TERMS OF REFERENCE (TOR)

Develop and Build the MIS System using Arc-GIS Software in order to generate estimated Malaria Incidence from geo-located village level data

Background

The National Center for Parasitology, Entomology and Malaria Control (CNM), has been implementing a strengthened and comprehensive malaria program since 2004 through a series of grants received from the Global Fund for HIV/AIDS, TB, and Malaria (GFATM). The UNOPS as the Principal Recipient for the Regional Artemisinin Initiative 2 Elimination (RAI2E) Grant received funding from the Global Fund to collaborate closely with CNM in the malaria fight. CNM is designated as the Principal Implementing Partner (PIP) for the program of Regional Artemisinin Initiative 2 Elimination in Cambodia. CNM in collaboration with UNOPS and other partners, endeavours to ensure more effective decentralized malaria control operations at provincial and operational district levels and bring down the malaria related morbidity and mortality in the country.

Objective and Justification:

Develop and build the MIS system using ArcGIS software to generate the estimated malaria incident figure from Geo-located village level data. This will be automatically generated in the MIS system for risk stratification this year.

Using ArcGIS, the data will be used for mapping and use of entries of the populated data to generate a modelled continuous surface of malaria risk. This surface will be modified using available environmental covariates including climate data and forest cover, where available, to generate a final estimate for malaria incidence (API/1000 pop/year) by species.

The estimated malaria incidence for each village will then be generated as the value of the incident surface at each location. In this way, estimates for malaria incidence at all villages, including locations with missing or incomplete data, will be produced. This extracted API value will then be ranked and classified to produce village level malaria risk stratification by species.

Using ArcGIS software, the procedure for generation of estimated malaria incidence figures each year from Geo-located village level data will be automated, so staff at CNM can generate new risk stratification each year.

Scope of Work

The selected consultant will develop and build a working integrated MIS system based on ArcGIS software; that can generate the estimated malaria incidence figure from village level data. They will work closely with CNM Technical Bureau and Data Management team to execute the specific tasks described below.

Specific Tasks

1. Develop a spatial database that can be integrated with the existing non-spatial database of CNM

   The consultant shall evaluate the current non-spatial database system of CNM and propose a spatial database solution that can be integrated with the current non-spatial database.

   The new spatial database should have the following specifications:

   i. It should store spatial data layers including:
      - Administrative data sets for villages, communes, districts, provinces
      - Health center and operational districts (OD)
      - Malaria cases
      - Forest covers
      - Distribution of bed nets
      - Rainfall
      - Other datasets if needed (Bidder should indicate the maximum number of data sets possible)

   ii. Create historic and up-to-date spatial data layers listed above

2. Develop a reporting tool that can retrieve data from spatial and non-spatial databases and create the following maps:
    i. Generate malaria incidence by specific location (whole country, province, operational district and commune)
    ii. Generate bed net coverage map in Cambodia
    iii. Generate village malaria worker (VMW) coverage in Cambodia

3. Develop a spatial modelling tool that can predict the malaria incidents in the areas without malaria report
    i. Conduct desk review to find the appropriate factors that can predict malaria incidents
    ii. Collect and create historic and up-to-date data needed to predict malaria incidents
    iii. Develop a spatial modelling tool that can automatically generate predicted malaria incidents
    iv. Generate malaria risk map in Cambodia based on reported malaria incidence and estimated malaria incidence every year

4. Prepare user manual and training materials on how to use the developed database and tools
    i. Identify the potential trainees
    ii. Conduct capacity assessment of those trainees
    iii. Develop training materials based on the capacity of the trainees
    iv. Provide 1-day training on how to use the developed database and tools

5. The successful contractor shall procure all the required data software licenses as well as the hardware needed to achieve this integrated Malaria Information System (MIS).

6. Conduct other relevant assignments as instructed by the National Malaria Program CNM

Expected outputs

The consultant shall;

- Set up Geodatabase in malaria information system (MIS),
- Share the User manual on how to use the systems developed,
- Train the CNM staff to manage the systems and
- Also share the implementation schedule against the deliverables as elaborated under ‘Specific Tasks’ above.

Table of Deliverables, Schedules and Payment plan

No	Tasks	Deliverables	Estimated timing	Payment Schedule
2	Data Develop a spatial database that can be integrated with the existing non-spatial database of CNM	The spatial database is up and running	20 days	**15% upon acceptable completion**
3	Develop a reporting tool that can retrieve data from spatial and non-spatial databases and create the maps requested under "Specific Tasks"	The reporting tools for producing malaria maps for reports are developed and are fully functional	40 days	**20% upon acceptable completion**
4	Develop a spatial modelling tool that can predict the malaria incidents in the areas without a malaria report	A fully functioning spatial modelling tool is in place to predict malaria incidence in areas without a report.	40 days	**20% upon acceptable completion**
5	Prepare a user manual and training materials on how to use the developed database and tools	User manual and training material are created and CNM staff are trained	10 days	**5% upon acceptable completion**
6	Procure all the required data software licenses as well as the hardware needed to achieve this integrated Malaria Information System (MIS).	All Software licenses as well as Hardware have been procured and delivered	5 days	**5% upon acceptable completion**
7	Any other tasks in relation to the MIS	All other assigned tasks in relation to the software have been completed and the system is fully operational	5 days	**35% upon acceptable completion**
		Total Duration	**120 days**	**100%**

Note; Payment shall only be made after submission of a report (to be approved by the National Malaria Program) for each of the milestones

Qualifications:

- The consultant should have the following minimum qualification:
  - Master 's or above degree in in GIS, Geography, or other related field
  - At least 10 years' professional experience in designing spatial databases and conducting spatial analysis and modelling with ESRI ArcGIS technology
  - Experience in preparing GIS-related training materials and conducting GIS trainings
  - Ability to lead a team of professionals

- At least 5 years' professional experience in writing programming codes with Net, PHP, JavaScript or similar for database and GUI applications
- Experience in working with databases and designing GUI
- Strong database development skills using MySQL and Ms SQL server
- Familiarity with the health system in Cambodia is desired
- Experience in Malaria or public health is desired

Reporting:

The contractor shall be expected to submit activity reports in line with the set deliverables and these reports shall be submitted for review and acceptance by the National Malaria Program before any payment is made.

Schedule of Payments

Payment will be done in several instalments as communicated in the table above.

Period

The work is to be concluded within 120 working days from the date of signing the contract.
The contractor shall share their proposed implementation schedule in line with the set deliverables