig. in USD

Objective 1: To achieve 100% coverage of *'at risk'* population with appropriate malaria preventive interventions by 2018

Service Delivery Areas	Key Activities	Cost and Implementation Time Line (FY: July – June)					Total
		2015-16	2016-17	2017-18	2018-19	2019-20	
-Malaria Prevention and Transmission risk reduction of at risk population **-Malaria prevention in high risk population *('Hot Pops' and 'Hot Spots')*** **-'Malaria Free Town' initiative**	Procurement of Long Lasting Insecticide Treated Nets (LLIN)	8,538,957	10,353,096	6,575,412	6,464,364	9,110,133	41,041,962
	Procurement of KO Tab 1-2-3 for treating community owned Bed nets	3,014,796			3,014,796		6,029,592
	Procurement of Insecticides (Pyrithroid compound)	128,205	141,026	155,128	170,641	187,705	782,705
	Procurement of Spray machines and accessories	140,000			160,000		300,000
	Procurement of Larvicides (Limbate-50 EC)	15,385	16,923	18,615	20,477	22,525	93,925
	Distribution of LLINs through mass community campaign	463,654	562,159	357,036	351,006	494,668	2,228,523
	Mapping transmission areas based on epidemiological and entomological parameters and conducting Focal Indoor Residual Spraying (IRS)	166,250	182,875	201,163	221,279	243,407	1,014,973
	Larval Source Reduction and environmental management -IVM	257,500	283,250	311,575	342,733	377,006	1,572,063
	Surveys for assessing coverage, use and impact of LLINs/ITNs/IRS	60,000	66,000	72,600	79,860	87,846	366,306
	Mapping 'Hot-spots' and conducting vector control interventions including mass awareness	108,000	118,800	130,680	143,748	158,123	659,351
	Involvement of community and partnerships including local bodies for managing "Hot Spots' with effective vector control interventions	31,950	35,145	38,660	42,525	46,778	195,058
	Additional treatment centers for 'Test, Treat and Track' of malaria patients within Town areas (Pvt. Practitioners, and others)	17,750	19,525	21,478	23,625	25,988	108,366
	Area delineation (5 district and 65 UZ Towns) in collaboration with local authorities/ stakeholders and deployment of vector control measures	100,000		84,000			184,000
	Routine and periodic vector control interventions (Larval source reduction, IRS, micro-environmental management using IVM approach)	47,215	51,937	57,130	62,843	69,127	288,252
	Multi-sector involvement (Media, Education, Agriculture, Social Welfare, and others)	71,000	78,100	5,910	94,501	103,951	433,462
	Sub Total Objective-1:	**13,160,662**	**12,008,835**	**8,109,386**	**11,192,398**	**10,927,256**	**55,398,538**

Objective 2: To have 100% malaria patients receiving early and quality diagnosis (RDT or Microscopy) and effective treatment by 2018

Service Delivery Area	Key Activities	2015-16	2016-17	2017-18	2018-19	2019-20	Total
-Quality diagnosis and effective treatment **- Increasing access to diagnosis and treatment in GoB and NGO facilities** **-Strengthening referral and pre-referral treatment of severe malaria** **-Engaging RMNCH, private sectors and other stakeholders**	Capacity building of Health Care Service providers	94,340	118,731	99,315	109,247	120,171	541,804
	Capacity building of Community Health Care Providers (Community Clinic)	48,000	7,500	7,500	7,500	7,500	78,000
	Establish Molecular Diagnostic Facility in central and selected district laboratories (Equipment, training, ELISA kits & accessories) and maintenance	-	130,000	25,000	25,000	25,000	205,000
	Laboratory equipment and supplies for effective diagnosis	52,292	57,521	63,273	69,601	76,561	319,248
	Establish Functioning of QA system for microscopy and RDT	25,000	27,500	30,250	33,275	36,603	152,628
	Procurement of RDT	228,248	233,898	239,690	245,626	251,709	1,199,171
	Continuation of existing laboratories and establishing new laboratories	71,215	78,337	86,170	94,787	104,266	434,776
	Strengthening Community Clinics for malaria diagnosis, treatment and referral	200,000	220,000	242,000	266,200	292,820	1,221,020
	Procurement of Antimalarials (ACT)	24,000	16,000	8,000	4,000	4,000	56,000
	Procurement of other antimalarials (PQ, CQ & others)	20,000	20,000	20,000	20,000	20,000	100,000
	Incentive for health Volunteer	64,779	63,345	61,757	67,932	74,725	332,538
	Special campaigns in hard to reach areas (viz. Operating Mobile Clinics)	104,252	107,400	112,770	124,047	136,452	584,921
	Mass Drug Administration (MDA) for asymptomatic carriers to reduce parasite load and transmission	75,000	82,500	90,750	99,825	109,808	457,883
	Capacity building on pre-referral treatment	52,250	57,475	63,223	69,545	76,499	318,991
	Provide transport support (incentive) for treatment and referral	2,862	2,575	2,318	2,086	1,877	11,718
	Improving management of severe malaria in hospitals (Training & additional support for equipment & logistics)	161,120	92,400	194,955	111,804	122,984	683,264
	Advocacy, coordination & capacity development of RMNCH and other stakeholders for malaria programme	22,000		25,000		30,000	77,000
	Training of service providers for diagnosis and treatment in adjacent districts & Upazillas	20,000		24,200		29,282	73,482
	Sub Total Objective-2:	**1,265,358**	**1,315,182**	**1,396,171**	**1,350,475**	**1,520,257**	**6,847,442**

Objective 3: To continue strengthening of programme management towards elimination by 2020							
Service Delivery Area	**Key Activities**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**Total**
-Strengthen programme management-control to elimination	Development and implementation of Annual Operational Plan (Business Plan)	15,000	16,500	18,150	19,965	21,962	91,577
	Development & Updating of Manuals, Guidelines, SOPs, Registers, Reporting Formats & Checklist etc. (Including Printing)	78,648	44,498	46,722	117,972	93,444	381,284
-Human resources, infra-structure and performance monitoring systems	Micro-stratification of malaria endemic areas based on set epidemiological and entomological criteria (including GIS) and population characteristics	144,000	101,250	-	24,000	-	269,250
	Training-retraining of GoB and NGO staff (All categories)	113,468	127,521	136,097	149,707	164,677	691,470
-Reinforce GoB-NGO partnerships and institutional linkages	Mid-term reviews for programme performance assessment		75,000			80,000	155,000
-Community System strengthening	Annual Internal & External Audit	54,719	58,355	62,263	68,489	75,338	319,165
	Deployment of additional workforce (Central Programme Coordinator, Entomological team)	248,280	273,108	300,419	330,461	363,507	1,515,774
	Human Resource (all levels)	4,796,118	5,275,730	5,803,303	6,383,633	7,021,996	29,280,780
	Technical Assistance (Epedemiologist, Entomologist, M&E and PSM Experts)	90,000	99,000	108,900	119,790	131,769	549,459
	Quality Assurance & Quality Control	125,000	137,500	151,250	166,375	183,013	763,138
	Participation in National and International Meeting and Seminar	61,540	67,694	74,463	81,910	90,101	375,708
	Review and Coordination meetings (Central, district & Upazilla Level)	132,368	145,605	160,165	176,182	193,800	808,120
	Establish linkage and coordination with specialized institutes and academic hospitals	10,000	11,000	12,100	13,310	14,641	61,051
	Community capacity development (community sessions, incentives etc.)	142,000	156,200	171,820	189,002	207,902	866,924
	Innovative approaches for Community involvement (Community Radio, Drug Dispensing Centers etc)	10,000	11,000	12,100	13,310	14,641	61,051
	Sub Total Objective-3:	**6,021,141**	**6,599,961**	**7,057,752**	**7,854,105**	**8,656,791**	**36,189,750**

Objective 4: To continue strengthening of disease and vector surveillance, Monitoring and Evaluation towards malaria elimination							
Service Delivery Area	**Key Activities**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**Total**
-Strengthened malaria surveillance **-Monitoring and Evaluation**	Strengthening disease and vector surveillance, HMIS and LMIS (Electronic Database, Web based Reporting)	50,000	11,000	12,100	13,310	14,641	101,051
	Cross border collaboration and tracking of mobile population (Cross border meeting, BBINMS Website)	25,000	27,500	30,250	33,275	36,603	152,628
	Establish & Maintain Three Sentinel sites in border districts for monitoring drug and insecticide resistance	50,000		60,500		73,205	183,705
	Operations research (To address programme issues, and testing tools and strategies)	125,000	137,500	151,250	166,375	183,013	763,138
	Monitoring of Porgramme Implementation, M&E and Supportive supervision at all levels	245,956	260,580	242,025	266,228	292,850	1,307,639
	Training of MIS Personnel on Data recording & Reporting	8,222	8,632	9,064	9,970	10,967	46,856
	Monitoring progress of programme implementation (key indicators)	12,820	14,102	15,512	17,063	18,770	78,267
	Sub Total Objective-4:	**516,998**	**459,314**	**520,701**	**506,221**	**630,048**	**2,633,283**

Objective 5: To intensify Advocacy, Communication and Social Mobilization (ACSM) for malaria elimination

Service Delivery Area	Key Activities	2015-16	2016-17	2017-18	2018-19	2019-20	Total
-Intensive IEC/BCC and community mobilization **-Acquisition of Assets, Establishment and Programme operation costs**	Development & updating of appropriate ACSM strategies	10,000			12,500		22,500
	Development, printing and dissemination of IEC materials	668,243	1,090,128	985,620	1,635,192	1,798,711	6,177,894
	Surveys for assessment of effectiveness of IEC/BCC methods		30,000		35,000		65,000
	Advocacy meeting with Media, key informants, and social activist groups	68,792	75,408	79,178	87,096	95,805	406,279
	Orientation of Community leaders and other key informants on malaria mass awareness	77,987	89,713	94,199	103,619	113,981	479,498
	Involving Tribal cultural Institutes/groups for ACSM	10,000	15,000	15,000	15,000	15,000	70,000
	Special Events - WMD, other Campaigns	27,408	29,128	31,240	34,364	37,800	159,940
	School based (Little Doctor) programmes	10,724	22,518	23,644	26,008	28,609	111,504
	Documentation and dissemination : annual report & other documents	14,292	15,336	16,466	18,113	19,924	84,130
	TV & Radio airing and monitoring progress	157,875	329,114	269,243	296,167	325,784	1,378,182
	Development, printing and dissemination of multilingual and pictorial IEC mataerials	15,000	16,500	18,150	19,965	21,962	91,577
	Office Rents	192,283	216,416	230,101	253,111	278,422	1,170,333
	Office Equipment (Computer, Softwares & Accessories); Furnitures & Fixtures; and Utility & Services etc.	190,814	110,034	124,012	136,413	150,055	711,328
	Procurement of Vehicles (Jeep, Pick-up & Motorcycle) including fuel & mainenance	354,297	278,893	42,853	47,138	51,852	775,033
	CD & VAT (ACT, RDT, LLIN, KO Tab etc.)	3,130,115	2,834,823	1,818,797	2,586,857	2,512,293	12,882,885
	Miscellaneous (unforeseen expenses)	25,000	25,000	25,000	25,000	25,000	125,000
Sub Total Objective-5:		**4,952,829**	**5,178,011**	**3,773,503**	**5,331,543**	**5,475,198**	**24,711,084**
Totals of Five Objectives:		**25,916,987**	**25,561,303**	**20,857,513**	**26,234,743**	**27,209,551**	**125,780,097**
Grand Total: 125,780,097							