# The Boma Health Initiative

## A five-year costing summary

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Ministry of Health
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## Background

South Sudan has continued to suffer some of the worst health indicators globally with an under-five mortality rate of 96 deaths per 1,000 live births and with 75% of child deaths due to the preventable diseases of diarrhea, malaria, and pneumonia. In addition, the maternal mortality rate is 789 per 100,000 live births[1] with less than 8% of deliveries attended by skilled birth attendants [2]. This is mostly due to limited access to health services with 83% of the population living in the rural areas and 56% of the population living further than one-hour walking distance from a health facility[3].




To address some of these challenges, the Republic of South Sudan launched the Boma Health Initiative (BHI) in March 2017 as a nationwide strategy to improve access to essential health services. The BHI is also designed to standardize the package of community health services, strengthen linkages between communities and primary health facilities, and improve community ownership and governance of health services. It is intended to replace and harmonize the delivery of fragmented community health services which are currently supported by non-governmental organizations (NGOs) with funding from different donors.

The overall goal of the BHI is to reduce preventable ill health and deaths by increasing the utilization of key services and to create a community health system that is accessible, equitable and sustainable. Trained community health workers (CHWs) will be responsible for delivering a standard, integrated package of promotional, preventive, and selected curative health services at the Boma level (the basic unit of local government). These services will focus on child health, the control of communicable and non-communicable diseases, and safe motherhood including new-born care. In addition, CHWs will be trained on disease surveillance and the reporting of service delivery data and vital statistics.

To help ensure its success, it was necessary to identify the future costs, required financing, expected health impact, and potential bottlenecks of the BHI. Therefore, in 2018, the Ministry of Health (MOH), with funding from the Government of Canada and technical support from UNICEF South Sudan and Management Sciences for Health (MSH), developed a cost and investment case analysis to provide evidence for advocacy and planning.

[1] United Nations Children's Fund (2018) Levels and Trends in Child Mortality. Estimates developed by the UN Inter-Agency Group for Child Mortality Estimation
[2] Ministry of Health, HMIS data, 2016
[3] Ministry of Health, National Health Sector Strategic Plan 2016-2021, Draft May

## Services package

The BHI package contains a total of 19 services with each service representing an encounter of a CHW with an individual care-seeker or an encounter with a group, such as for health promotion (Table 1). It includes the diagnosis and treatment of malaria, pneumonia, and diarrhea in children under-five. The other services include male condom distribution, child nutrition assessment, various health promotion activities, surveillance and registration, and reporting. According to the MOH, a more comprehensive package of services will eventually be introduced through the BHI and will comprise additional preventive, promotional, and counselling services as well as the detection and referral of more types of health conditions to primary health facilities.

*Table 1. BHI Package of Services*

| Focal Area | The BHI Package of Service |
|---|---|
| Health Education & Counselling | • Health education and counseling promoting immunization, nutrition, hygiene prevention, safe motherhood, family planning and the prevention and treatment of illnesses (e.g. malaria, pneumonia, diarrhea, TB and HIV)<br>• Community engagement and mobilization for health seeking behavior<br>• Identification of community-based means of transport for referrals |
| Child Health | • Integrated Community Case Management of Malaria, Pneumonia and Diarrhea |
| Immunization | • Community mobilization for immunization<br>• Defaulter tracing of immunization, counselling and referral<br>• Community mobilization support during supplementary immunization activities |
| Nutrition | • Screening for malnutrition among Children and Pregnant and Lactating women<br>• Referral for moderate and severe malnutrition. |
| Maternal/ Newborn Health | • Identification, counselling and referral for family planning, ANC, safe deliveries, emergency obstetric care, post-natal care<br>• Counselling Mothers who have delivered at home on essential care of the newborn<br>• Kangaroo mother care for LBW/preterm<br>• Training Mothers on clean cord care<br>• Prompt referral for babies delivered at home to the nearest health facility.<br>• Postnatal monitoring and follow up<br>• Maternal and neonatal death reporting |
| Communicable Diseases | • Community based Integrated Disease Surveillance and Response |
| First Aid | • Awareness creation on common hazards and accidents<br>• Basic interventions at site of accidents and referral |
| Gender Based Violence | • Identification, basic psychosocial support provision and prompt referral |
| Community HIS | • Vital statistics: registration of births, deaths at community level<br>• Data collection and reporting of services and activities using the appropriate tools |

## Coverage projections

Using the UNICEF/MSH Community Health Planning and Costing Tool, several different scenarios were developed with different utilization and coverage targets. In relation to geographic coverage, the CHWs would serve the 56% of the population living more than five kilometers from a functional health facility.




After discussion, the MOH decided to focus on four scenarios reflecting different levels of geographical coverage (numbers of Bomas and their populations covered by CHWs). Under each scenario the annual service utilization rate was set at 70% for individual curative and preventive services and 100% for campaigns, outreach and group promotion services.

The geographical coverage, numbers of CHWs and numbers of services under each scenario for the first year are shown in Table 2. Under the 50% scenario, for example, 1,068 Bomas would be covered in 258 Payams in 40 Counties in 17 States. In those 1,068 Bomas 3,4 million people would be covered by 14,378 CHWs and would receive 9.6 million services. That translates to approximately 13 CHWs per Boma, and average of 2.8 services per beneficiary, and 672 services per CHW.

*Table 2. Geographical coverage scenarios – Year 1*

| | **100% geographic coverage** | **80% geographic coverage** | **50% geographic coverage** | **30% geographic coverage** |
|---|---|---|---|---|
| Regions | 3 | 3 | 3 | 3 |
| States | 33 | 26 (of 33) | 17 (of 33) | 10 (of 33) |
| Counties | 80 | 64 (of 80) | 40 (of 80) | 24 (of 80) |
| Payams | 516 | 413 (of 516) | 258 (of 516) | 155 (of 516) |
| Bomas | 2,136 | 1,709 (of 2,136) | 1,068 (of 2,136) | 641 (of 2,136) |
| Target population (i.e. those living 5km and more from a health facility) | 6,901,115 | 5,520,892 | 3,450,558 | 2,070,335 |
| Total services | 19,324,909 | 15,459,930 | 9,662,451 | 5,797,472 |
| Community Health Workers (CHWs) | 28,755 | 23,004 | 14,378 | 8,627 |
| Average CHWs per Boma (1 per 40 households) | 13 | 13 | 13 | 13 |
| Average services per capita | 2.8 | 2.8 | 2.8 | 2.8 |
| Average services per CHW | 672 | 672 | 672 | 672 |

A breakdown of the service numbers for each scenario for Year 1 is shown in Figure 1. Since constant utilization rates were used over the five years, the figures in the following years only increase in relation to population growth.

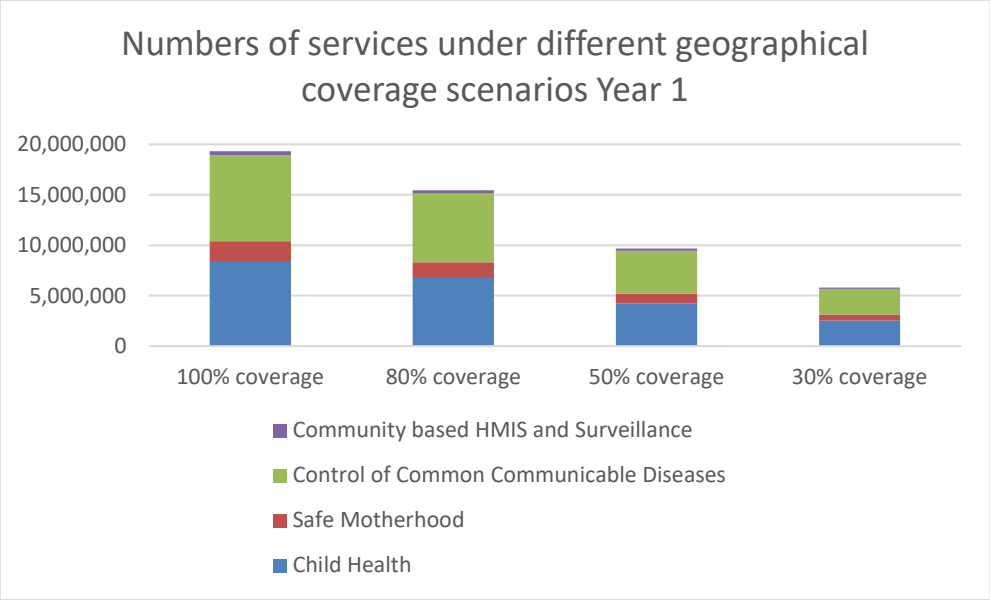



Figure 1. Numbers of services under different geographical coverage scenarios in Year 1

## Cost projections

The total cost in the first year would be US$36.1 million with 100 per cent geographic coverage, US$28.9 million with 80 per cent geographic coverage, US$18.1 million with 50 per cent geographic coverage, and US$10.8 million with 30 per cent geographic coverage (Table 3). The cost is less in the second year because the first year includes start-up costs for initial training and equipment.

*Table 3. Number of services and costs by year for each scenario*

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| **Total services** | | | | | |
| 100% scenario | 19,324,909 | 19,849,471 | 20,389,238 | 20,944,659 | 21,516,192 |
| 80% scenario | 15,459,930 | 15,879,573 | 16,311,389 | 16,755,729 | 17,212,952 |
| 50% scenario | 9,662,451 | 9,924,737 | 10,194,619 | 10,472,333 | 10,758,096 |
| 30% scenario | 5,797,472 | 5,954,835 | 6,116,770 | 6,283,395 | 6,454,856 |
| **Total costs (US$)** | | | | | |
| 100% scenario | 36,189,696 | 30,600,584 | 32,317,294 | 34,401,935 | 34,071,502 |
| 80% scenario | 28,953,676 | 24,482,236 | 25,856,066 | 27,523,470 | 27,258,965 |
| 50% scenario | 18,100,096 | 15,305,472 | 16,163,836 | 17,205,769 | 17,040,941 |
| 30% scenario | 10,864,077 | 9,187,122 | 9,701,831 | 10,327,301 | 10,228,404 |

The total cost for each programme in every year would be highest for child health interventions under all scenarios, followed by control of common communicable disease interventions. In the second year with 50% geographical coverage, for example, the costs would be US$7.8 million for child health interventions, US$1.5 million for safe motherhood interventions, US$5.6 million for control of communicable disease and US$0.3 million for HMIS and surveillance (Figure 2).

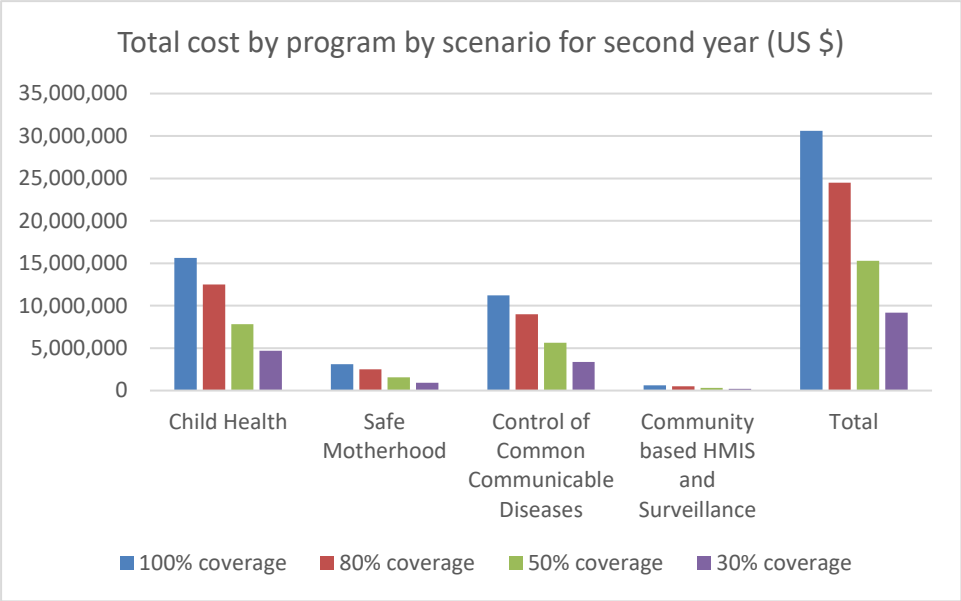



Figure 2. Cost by programme for each scenario for the second year in US $.

The interventions with the highest total costs would be male condom provision and the treatment of diarrhea and malaria for children, partly because they include medicines and supplies. For example, in the second year under the 50% geographical coverage scenario, male condom provision would cost US$4.0 million, treatment of <5 diarrhea would cost US$3.5 million, treatment of <5 malaria would cost US$1.9 million, and rapid testing for malaria would cost US$1.8 million, representing 27%, 23%, 13% and 12%, respectively, of total costs.

Under all geographical coverage scenarios, the cost per child in the second year[4] would be US$1.22 for rapid testing for malaria, US$2.60 for treatment of malaria, US$2.60 for treatment of pneumonia and US$2.81 for treatment of diarrhea. The cost savings from these interventions are significant – both in terms of averting the higher costs to providers and families of obtaining treatment at facilities. The highest single cost driver under all scenarios would be CHW salaries and incentives, followed by training and medicine and supplies costs. In the fifth year of the 50% coverage scenario, for example, CHW salaries would be 37% of total costs, followed by recurrent training (refresher and replacement training) (31%) and medicines and supplies (19%) (Table 4).

[4] These figures represent the recurrent cost because they do not include the start-up costs incurred in the first year.

*Table 4. Costs breakdown for 50% coverage (US $)*

| Resource | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 5 % |
|---|---|---|---|---|---|---|
| CHW salaries and performance-based incentives | 5,555,659 | 5,716,788 | 5,882,554 | 6,052,956 | 6,228,768 | 37% |
| CHW Equipment | 3,484,657 | 370,078 | 705,003 | 1,458,862 | 746,495 | 4% |
| Medicines and supplies | 2,880,449 | 2,963,984 | 3,049,939 | 3,138,388 | 3,229,401 | 19% |
| Supervision Salaries | 619,200 | 619,200 | 619,200 | 619,200 | 619,200 | 4% |
| Supervision Equipment | 995,841 | 3,083 | 126,407 | 3,083 | 126,407 | 1% |
| Supervision Visits | 736,120 | 744,460 | 753,040 | 761,860 | 770,960 | 5% |
| Recurrent Training (CHWs) | - | 4,821,838 | 4,961,654 | 5,105,380 | 5,253,669 | 31% |
| Recurrent Training (Supervisors) | - | 25,800 | 25,800 | 25,800 | 25,800 | 0% |
| Management Meetings | 40,240 | 40,240 | 40,240 | 40,240 | 40,240 | 0% |
| Start-up Training (CHWs) | 3,602,408 | - | - | - | - | 0% |
| Start-up Training (Supervisors) | 177,602 | - | - | - | - | 0% |
| Start-up Training (Managers) | 7,920 | - | - | - | - | 0% |
| Total | 18,100,096 | 15,305,472 | 16,163,836 | 17,205,769 | 17,040,941 | 100% |

### Community health system bottlenecks

Several bottlenecks exist currently within the health system and are likely affect the degree to which the goals of the BHI can be achieved – in particular the attainment of the coverage targets, the 70% utilization of services and the quality of those services. The key bottlenecks are:

- Lack of qualified CHW candidates - lack of formal education, low levels of literacy and gender barriers.
- Insufficient remuneration for CHWs - in some cases, the proposed salary and incentives may be less than are currently paid by NGOs.
- Shortages of medicines and supplies and equipment - poor management, insecurity, high distribution costs, inadequate storage, weak logistics and transport systems.
- Limited capacity and numbers of MOH supervisors and weak linkages between CHWs and health facilities;
- Low acceptance of community health services. Insufficient buy-in by community leaders, poor community understanding due to misinformation, and insufficient numbers of female CHWs.

The implementation of the BHI will help to resolve some of these bottlenecks, such as the provision of sufficient funding for medicines, supplies and equipment and the training of CHWs on supply chain management. However, additional funding may be required to engage more CHWs and to strengthen supervision and to promote community health services in the communities.

## Potential impact

Based on the projected increases in coverage of the initial package under the high coverage scenario, it is estimated that by year five of the program a total of more than 36,000 deaths could be averted in the 100% coverage scenario compared to the baseline coverage scenario[5].

The vast majority of these would be deaths among children under 5 years old with the under-five mortality rate reducing from 96 deaths to 73 deaths per 1,000 live births after five years in all coverage scenarios. These only represent the benefits in terms of estimated lives saved and do not take into account reductions in morbidity which would have a beneficial impact on areas like education and economic productivity.




## Discussion

The four-geographic coverage and cost scenario results are based on the assumption that the programme will be able to achieve 70% utilization of services every year. This assumes that the identified supply and demand-side bottlenecks will have largely been resolved and failure to resolve them will affect the provision and impact of services.

The models also assume that the cost of programme implementation is the same for all geographical areas of South Sudan. In other words, the models do not consider the potential higher costs associated with addressing the logistical and security challenges of implementing in hard-to-reach areas or areas currently experiencing conflict.

[5] Total deaths averted (lives saved) by year 5: 100% scenario: 36,428; 80% scenario: 29,176; 50% scenario: 18,328; 30% scenario: 11,101.

## Conclusions

The implementation of the BHI nationwide should help to build and strengthen South Sudan's health system and improve equitable access to quality health services, assuming that the bottlenecks will be resolved.

The BHI package should save many lives by reducing neonatal, child, and maternal morbidity. It should reduce the burden at health facilities of diagnosing and treating childhood malaria, pneumonia, and diarrhoea but should also increase utilization of health facility services promoted by the CHWs, such as ante-natal and post-natal care, and illnesses referred by CHWs. It should also save scarce provider and family resources, allowing them to be used in more productive ways.

For community health services to be fully effective they need to be supported by health facilities, for example with the provision of supervision and medicines and supplies. They also need to be linked with health facility services to ensure functional upward and downward referrals.




If insecurity restricts the access of people to health facilities or the functionality of those facilities, the services provided by the CHWs will be affected. However, the community health services that can be provided will be even more important in the absence of functioning health facilities.

The models provide the MOH with evidence to advocate for and mobilize domestic and external financial resources for the implementation of the BHI program in select geographic areas. Further revisions to the models can be made as needed based on the availability of funding and priorities.

## Annex 1. List of costing assumptions used for the models

| Category of data | Modelling Assumptions for Costing Purposes |
|---|---|
| **General** | |
| Period of analysis | 5 years (no specific start year indicated) |
| Population to be covered by the BHI | Baseline (year 1) coverage population:<br>– Low geographic coverage: 2.07 million people (30% of hard to reach rural areas)<br>– Medium geographic coverage: 3.45 million people (50% of hard to reach areas)<br>– High geographic coverage: 5.52 million people (80% of hard to reach areas)<br>– Complete geographic coverage: 6.9 million people (100% of hard to reach areas) |
| **Geographic coverage**[6] | |
| Number of Regions | – 3 (Upper Nile, Equatoria, Greater Bahr el Ghazal) |
| Number of States | – Low geographic coverage: 10<br>– Medium geographic coverage: 17<br>– High geographic coverage: 26<br>– Complete geographic coverage: 33 |
| Number of Counties | – Low geographic coverage: 24<br>– Medium geographic coverage: 40<br>– High geographic coverage: 64<br>– Complete geographic coverage: 80 |
| Number of Payams | – Low geographic coverage: 155<br>– Medium geographic coverage:258<br>– High geographic coverage: 413<br>– Complete geographic coverage: 516 |
| Number of Bomas | 2,136 |
| **CHWs** | |
| Number of CHWs | The number of CHWs varies depending on the coverage scenario:<br>– Low geographic coverage scenario (30% coverage of hard to reach areas): **8,626 CHWs**<br>– Medium geographic coverage scenario (50% coverage of hard to reach areas): **14,377 CHWs**<br>– High geographic coverage scenario (80% coverage of hard to reach areas): **23,004 CHWs**<br>– Complete geographic coverage scenario (100% coverage of hard to reach areas): **28,755 CHWs** |
| Geographic coverage | CHWs will cover all geographical areas > 5 km from a health facility. **It is assumed one CHW (BHT) will cover 40 households (HH), i.e. 240 people.** This averages at about 13 CHW (BHT) per Boma. |

[6] In the revised models, programme coverage is based on the population living in rural areas as opposed to the number of targeted Regions, States, Counties, Payams, and Bomas. However, in the revised models, the number of administrative levels influence the quantity of training, supervisions, and meetings conducted at each level.

| | |
|---|---|
| Desired ratio of CHW per population | Each CHW will provide the basic start up package of services for his/her respective catchment area of 40 households, i.e. 240 people in year I. See above for details on the number of people to be covered under each scenario. |
| Number of hours worked per CHW per week | 20 hours per week |
| Annual salary | US $86.40 (assumes CHWs will earn a monthly salary of US $7.20 which is equivalent to 925 SSP at official rate of SSP 130 : USD $1) |
| Performance-based incentives (monthly) | US $25 per month per CHW (maximum) |
| **Supervisors** | |
| Type of supervisor | One category of direct supervisor: Payam Health Supervisor who will work for NGO (not MOH), likely attached to a health facility. |
| Desired ratio of CHWs per supervisor | 20 CHWs per direct supervisor (2 supervisors will cover 1 Payam which has an average of 4.1 Bomas) |
| Number of supervisors | The number of direct CHW supervisors varies depending on the coverage scenario:<br>– Low geographic coverage scenario (30% coverage of hard to reach areas): **310 supervisors**<br>– Medium geographic coverage scenario (50% coverage of hard to reach areas): **516 supervisors**<br>– High geographic coverage scenario (80% coverage of hard to reach areas**): 826 supervisors**<br>– Complete geographic coverage scenario (100% coverage of hard to reach areas): **1,032 supervisors** |
| Per cent of time for supervision | 100% |
| Annual salary | US $1200 |
| On-site supervision (Payam Supervisor) | A supervision visit costs $5 (for fuel) and covers 3 CHWs at a time. It is assumed that the Payam Health Supervisor would conduct 84 visits per year per (7 visit x 12 months) totaling $420. Note: It is assumed there will be no overnight stays and costs |
| On-site supervision (County Supervisor) | The County Supervisor visits each Payam (and selected Bomas) once in a quarter (7 payams per quarter). This totals 28 visits per year @ $25 each per county. (US $10 to cover transport and $15 to cover overnight stay in the field). |
| On-site supervision (State Supervisor) | This totals 4 visits per year @ US $40 each per state. (US $15 to cover transport and US $25 to cover the overnight stay in the field). |
| On-site supervision (National and Regional Supervisors) | The National/Regional Coordinator(s) will perform 1 visit per quarter (selected states, counties, Payam and Bomas) annually. This totals 5 days on average per visit (1 x 16 visits x 5 days per year). This totals 16 visits per year @ $600 each ($550 to cover air transport and $50 to cover overnight stay in the field). |
| Monthly group supervision | One meeting per quarter (i.e. four times per year); $5 per CHW per meeting to cover transportation costs. |
| Initial and refresher training for CHWs | • Comprehensive Training of CHWs (12 days), (6 days X 2 = 12 days in total during their first year at a total cost of $250.55 per participant).<br>• Programme module specific trainings (assume 3 days), every 1 year to cover refresher training or additional modules of BHI Service Package at a cost of US $75.36 per participant per session. |

| | |
|---|---|
| Initial and refresher training for direct supervisors (Payam Health Officers) | • Comprehensive training in BHI service package (6 days), once only at a cost of US $344.19 per participant per session.<br>• Technical programme specific training (1 day), every year at a cost of US $50 per participant per session. |
| Training and refresher training for capacity development | • Training of master trainers—participants at a cost of $240 per participant per session every two years.<br>– Low geographic coverage scenario (30% coverage of rural areas): 20 participants.<br>– Medium geographic coverage scenario (50% coverage of rural areas): 33 participants.<br>– High geographic coverage scenario (80% coverage of rural areas): 53 participants.<br>– Complete scenario (100% coverage of rural areas): 66 participants. |
| Equipment used by CHWs | • Respiratory Rate Timer ($4.82 replaced every 2 years)<br>• Beads for Counting Respiratory Rate ($5.00 replaced every 2 years)<br>• Jags and cups for preparing ORS ($3.00 replaced every 2 years)<br>• 2 MUAC Tapes ($0.076 replaced every 1 year)<br>• IEC materials for BHI ($7.00 replaced every 3 years)<br>• BHT illustration Charts ($7.00 replaced every 5 years)<br>• BHI handbook ($6.81 replaced every 5 years)<br>• Family Health Information Register ($5.74 replaced every year)<br>• BHI Service Information Register ($5.74 replaced every year)<br>• BHI reporting tools ($5.00 replaced every year)<br>• Megaphone ($59.25 replaced every 5 years)<br>• Gum Boots ($5.00 replaced every 3 years)<br>• Rain Coat ($25.00 replaced every 3 years)<br>• Torch ($4.00 replaced every 5 years)<br>• Metallic box ($30.00 replaced every 5 years)<br>• Back pack ($20.00 replaced every 3 years)<br>• Box of clean disposable gloves ($4.30 per box), replaced every 1 year<br>• Sharps box, replaced every year ($0.76 per box) |
| Medicines provided to CHWs | • Artesunate/Amodiaquine 2-11months - tablets - 25mg/67.5mg (3 tabs) - 1 treatment (3 tabs) $0.25<br>• Artesunate/Amodiaquine 1-5 years - tablets - 50mg/135mg (3 tabs) - 1 treatment (3 tabs) $0.34<br>• Malaria rapid diagnostic tests-RDT Pf- 1 diagnostic test kit $0.30<br>• ORS low osm. 20.5g/1L (non-flavoured) - Per 1 sachet $0.06<br>• Zinc 2-6 months - Per tablet - $0.01<br>• Zinc 6-59 months - Per tablet - $0.01<br>• Amoxicillin - Capsules and tablets - 250mg (dispersible) 2-12 months (6 tabs)" - Per tablet - $0.02<br>• Amoxicillin - Capsules and tablets - 250mg (dispersible) 1-5 years (12 tabs)" - Per tablet $0.02<br>• Male condom – 54 mm size - $0.0311 each |
| Equipment used by CHW direct supervisors | • Motorcycles ($1,250 replaced every 5 years)<br>• Mobile phones ($200 replaced every 2 years)<br>• Miscellaneous office items ($120 replaced every year i.e., $10 per month)<br>• Payam BHI reporting form ($5 replaced every year) |

For more information, please contact the:

Boma Health Initiative Secretariat
(Management Sciences for Health Old Building)
Ministry of Health,
Juba, South Sudan