

# **Malaria Control Strategic Plan**

**July 2006 – July 2011**



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**Ministry of Health  
Government of Southern Sudan**

**Foreword**

## List of Acronyms

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal Care
AQ	Amodiaquine
BCC	Behavioural Change Communication
BEG	Bahr El Ghazal
CBO	Community Based Organization
COMBI	Communication for Behavioural Impact
CQ	Chloroquine
DFID	Department for International Development.
ECHO	European Commission's Humanitarian Aid Department
EPI	Extended Programme of Immunisation
FBO	Faith-based Organization
GFATM	Global Fund to Fight AIDS, Tuberculosis & Malaria
HANMAT	Horn of African Network for Monitoring Antimalarial Treatment
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HMM	Home Based Management of Malaria
HRD	Human Resource Development
IDP	Internally Displaced Persons
IEC	Information, Education and Communication
IECHC	Integrated Essential Child Health Care
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
IPT	Intermittent Preventive Treatment
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
IVM	Integrated Vector Management
LLI-K	Long Lasting Insecticide - Kit
LLIN	Long Lasting Insecticidal Net
MCP	Malaria Control Programme
MOH	Ministry of Health
MSF	Médecins sans Frontière
NGOs	Non Governmental Organizations
NID	National Immunization Days
OLS	Operation Lifeline Sudan
PLWHA	People Living with HIV/AIDS
PSI	Population Services International
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
SP	Sulphadoxine-Pyrimethamine
SRRA/C	Sudan Relief and Rehabilitation Association/Commission
TBA	Traditional Birth Attendant
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization
WHOPES	WHO-Pesticide Evaluation Scheme

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## **Introduction**

With the signing of the Comprehensive Peace Agreement in January 2005 the stage has been set in Southern Sudan for a comprehensive reconstruction after years of conflict. The Interim National Constitution of Southern Sudan acknowledges the need to promote public health and equal, free access to primary health care. This is specified in more detail in the Southern Sudan Interim Health Policy (Draft December 2005) which mentions malaria as a particular challenge and gives priority to maternal and child health interventions. This is the framework within which malaria control will be implemented.

The development of the Malaria Control Strategic Plan for Southern Sudan is based on a situation analysis using all currently available data and sources and involving all partners and stakeholders. The Plan was then developed in a participatory process in two phases: A first draft was developed by the Malaria Focal Person and WHO with support from the Malaria Consortium. This draft was widely distributed and formed the basis of a consultative meeting with key partners in Juba in May 2006 which resulted in a second draft version of the document. The final version was then derived at by incorporating comments and suggestions from those that were not able to attend the meeting.

## 1. Country Profile and Situation Analysis

Following the Comprehensive Peace Agreement between North and the South Sudan in January 2005 an Interim National Constitution was agreed upon which allows for a decentralised state with four levels of government: national, Southern Sudan, state and local government. This allowed for a separate Interim Constitution and government of Southern Sudan which covers the area of Greater Upper Nile, Greater Bahr el Ghazal, Greater Equatoria and Blue Nile with a total of 13 states and 53 counties.

### 1.1. Country profile

#### 1.1.1. Geography and Climate

The territory of Southern Sudan is dominated by savannah with only minor mountains. The climate is tropical with temperatures ranging between an average minimum of 20 °C and maximum of 37 °C and relative humidity between 26% and 88%. Annual rainfall ranges between 1,000 mm in the South and 400 mm in the northern parts. Similarly, the duration of the rainy season is longest in the South (7-8 months) and reduces towards the northern part (5-6 months). During the rainy season flooding is common in many areas.

#### 1.1.2. Demography

No exact census data are available for Southern Sudan. WHO has estimated the population in 2003 to be around 8 million, based on data from children under 5 receiving immunizations during National Immunization Days (NID). There are also an estimated 700,000 – 900,000 refugees and internally displaced persons who are expected to return to Southern Sudan in the next years. Population growth rate is estimated to be above the average of sub-Saharan Africa.

#### 1.1.3. Economic and General Development

One of the longest civil wars in modern African history has destroyed most of the infrastructure in the country. It has also inhibited economic activity and market development resulting in very low levels of income and purchasing power. It is estimated that more than 90% of the population lives on less than 1 US\$ per day and the poverty rate is between 40% and 50%<sup>1</sup>.

About 71% of the 650,000 square kilometres of Southern Sudan are suitable for agriculture with another 24% being forest. Accordingly, agriculture is the main source of income for more than 85% of the population.

#### 1.1.4. Health System and Health Status

A first health policy for Southern Sudan was released in 1998 but due to the severe damages and constraints of the civil war the plans could not be realized. Currently a new Interim Health Policy is being formulated which builds on the long tradition of primary health care in the area.

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<sup>1</sup> poverty rate defined as the proportion below 40% of an economic status index based on asset ownership: Joint Assessment Mission, Economic Policy Cluster Report, March 2005

It is estimated that only about 25% of the population currently have access to health services. The majority of these are provided by NGOs and FBOs. There are currently 64 NGOs (31 Operation Life Line Sudan and the remaining are non OLS) running a mix of basic health units that provide mainly curative PHC and /or communicable disease control programmes.

Health activities have been coordinated through several mechanisms. The Health Advisory Body includes representatives from SRRA/SRRC, OLS and non-OLS agencies and meets every three months. Monthly meetings of the Health and Nutrition Consultative Group had been held in Lokichoggio but are now shifted to Juba. UNICEF leads the Emergency Preparedness and Response Team for the coordination of needs assessments and relief interventions.

In addition to a very high burden of the classical communicable diseases (respiratory and gastro-intestinal) there is a high prevalence of tropical and vector-borne diseases such as malaria, sleeping sickness, visceral leishmaniasis (Kala-Azar) and onchocerciasis.

Accordingly, the health status of the population is very poor: all causes infant mortality rate is estimated at 150/1,000 live births, under-five mortality rate 250/1,000 live births and maternal mortality ratio 1,700/100,000 live births. The proportion of children age 1-2 years with measles vaccination is only 25% and 45% of under-fives suffer from chronic malnutrition (stunting)<sup>2</sup>.

## 1.2. Malaria Situation Analysis

### 1.2.1. Epidemiology

Based on the geography and climate the territory of Southern Sudan is suitable for malaria almost throughout with the only exception being a small area in the Southeast bordering Kenya according to the malaria risk mapping<sup>3</sup>. In the majority of the country, malaria endemicity varies between meso-, hyper- and holoendemic. Transmission is perennial with seasonal variations and the peak malaria incidence occurring towards the end of the rainy season. As shown in figure 1, the duration of the peak malaria transmission is longer in the southern parts (7-8 months) than in the northern parts (5-6 months).

The major vectors are *Anopheles gambiae* s.s. and *A. arabiensis* and *A. funestus* but very little is known about their relative distribution. *Plasmodium falciparum* is the dominant parasite with more than 90% of all morbidity except for the border regions with Ethiopia where *Plasmodium vivax* does also cause malaria episodes although the exact proportion of these infections is not yet known. As for the vector, there are very limited data available on the epidemiology and distribution of parasite species. However, a recent malariometric survey conducted which included two of the major

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<sup>2</sup> Joint Assessment Mission, Basic Social Services Cluster Report, March 2005

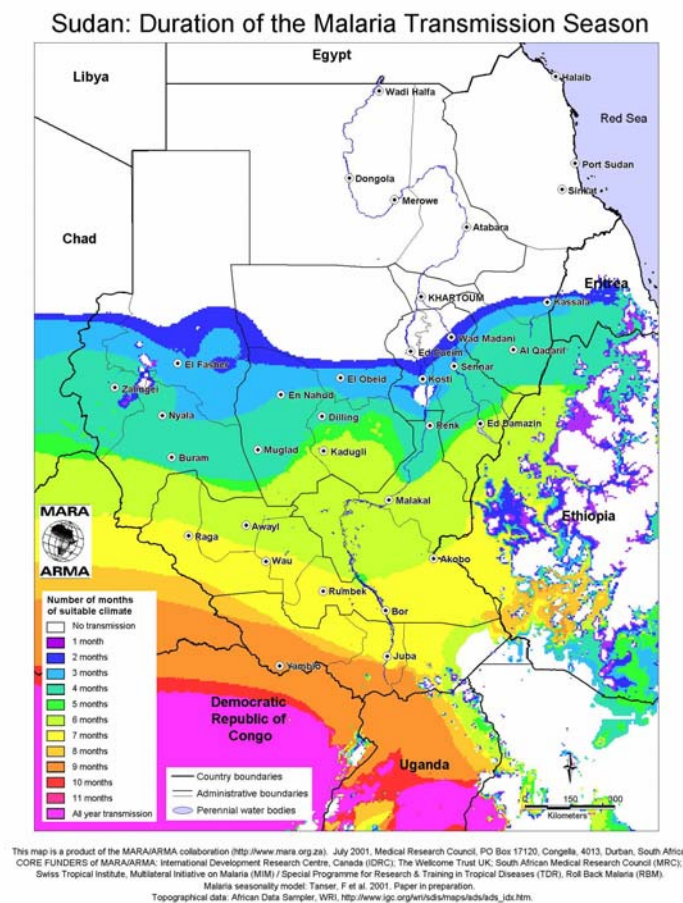
<sup>3</sup> Mapping Malaria Risk in Africa, MARA/ARMA project <http://www.mara.org.za/>

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towns in Southern Sudan (Juba and Wau) indicated that parasite prevalence rate in children under 5 years was in the range of 30-40% in these urban centres<sup>4</sup>.

Malaria epidemics and more localized outbreaks do occur and are caused by environmental and climatic factors (e.g. massive flooding) but also by movement of populations with little immunity into areas of high transmission (Internally Displaced Persons) as well as lack of access to any kind of anti-malaria treatment in some areas. The major difficulty at the moment is, however, that no exact data are available to assess whether reported cases are within or above expected seasonal variation and therefore represent an epidemic or not.

**Figure 1**



### 1.2.2. Prevention

In the late 70's and early 80's, indoor residual spraying and larviciding was implemented by local vector control units to prevent malaria transmission in and around the major towns and municipalities. However, due to the collapse of infrastructure and public services, these interventions stopped in 1983 and are currently not available.

Distribution of insecticide treated nets (ITNs) and – because re-treatment is very difficult to implement or sustain in the post-conflict situation – long-lasting insecticidal

<sup>4</sup> Malaria Prevalence and Indicator Survey Sudan, Federal Ministry of Health, National Malaria Control Programme, December 2005

nets (LLINs) are the main strategy at present, particularly for the rural and remote areas. A detailed strategy paper on ITNs outlining the implementation has been developed in 2004 and has been up-dated in 2005. The major targets for LLINs are pregnant women and children under 5 years of age. Nets are procured through GFATM, UNICEF and the USAID funded Sudan Health Transformation Project and distributed by NGOs for free through health facilities and communities and sold at highly subsidized prices (US\$ 1.0 for a mesh net) through social marketing funded by DFID and implemented by PSI.

The population in Southern Sudan traditionally uses a mosquito net made locally out of cotton sheeting which is called "damuria". Since this net is more durable and provides more privacy when used outside, which is common in the dry season, the damuria is preferred over mesh nets in many areas. This preference is documented in a study undertaken by OXFAM among the nomadic people of the Nuer in Lankien. But sales records from social marketing by PSI as well as practical experience on the ground by NGOs and government institutions strongly suggests that damuria are the first choice for malaria protection in many parts of Southern Sudan. In order to serve this population and ensure use of nets a LLIN version of the "damuria" has been developed by one of the manufacturers and is now being sold at US\$ 1.50 by PSI.

The commercial sector to date is still quite weak. Nonetheless, it exists and is rapidly re-establishing itself in Southern Sudan. Traders bring nets from Uganda and Kenya (ITN as well as untreated nets) and sell them in the shops and markets in the major towns. With the market priming through social marketing this development is expected to continue and accelerate in the near future.

There is limited data available on the current coverage of households with nets or ITN and use by the target groups. A UNICEF multi-cluster survey carried out in three operational areas in 2000 indicated that a maximum of 36% of children under the age of five were sleeping under a mosquito net and less than 5% under an ITN. However, the accuracy of these estimates has been questioned and more detailed information is expected from currently planned surveys such as the Southern Sudan Household Survey and a malaria related KAP study. Better estimates exist on the number of nets distributed by various partners. According to these data the total net output (mesh and damuria) in 2003/04 was about 45,000; in 2005, 253,000 (of which 89,000 were through social marketing) and the expected number in 2006 is approximately 700,000.

### 1.2.3. Case Management

There is increasing resistance of *Plasmodium falciparum* to the cheapest anti-malarial drugs chloroquine and sulfadoxine-pyrimethamine. This is documented from five sentinel areas of the country. *Plasmodium falciparum* resistance to chloroquine was first detected in Kajo-Keji (East Equatoria) and Lankien (Upper Nile) in 2001, with 93% and 28% of treatment failure respectively. In 2002, 72% of chloroquine resistance rate was documented in Lui (Mundri) of West Equatoria. Again in 2003, 83% and 40% of chloroquine resistance rates were detected in Mapel and Akeum (BEG) respectively. *Plasmodium falciparum* resistance to SP was also documented. The resistance rates were lower than those with Chloroquine and are summarized in the table below.

MSF Holland conducted an in vivo efficacy study of two artesunate combination therapies. 161 children between 6 and 59 months were randomized to receive a

three-day supervised course of either artesunate (AS) + SP or AS + AQ, and followed for 28 days. Endpoints were corrected by PCR genotyping to distinguish recrudescence from re-infection. Overall, 112 patients had an analyzable efficacy endpoint at 28 days after PCR adjustment. Efficacy rates were 91.2% in the AS + SP arm and 92.7% in the AS + AQ arm. No treatment failure occurred before Day 14 of the follow-up

**Table 1:** Recently documented levels of SP treatment failures in Southern Sudan

Region	Location	Organization	SP treatment failure (children 14 days)
East Equatoria	Kajo-Keji	MSF-CH	69%
Upper Nile	Lankien	MSF-H	0%
Bahr El Ghazal	Mapel	MSF-B	16%
Bahr El Ghazal	Akeum	MSF-F	15%
Mundri	Lui	WHO/SP <sup>5</sup>	15%

Based on these findings a meeting involving all stakeholders was convened by WHO in April 2004 and it was decided to revise the malaria treatment policy and shift to an artemisinin-based combination therapy (ACT). After careful considerations and with particular attention to the maximum protection for SP as a drug used for IPT it was recommended to introduce Artesunate + Amodiaquine (AS + AQ) in a co-packaged blister pack as the first line malaria treatment with Artemether/Lumefantrin being second line treatment and quinine third line.

Treatment guidelines for the new policy have been developed and training of staff has begun. While the government plans to procure AS+AQ in the near future, the current supplies are either from GFATM or ECHO and then distributed to NGOs or directly procured by the implementing partners (e.g. Goal and MSF). The two major problems facing the roll-out of the new treatment policy are a) the fact that not all NGOs have access to the ACT and, therefore, continue to use mono-therapy with CQ or SP and b) that the major towns which have been under the administration of the North are currently using AS + SP as their first line treatment which could lead to confusion among health workers as well as patients.

Since about three quarters of the population have no access to health services at all a considerable proportion of malaria treatments are accessed through the formal and informal commercial sectors. Since these treatments often are of poor or questionable quality and little if any instructions on dosage and compliance are given, a community-based distribution of anti-malarials to children under 5 years of age (Home-based Management of Malaria, HMM) is currently considered as a possible way to promote prompt treatment. Pilots of HMM are under way to look at the feasibility of this approach in the context of Southern Sudan.

With the introduction of the ACT the need exists to increase the capacity for diagnosis in order to avoid unnecessary treatment. For peripheral health facilities the use of Rapid Diagnostic Tests (RDTs) has been recommended and guidelines as well as training materials have been developed. Due to the epidemiological situation children under 5 continue to be treated based on clinical diagnosis but older patients should be first tested wherever RDTs are available.

<sup>5</sup> SP=Samaritans Purse (NGO)

### 1.2.4. Malaria in Pregnancy

In addition to the adequate treatment of clinical episodes and malaria prevention using LLIN, Intermittent Preventive Treatment (IPT) has been adopted in Southern Sudan as a key strategy to reduce the burden of malaria in pregnancy. Following the most recent WHO guidelines at least 2 doses of SP are recommended for all women and at least 3 doses for those known to be infected with HIV.

NGOs and health workers have been sensitized on this strategy and additional supplies of SP procured but exact data on the coverage level for IPT2 are not yet available.

### 1.2.5. RBM Partnership, Coordination and Management

In 1998 WHO began to support the coordination and management of malaria control within the Southern Sudan Health Secretariat and this can be considered the starting point of the Malaria Control Programme. The major task of the malaria focal person was to coordinate activities with the North as well as all implementing partners on the ground. Although supported by 3 other malaria focal persons in the garrison towns, the capacity of the MCP Southern Sudan clearly is not sufficient, particularly since more resources have become available in the recent past and additional staff within the new Ministry of Health are urgently needed.

In 2003 a Malaria Task Force was formed in order to allow a broad discussion and consensus building mechanism among partners with respect to the new malaria treatment policy. After the peace agreement this group was renamed the Technical Working Group and now deals with preventive as well as case management issues.

### 1.2.6. M&E and research

There are very few data available from the as yet weak health information system. This significantly hampers the planning and monitoring of malaria control activities including the interpretation of and response to reported epidemics. Similarly, insufficient data are available with respect to the epidemiology and mapping of malaria and the health seeking and preventive behaviour of the population.

## **2. Malaria Control Strategy**

### **2.1. Context within Development Framework**

With the signing of the Comprehensive Peace Agreement in January 2005 the stage has been set in Southern Sudan for a comprehensive reconstruction after years of conflict. The Interim National Constitution of Southern Sudan acknowledges the need to promote public health and equal, free access to primary health care. This is specified in more detail in the Southern Sudan Interim Health Policy (Draft December 2005) which mentions malaria as a particular challenge and gives priority to maternal and child health interventions. This is the framework within which malaria control will be implemented.

The purpose of the Malaria Control Strategic Plan 2006-2011 is to provide a common platform and detailed description of interventions for all RBM partners and sectors of society. It encourages all partners to engage themselves in malaria control with a common strategy and objectives, i.e. one plan, one implementation and coordination mechanism and one M&E plan and incorporates already existing policies on treatment and prevention (ITN policy and strategy, Malaria Treatment Policy and guidelines).

### **2.2. Vision**

- Malaria will no longer be the leading health problem in Southern Sudan and the people of Southern Sudan will have access to appropriate and high quality malaria preventive and treatment services under the leadership and coordination of national and state governments in partnership with civil society and the private sector.

### **2.3. Goal**

The goal of the malaria control strategy is

- To reduce malaria related morbidity and mortality in Southern Sudan and minimize the socio-economic impact of the disease

This will directly contribute to the goal of the health sector as formulated in the Interim Health Policy

- To improve the health of the people of Southern Sudan through strengthening the health system at all levels

### **2.4. Overall Approach**

The overall approach is

- To rapidly scale up preventive as well as curative interventions for malaria delivered as a comprehensive, integrated package with focus on the most vulnerable populations

## 2.5. Working Principles

In implementing malaria control the following working principles will be applied

- Build a strong RBM partnership involving all sectors and stakeholders
- Enhance community involvement
- Target particularly the biologically vulnerable (children under 5 and pregnant women), economically disadvantaged (poor) or difficult to reach populations (IDP, nomads etc.), immunologically compromised (HIV/AIDS) and the elderly with free or highly subsidized interventions
- Achieve maximum synergy between malaria control and health system development as well as other programmes
- Apply an evidence based approach to the further development and improvement of malaria control interventions (e.g. operational research)

## 2.6. Strategies and Specific Objectives

### 2.6.1. Prevention

Objective 1:

- Increase the population coverage with effective malaria prevention as part of an integrated vector control strategy that utilizes all approaches including long-lasting insecticidal nets, indoor residual spraying and environmental management when and where most suitable and sustainable.

Core indicator:

- Proportion of children under 5 sleeping under an ITN the previous night increased to at least 60%

Additional indicators

- Proportion of households with at least one ITN increased to at least 70%
- At least 80% of structures in targeted areas sprayed with quality IRS

### *Insecticide Treated Nets*

Since the prospect of establishing a culture of net re-treatment is very poor, the priority will continue to be given to long-lasting insecticidal nets (LLINs) either as mesh or as damuria-LLIN. Damuria need to be tested for efficacy and effectiveness to be classified as public health tool. In addition, efforts will be undertaken during the transition period to re-treat the existing crop of conventionally treated or un-treated nets, preferably with a long-lasting insecticide kit (LLI-K) provided the respective products have received recommendation from WHOPES.

Delivery of free or highly subsidized nets (LLIN) will be flexible using all available channels, mechanisms and partners and will expand beyond the currently involved NGOs to include also local NGO/FBO. It will be adjusted as the situation changes moving from a rapid scale up which concentrates on community distribution and mass campaigns to a continuous replacement of nets during the “keep-up” phase which will use distribution through health facilities, other outlets and the commercial sector. Special efforts will be undertaken to provide the type and colour of nets that best suits the particular preferences and needs of the population based on

behavioural research. Guidelines and training materials will be developed to facilitate and standardise the distribution of nets.

The increasing involvement of the commercial sector and the medium to long term establishment of a viable market for ITN/LLIN that can sustain a culture of net use will be promoted through the creation of an enabling environment (e.g. waiver of taxes and tariffs) including continuing the market priming through social marketing until the commercial market is sufficiently strengthened.

The primary target group for ITN through free distributions will be children under 5 and pregnant women but special attention will also be given to other vulnerable groups such as people returning from areas of low malaria transmission, internally displaced persons, difficult to reach populations such as nomads, people with suppressed immunity (PLWHA) and the elderly.

In order to ensure correct use of the nets determined by utilization, retention and deterioration, distribution efforts will be accompanied by intensive IEC/BCC campaigns in the context of the COMBI strategy (see 2.6.4) and this will be monitored by surveys of the actual behaviour, utilization, retention and deterioration rates.

### *Indoor Residual Spraying*

Building on previous experience in the major towns, the possibilities to introduce and sustain IRS services in these towns as well as in other sites such as mountainous areas will be explored. Emphasis will be on capacity building of the vector control staff in the management of supplies, providing spraying services, maintenance of equipment and quality of services. In each of the areas identified for IRS at least 80% of all structures will be sprayed.

Selection of insecticide will be based on regular monitoring of resistance patterns of local vectors at sentinel sites as well as environmental and management considerations and cost effectiveness. Operations will be supported by intensive efforts in advocacy and IEC in order to ensure a high and continuous level of support by the population in terms of pre and post spray acceptability and compliance..

### *Environmental Management*

The feasibility of environmental management will be carefully examined in close collaboration with other relevant departments and ministries, particularly in connection with other vector-borne diseases. All options including larviciding and biological control will be considered in areas where a large proportion of breeding sites can be identified and covered. In addition, research on alternative vector control options will be carried out.

Special attention will be given to sanitary engineering during the reconstruction process of the major towns in close collaboration with the relevant departments of the towns and municipalities.

### 2.6.2. Case Management

#### Objective 2:

- Provide wide access to appropriate diagnosis and highly efficacious artemisinin-based combination therapy to all affected by malaria using a mix of approaches that include public and private health care providers, a trained and supervised commercial sector and community distribution.

#### Core indicator:

- Proportion of children under five treated within 24 h of fever onset with adequate treatment according to policy, increased to at least 60%

#### Additional indicator

- Proportion of patients with uncomplicated malaria attending health facilities that receive correct diagnosis increased to at least 60%

#### *Uncomplicated Malaria*

The initial priority will be to harmonize the treatment policy for uncomplicated malaria in order to ensure that all health care providers throughout Southern Sudan, i.e. within the major towns and the rural areas use the same ACT drugs and case definitions as outlined in the treatment guidelines. Secondly, access to the ACTs will be expanded to all health facilities including those of local NGOs and FBOs and all staff will be trained in its use and supply management issues. This training will be updated in regular intervals. While availability of ACTs is increased the commercial sector will be strongly encouraged to reduce imports of non-recommended anti-malarial and particularly CQ as ACT availability has increased.

In the context of expanding the current reach and coverage of health services provided by government or contracted out to civil society organizations, access to effective treatment will increase. However, these efforts will need to be complemented by community based distribution mechanisms such as home based management of malaria (HMM). The design of this HMM programme will be based on the experience from the currently ongoing pilots and will as much as possible be integrated into other community based health initiatives such as IECHC and child survival strategy.

With the progress in reconstruction of Southern Sudan increasing availability of quality ACTs through formal and informal private sector channels is expected. This will require training and supervision of the commercial sales staff by the relevant department within the Ministry of Health. Also, the quality of drugs in the private as well as public sectors will be controlled regularly.

Sensitivity of *Plasmodium falciparum* against the currently used drugs as well as potential new anti-malarials will continue in the sentinel sites currently established. Based on the results the treatment policy and guidelines will be reviewed by a technical forum of experts and partners and updated if necessary.

Intensive efforts will be made to promote treatment seeking behaviour and full compliance with treatment as part of the integrated communication efforts and studies will be carried out to monitor success.

### *Severe Malaria*

The capacity to manage severe malaria cases will be strengthened. This will include the early recognition of danger signs (in the context of the IECHC<sup>6</sup> algorithms), improved referral practices at health facilities and effective pre-referral treatment (with the use of artesunate suppository) as well as improvement of the management of severe malaria cases (cerebral malaria and severe malarial anaemia) at health centres and hospitals.

### *Diagnostic Capacity*

Since the cost of providing ACT is significantly higher than for previously used medicines, increased efforts will be made to minimize over-treatment. This will be done by strengthening the laboratory capacity and quality assurance (with the use of microscopy) at health centres and hospitals with the use of microscopy and providing rapid diagnostic tests (RDTs) at lower health care levels. Specific guidelines when and where to use and how to manage RDTs will be disseminated and staff trained with emphasis of ensuring that adequate action is taken based on test results. Quality of the RDT used will be monitored.

### 2.6.3. Malaria in Pregnancy

#### Objective 3:

- Deliver a package consisting of ITN, IPT and effective treatment to pregnant women through comprehensive and focused ante-natal care services involving all levels of health care including the communities.

#### Core indicator:

- Proportion of pregnant women attending ANC services receiving at least 2 doses of IPT increased to 60%

#### Additional indicator

- Proportion of pregnant women who slept under an ITN the previous night increased to at least 60%

Services provided for pregnant women with respect to malaria treatment and prevention, i.e. ITNs, IPT and case management, will be integrated into and coordinated by the reproductive health programme with the target of expanding the geographical access and achieving at least 4 ANC visits for each pregnant woman. This will allow the delivery of at least 2 doses of IPT to every woman attending ANC services and at least 3 doses to women infected with HIV. The distribution of a free LLIN in connection with ANC visits will enhance the uptake of these services.

In addition to delivery of IPT and ITNs through health facilities community outreach activities will be undertaken using the Traditional Birth Attendants (TBAs) as outlets. The medicine used for IPT will continue to be SP but the international development with respect to alternative preventive treatments during pregnancy will be monitored closely and changes considered should an alternative and more effective drug or drug combinations become available.

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<sup>6</sup> Integrated Essential Child Health Care is the Southern Sudanese term for IMCI

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### 2.6.4. IEC, Social Mobilization and Advocacy

#### Objective 4:

- Mobilize all sectors of society to promote malaria control and increase adoption of positive behaviour, based on a comprehensive malaria communication strategy that includes all available media and communication channels

Core indicators for this objective will be those of objectives 1-3 as they strongly depend on an effective communication effort.

Behavioural change communication, social mobilization and advocacy are cross-cutting interventions which are essential for prevention, e.g. correct use of ITNs, as well as treatment related strategies of malaria control such as early treatment seeking and compliance. The first step, therefore, will be the development of a comprehensive communication strategy and its implementation plan. This strategy will utilize all available communication channels such as printed materials, radio and inter-personal communication and will be based on the “Communications for Behavioural Impact” (COMBI) approach which involves the following five elements:

- Public relations / advocacy / administrative mobilization  
(e.g. news coverage, talk shows, launch events, Africa Malaria Day, use of goodwill ambassadors or celebrity spokespersons)
- Community mobilization  
(e.g. community group meetings, traditional song and dance, community drama, mobile video)
- Advertising  
(e.g. radio, billboards, posters, stickers, shirts, key chains, hats/caps, bags)
- Personal selling / interpersonal communication / counselling  
(e.g. home visits, counselling at service points)
- Point-of-service promotion  
(promotion of the place where the health service or health product is available)

The implementation of the communication strategy will involve all partners and materials and resources will be shared as widely as possible. Operational research will be carried out to better understand behavioural patterns of all relevant population groups and help to continuously improve and fine-tune the strategy particularly taking into account the post-conflict situation of Southern Sudan. Necessary staff will be identified and trained and a COMBI network established within the overall coordination mechanisms which will link up with other, regional COMBI networks.

### 2.6.5. Epidemics and Outbreaks

#### Objective 5:

- Detect early and respond rapidly to malaria outbreaks and epidemics as part of an effective disease surveillance programme

#### Core indicator:

- Ministry of Health and partners will respond to at least 80% of reported suspected malaria outbreaks and epidemics within 3 working days with an initial investigation and action plan

The first priority in this area will be the establishment of a surveillance system and database that will allow the classification of reported fever epidemics as malaria or non-malaria. This will require records over several years and training of staff at health facility, state and national levels in the use and interpretation of these data.

Each reported outbreak will be investigated without delay and a plan for immediate action developed. Emergency stocks of drugs and insecticides will be kept in epidemic prone areas and staff trained in epidemic preparedness. In addition, a mapping exercise of returning populations will be undertaken with emphasis on those coming from areas of low malaria endemicity in order to identify particularly at risk populations with low immunity where increases of malaria incidence can be expected. Special efforts will be made to provide protection (e.g. LLIN) to these groups.

In order to better understand the triggering factors and the dynamic of malaria epidemics, operational research will be carried out that will enable the Malaria Control Programme to improve the control of outbreaks and epidemics in the future.

### 2.6.6. Management and Coordination

#### Objective 6:

- Strengthen the Malaria Control Programme within the Ministry of Health of the Government of Southern Sudan that is able to take the lead in integrated efforts aimed at the control of malaria involving all sections of society

#### Core indicator:

- By 2007 the Malaria Control Unit (or Department) is fully functional with at least 3 technical staff and sufficient infrastructure and by 2009 all state malaria focal persons are in place and trained

#### Additional indicator

- Each year the Malaria Control Programme organizes at least 2 coordination meetings with all partners and disseminates minutes and action points in a timely manner

As the Ministry of Health of Southern Sudan increases its capacity and human resources, the Malaria Control Programme will be expanded beyond the current Malaria Focal Person. With sufficient staff and resources in place the MCP will increasingly take the lead in strengthening malaria control efforts and coordinating all activities implemented by the various partners. This will include advocacy for malaria within the Ministry of Health and the Government of Southern Sudan to ensure malaria control is fully integrated into the overall development plans, collaboration and coordination with the National Malaria Control Programme of Sudan in Khartoum, where necessary and regional networking in organizations such as the Eastern Africa Roll Back Malaria Network (EARN).

Supported by other members of the RBM partnership such as WHO, the MCP will provide guidance, technical support and supervision to ensure that agreed upon strategies and guidelines are followed. The Technical Working Group involving all partners will develop or update malaria related policies, strategies and guidelines as

need arises. Detailed annual work plans will be developed and progress monitored during regular, at least quarterly coordination meetings.

Establishment of malaria focal persons at state as well as county levels will be a crucial step in order to ensure implementation and coordination at all levels. These malaria focal persons will not only be supported through training but also be availed of operational and logistic support.

### 2.6.7. Health System Strengthening

Objective 7:

- Support the strengthening and expanding of the health system through staff training, supervision, effective management, efficient planning and coordination at all levels

Core indicator:

- Proportion of health staff that know the prevention and case management of malaria according to national guidelines increased to 90%

Additional indicator

- Proportion of the population covered by health facilities offering the malaria element of the basic services package increased to 40%

Without significant improvements in the health service delivery and particularly increasing access to health care by populations currently not reached and improving the quality of these services, effective malaria control will not be possible.

The basis for the health system development in Southern Sudan is the Health Sector Recovery Strategy, the Southern Sudan Interim Health Policy and the recently developed Basic Health Services Package. These documents describe in full detail the needs and approaches to be taken in order to increase quality as well as geographical coverage of the health services provided at the various levels of health care, County Hospitals, Primary Health Care Centre, Primary Health Care Unit and community based activities (Home Health Promoters and TBAs) .

Malaria related activities will support the health system development by contributing in an integrated fashion to capacity building (curricula, guidelines and training), service improvement, planning, supply management and supervision at all levels (State, County).

In addition it is hoped that strengthening of laboratory capacity through microscopy or RDTs as well as distribution of free LLIN through ANC and child care services will increase the attractiveness of services and thereby increase user rates and client satisfaction.

### 2.6.8. M&E and Research

#### Objective 8:

- Establish a sound and continuously updated database that monitors progress towards agreed targets and is used to effectively manage and adjust interventions based on evidence

#### Core indicator:

- At least annual analysis and publication of data and trends from surveillance and survey/ study results

#### Additional indicator

- Proportion of health facilities that reported on malaria cases the previous month to central level increased to at least 70%

Surveys will be carried out to better define the baseline situation with respect to the distribution and epidemiology of malaria, coverage of interventions and better understand existing beliefs, practices and behaviours. This will also enable the programme to better target planned interventions.

It is expected that data from routine monitoring measured through an increasingly effective and timely health management and information system (HMIS) and various sentinel sites will become available allowing better monitoring of the number of treated malaria cases, admissions, deaths and IPT treatments etc. This will be complemented by input-output data (number of ITNs procured and distributed etc) from all RBM partners to give a better picture of progress in the implementation of the annual work plans.

Continuous monitoring of behavioural aspects of malaria control, sensitivity of parasites against various anti-malarial drugs and of vectors against insecticides as well as other operational research will be carried out and results used to update and adjust policies, strategies and implementation guidelines.

In addition to the indicators presented in this strategic plan (see also the table format in the Annex), detailed input, output and process indicators will be developed as part of the implementation plan.

The evaluation of the Malaria Control Programme will be done as part of the overall evaluations of the performance of the health sector as suggested in the Southern Sudan Interim Health Policy.

### 2.7. Targets

Malaria control will contribute to the achievement of the following targets of the Southern Sudan Interim Health Policy 2006-2011 (Draft December 2005):

- Under-5 mortality rate reduced from 250 to 140/1,000 live births
- Maternal mortality ratio reduced from 1,700 to 850/100,000 live births
- Under-5 chronic malnutrition (stunting) reduced from 45% to 30%

The major, specific targets for malaria control to be achieved by 2011 are as follows:

- Proportion of households with at least one ITN increased to 70%
- Where appropriate 80% of structures protected through IRS
- Proportion of children under five and pregnant women sleeping under an ITN increased to 60%
- Proportion of children under 5 with fever treated within 24 hours with an effective and adequate malaria treatment increased to 60%
- Proportion of pregnant women attending ANC services who receive at least 2 doses of IPT increased to 60%

### **3. Implementation Arrangements**

#### **3.1. Management and Coordination**

In order to manage the implementation of the malaria control programme, a three year rolling implementation plan will be developed and updated each year.

The coordination of malaria related activities and their integration with the overall health activities will be the primary responsibility of the Malaria Control Programme. At national level there will be two mechanisms of coordination:

1. A Malaria Technical Working Group – building on the previous Malaria Task Force – that will meet at least quarterly and comprise of the technical staff of the Malaria Control Programme and any interested partner. This forum will discuss issues regarding policy and implementation guidelines of all aspects of malaria control, review emerging new evidence and make recommendations to the overall RBM coordination forum and the Ministry of Health.
2. A RBM Coordination Committee that meets at least twice a year and brings together all partners from government ministries, civil society and the private sector. This forum will be chaired by the MoH and discuss progress in malaria control and will take decisions on major issues based on the recommendation of the TWG. Results will be reported to the Health and Nutrition Consultative Group where the Malaria Control Programme will also be represented.

As the Ministry of Health of the Government of Southern Sudan is just forming itself, there may be further changes in the overall coordination mechanisms or government policies. The coordination of malaria activities will be adjusted accordingly.

At state and county levels the coordination will be managed by the malaria focal person and will be as much as possible integrated into the overall health coordination.

#### **3.2. Partners and their Roles and Responsibilities**

The following sections give an overview over the key roles and responsibilities of the various partners in the context of this strategic plan.

##### **3.2.1. Government**

The major role of government is to

- Provide enabling environment to all stakeholders

Within the government the Ministry of Health and the Malaria Control Programme will play the key role in implementing malaria control with the following responsibilities

- MoH and MCP
  - Provide leadership
  - Devise policies and guidelines
  - Provide health services

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- Supervise and coordinate
- Mobilize resources
- Monitoring & Evaluation
- Respond to emergencies
- Direct and review research
- Provide commodities and supplies
- Regulate pharmaceuticals
- Guide private health care providers
- Quality control and assurance
- Human Resource Development

Since there are many cross-cutting issues, other ministries and departments of government also need to be involved

- Education
  - Include malaria in curriculum
  - provide school health (ITN, treatment)
- Agriculture
  - Regulate the use of pesticides
- Ministry of Irrigation and Water Resources
  - Ensure appropriate management of irrigation systems
- Ministries of Roads and Ministry of Housing
  - Sanitary engineering
  - Improving access to health facilities
- Ministry of Information
  - Dissemination of malaria related information

### 3.2.2. Civil Society

Civil society organizations comprise international and national NGOs, community- and faith-based organizations (CBO and FBO). They provide curative and preventive health services through hospitals and health facilities or work directly with the communities. Their responsibility is to

- Follow government guidance
- Advocacy and mobilization
- Sensitization
- Provide health services

### 3.2.3. Private Sector

The private sector can be divided into two groups; the first comprising the for-profit health care providers and the second the manufacturers and distributors of health related products. Their responsibilities are to

- Supply appropriate, affordable and high quality health products and services
- Follow government guidance
- Contribute to positive behaviour change by advertising
- Social responsibility

### 3.2.4. International Partners

Multi-lateral UN-organizations such as WHO, UNICEF etc. and international finance institutions (e.g. World Bank, GFATM) together with organizations of bi-lateral cooperation (e.g. USAID, DFID) form the group of development partners. Their responsibility is to

- Provide funds
- Provide technical assistance
- Build capacity

### 3.2.5. Communities

Communities, their leaders (political and religious) and health workers (e.g. HHB, TBA) are a crucial partner in the implementation of the malaria strategic plan. Their responsibility is to

- Advocate and mobilize
- Actively participate in and contribute to malaria control activities
- Seek treatment early and adhere to treatment guidelines
- Use nets correctly
- Manage local environment

### 3.2.6. Academia

Currently academia in country is still weak but collaborations do exist and it is expected that the capacity to undertake operational research will increase. The responsibility of the academia is to

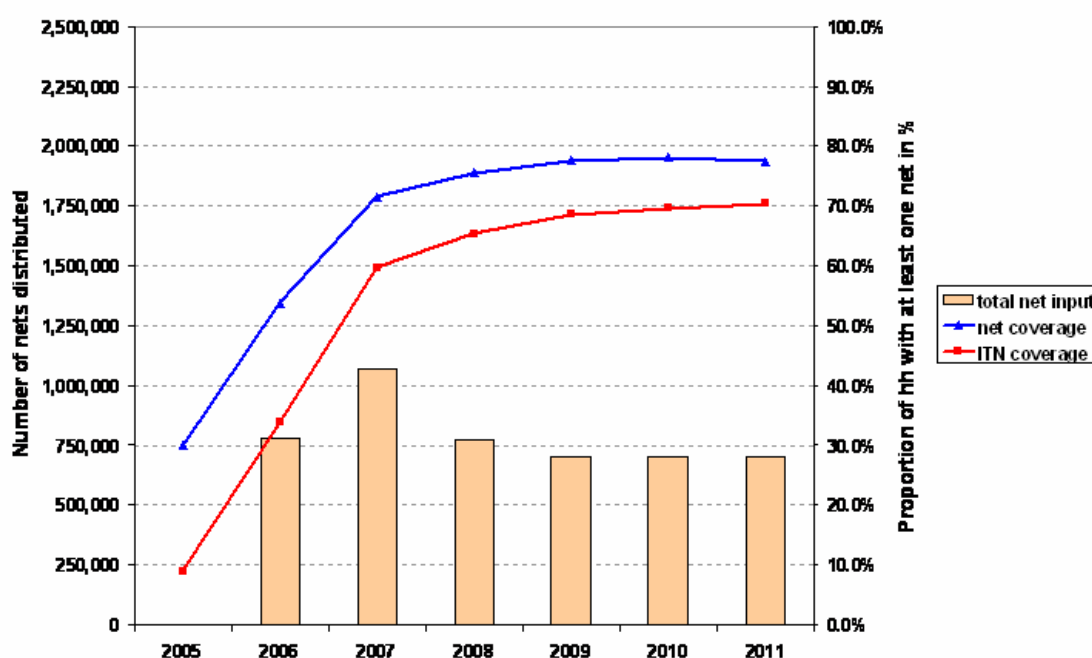
- Undertake research
- Interpret and disseminate research results
- Provide technical support
- Provide and control training
- Ensure that malaria is part of curriculum

### 3.3. Resources and Gaps

The exact estimation of the inputs needed to implement the five year strategic plan is difficult since some of the necessary information is not available such as exact census data. However, a rough estimation has been attempted using assumptions that are outlined in detail in the Annex.

Based on these projections a total of 4 million ITNs would be needed over the time period to reach and sustain a level of at least 70% of households having at least one ITN (see Figure 2). Of these nets 1.2 million would be “damuria” and the rest mesh nets. In addition approximately 200,000 net treatments for conventionally or untreated nets would have to be provided per year.

**Figure 2:** Projected net input and resulting estimated household coverage for ITN



For Indoor residual spraying an increasing number of houses would be sprayed at least once a year starting with 50,000 and reaching 150,000 in the third year.

In the area of case management the number of treatments needed for ACTs, quinine for severe malaria cases and SP for IPT have been estimated assuming an increasing coverage of the population with health services reaching 40% in 2008. On the other hand a decline in the number of malaria episodes per person per year is expected based on the increasing use of ACTs as well as prevention efforts. The expected numbers of treatments as well as the demand for RDTs are presented in table 2 below.

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**Table 2:** Estimated inputs needed to achieve the set targets

Inputs	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ACT treatments	2,980,000	3,500,000	3,310,000	2,770,000	2,640,000	15,200,000
under 5	1,190,000	1,400,000	1,320,000	1,110,000	1,060,000	6,080,000
5 and older	1,790,000	2,100,000	1,990,000	1,660,000	1,580,000	9,120,000
Quinine treatments	210,000	250,000	230,000	190,000	180,000	1,060,000
under 5	147,000	175,000	161,000	133,000	126,000	742,000
5 and older	63,000	75,000	69,000	57,000	54,000	318,000
IPT doses	310,000	420,000	550,000	620,000	640,000	2,540,000
RDTs	1,180,000	1,540,000	1,550,000	1,390,000	1,320,000	6,980,000

Based on these input estimations of the cost for the core interventions (including distribution cost) as well as for key elements of the strategy such as M&E, communication, supervision and training have been calculated (Table 3). Comparing these resource needs with the currently available or expected resources then gives the anticipated gap presented in table 4.

**Table 3:** Estimation of annual cost for the key interventions

Interventions	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ITN	10,060,000	10,130,000	8,120,000	7,750,000	7,750,000	43,810,000
IRS	260,000	740,000	1,180,000	1,370,000	1,330,000	4,880,000
Drugs	3,370,000	4,650,000	5,480,000	5,190,000	4,360,000	23,050,000
RDT	820,000	1,410,000	1,850,000	1,850,000	1,660,000	7,590,000
<b>Subtotal</b>	<b>14,510,000</b>	<b>16,930,000</b>	<b>16,630,000</b>	<b>16,160,000</b>	<b>15,100,000</b>	<b>79,330,000</b>
Communication 10%	1,450,000	1,690,000	1,660,000	1,620,000	1,510,000	7,930,000
M&E 5%	730,000	850,000	830,000	810,000	750,000	3,970,000
Supervision, training etc 15%	2,180,000	2,540,000	2,500,000	2,420,000	2,260,000	11,900,000
Infrastructure 2%	290,200	338,600				
Training and capacity strengthening MCP ,05%	72,550	84,650	83,150	80,800	75,500	
<b>Direct costs</b>	<b>19,232,750</b>	<b>22,433,250</b>	<b>21,703,150</b>	<b>21,090,800</b>	<b>19,695,500</b>	<b>103,130,000</b>
Ops costs +HR 40%	7,693,100	8,973,300	8,681,260	8,436,320	7,878,200	41,252,000
Planning and Admin 12%	3231102	3768786	3646129.2	3543254.4	3308844	17325840
<b>GRAND TOTAL</b>	<b>30,156,952</b>	<b>35,175,336</b>	<b>34,030,539</b>	<b>33,070,374</b>	<b>30,882,544</b>	<b>161,707,840</b>

**4. Annexes**

## 4.1. Logical Framework

	Indicators	Means of verification	Assumptions
<b>Goal</b>			
To reduce malaria related morbidity and mortality in Southern Sudan and minimize the socio-economic impact of the disease	Under-5 mortality rate reduced from 250 to 140/1,000 live births	Demographic and Health Survey	A peaceful environment continues and other health programmes are successfully implemented
<b>Overall Approach</b>			
To rapidly go to scale with preventive as well as curative interventions for malaria delivered as a comprehensive, integrated package with focus on the most vulnerable populations	Proportion of households with at least one ITN or protection through IRS increased to 70%	Household surveys	International market can supply the necessary commodities
<b>Objective 1</b>			
Increase the population coverage with effective malaria prevention as part of an integrated vector control strategy that utilizes all approaches including long-lasting insecticidal nets, indoor residual spraying and environmental management when and where most suitable and sustainable.	Proportion of children under 5 sleeping under an ITN the previous night increased to at least 60%	Household surveys	
<b>Objective 2</b>			
Provide wide access to appropriate diagnosis and highly efficacious artemisinin-based combination therapy to all affected by malaria using a mix of approaches that include public and private health care providers, a trained and supervised commercial sector and community distribution	Proportion of children under five with fever treated within 24 h with adequate treatment increased to at least 60%	Household surveys	
<b>Objective 3</b>			
Deliver a package consisting of ITN, IPT and effective treatment to pregnant women through comprehensive and focused ante-natal care services involving all levels of health care including the communities	Proportion of pregnant women attending ANC services receiving at least 2 doses of IPT increased to 60%	HMIS recods	

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	<b>Indicators</b>	<b>Means of verification</b>	<b>Assumptions</b>
<b>Objective 4</b>			
Mobilize all sectors of society to promote malaria control and increase adoption of positive behaviour, based on a comprehensive malaria communication strategy that includes all available media and communication channels	See objectives 1-3		
<b>Objective 5</b>			
Detect early and respond rapidly to malaria outbreaks and epidemics as part of an effective disease surveillance programme	Ministry of Health and partners will respond to at least 80% of reported suspected malaria outbreaks and epidemics within 3 working days with an initial investigation and action plan	Records of reported epidemics	
<b>Objective 6</b>			
Strengthen the Malaria Control Programme within the Ministry of Health of the Government of Southern Sudan that is able to take the lead in integrated efforts aimed at the control of malaria involving all sections of society	By 2007 the Malaria Control Unit (or Department) is fully functional with at least 3 technical staff and sufficient infrastructure and by 2009 all state malaria focal persons are in place and trained	Evaluation report	
<b>Objective 7</b>			
Support the strengthening and expanding of the health system through staff training, supervision, effective management, efficient planning and coordination at all levels	Proportion of health staff that know the prevention and case management of malaria according to national guidelines increased to 90%	Health facility based survey	
<b>Objective 8</b>			
Establish a sound and continuously updated database that monitors progress towards agreed targets and is used to effectively manage and adjust interventions based on evidence	Establish a sound and continuously updated data base that monitors progress towards agreed targets and is used to effectively manage and adjust interventions based on evidence	MCP records	

## 4.2. Variables and values used for need estimation and cost

### *Population*

Population in 2003: 7,997,432 (UNICEF)  
Annual growth rate: 3.0%  
Average # of persons per household: 6  
Proportion of under 5s among total population: 20%  
Proportion of population pregnant each year: 4.5%  
Influx of returnees 2006/07: 900,000

### *ITN*

Proportion of households with at least one net in 2006: 30%  
Proportion of all nets being ITN in 2006: 30%  
Proportion being LLIN: 20%  
Average number of nets per net owning household: 1.75 in 2006 increase to 2.4  
Average loss rate of net crop per year: 15%  
Proportion of new ITN being damuria: 30%  
Landed cost of mesh LLIN: US\$ 7.50  
Landed cost of damuria LLIN: US\$ 12.0  
Cost of net distribution per net: US\$ 2.0

### *IRS*

Average surface of houses: 150 m<sup>2</sup>  
Average number of sprayed houses per household: 1.2  
Surface covered per unit of insecticide: 200 m<sup>2</sup>  
Landed cost per unit insecticide: US\$ 7.50  
Management cost per house: US\$ 3.50  
Initial equipment cost per house: US\$ 1.70  
Equipment maintenance cost per house (after 2 years): US\$ 0.40

### *Treatment*

Proportion of population with access to health services: 25%, increasing to 40%  
Proportion of cases being under 5: 40%  
Average number of malaria episodes per person per year: 1.0 decline to 0.6  
Proportion of cases being severe: 7.0%  
Proportion of severe cases being under 5: 70%  
Cost of ACT treatment for under 5: US\$ 1.00 (including distribution)  
Cost of ACT treatment 5+: US\$ 1.80 (including distribution)  
Average cost of quinine treatment: US\$ 1.06

### *IPT*

Proportion of pregnant women reached: 25% increasing to 65%  
Proportion of ANC attendees receiving IPT2: 60% increasing to 80%  
Proportion of ANC attendees receiving IPT3: 10%  
Cost per SP dose: US\$ 0.03

### *RDT*

Proportion of cases in health facilities tested u5: 10% increasing to 20%  
Proportion of cases in health facilities tested 5+: 40% increasing to 70%  
Cost per RDT: US\$ 1.20 (including distribution)