

ROTARIANS AGAINST MALARIA



LONG LASTING INSECTICIDAL NET DISTRIBUTION REPORT

JIWAKA PROVINCE Jimi District

Carried Out In Conjunction With The Provincial And District Government Health
Services And The Church Health Services Of Jiwaka Province

With Support From Against Malaria Foundation and Global Fund

12 February to 15 April 2018



Table of Contents

Executive Summary	3
Background.....	4
Schedule	6
Methodology.....	6
Results	10
Conclusions.....	12
Acknowledgements	13
Appendix One – History Of LLIN Distribution In PNG	13
Appendix Two – Malaria In Jiwaka Compared With Other Provinces.....	18
Appendix Three - Malaria By Altitude	20
Appendix Four – Other Photographs	21
Appendix Four - Map Of Jiwaka Showing Census Points Of 2000 Census.....	22

Annex One Detailed Distribution Data For Jimi District

Executive Summary

Jiwaka is a highlands province of PNG with mountains that rise up to over 3,600 metres. It is made up of three districts: North Waghi, Anglimp South Waghi and Jimmy. North Waghi and Anglimp South Waghi are situated in the mountains while Jimi District is the northernmost district. It has a low lying valley which goes down to almost 400 meters in the West and rises to high altitude in the East. This is the district with endemic malaria in Jiwaka Province.

A family level survey and distribution of Long Lasting Insecticidal Nets (LLINs) were carried out between 12 February and 15 April in Jimmy District. North Waghi and Anglimp South Waghi Districts were covered by LLIN in 2017. Of the three districts, Jimi is the most inaccessible with a very bad road network and three of its health facilities namely Kol, Ambulua and Tsendiap can only be reached by aircraft.

Table One shows the estimated population and actual population found in Jimmy District along with the number of LLINs distributed. In total, 26,797 LLINs were distributed to a population of 54,629 people. This resulted in distribution of 49.1 nets for every 100 people in the province.

TABLE ONE – Population And Nets Distributed In 2018

District	Census Population 2000	Population Of Targeted Areas In 2015	Population Surveyed 2018	House Holds Surveyed 2018	Nets Issued 2018
Jimi	37,385	49,320	54,629	10,297	26,797
Totals	37,385	49,320	54,629	10,297	26,797

A further 335 LLINs were donated to health centres as nets were surplus to requirement and in most cases could not be easily returned to a central location. These nets would be used by pregnant mothers and for indoor hospital beds where needed.

The overall operational cost of the programme was 186,806.30 Kina (Approximately US\$57,478) resulting in a unit cost of about 6.97 Kina or US\$2.14 per net delivered which was about 3.5% under the anticipated overall budget. There were overspends in car hire and fuel and savings in human resources. The high cost of delivery in this province is due to many places only being reached by air and trekking and very poor condition of roads meaning that all travel took much longer than normal.

Overall, the distribution went very well in Jiwaka except a malaria outbreak in Koinambe that occurred in January which caused our programme to be brought forward for this area before the rest of the team came a month later to complete the work. The other major challenge in Jimi District was the state of the roads which were awful. Vehicles were often stuck and often damaged requiring repairs.

Feedback from partners and communities suggest they were happy with the methodology used as the process appeared transparent to all concerned. However, as always, there were a few families who complained that they did not receive enough nets but for the most part it is believed that this was a result of families not fully understanding the allocation system used.

The Against Malaria Foundation (AMF) generously donated all nets for Jimi District while the Global Fund (GF) provided the delivery costs of nets at the family level. Without these two donors, the delivery of nets into Jiwaka would not have been possible.

The history of LLIN distribution in PNG and Jiwaka Province is discussed in Appendix One and the malaria situation and stratification of malaria in Jiwaka are discussed in Appendix Two and Appendix Three.



Fig.1 – Training Volunteers In Tabibuga Health Centre Area

Background

Rotarians Against Malaria (RAM) is a nationally based organisation which was formed in 1997 by the Port Moresby Rotary Club in recognition of the tremendous burden that malaria imposes on the people of PNG.

RAM has an organizational mandate to work in malaria control and the distribution of LLINs in Papua New Guinea and has been working for many years with the National Department of Health (NDOH) and other partners including multilateral and bilateral agencies such as UNICEF and WHO (World Health Organisation), NGOs and church groups. (See Appendix One for full history of LLIN Distribution)



Fig.2 Road Side Difficulties In Koinambe

Since 2010, RAM has been coordinating the distribution of nets to all districts and provinces on a three-year recurrent cycle. This effectively means that RAM visits every village in PNG every three years. RAM is funded by the Global Fund since 2009 and since 2017 also from Against Malaria Foundation which supplied PNG with all its nets. The Global Fund resources are now used for LLIN distribution costs and other relevant administration costs.

Generally, LLINs have been distributed to household level throughout the country but when shortage of funds occurred, different strategies of distribution have been used.

PNG can be roughly divided into five epidemiological zones.

- a) Areas which lie above 2000m in altitude will no longer receive LLINs as malaria transmission is not considered possible at these altitudes.
- b) Low lying areas of the country up to 1200m which have stable malaria endemicity and often have poor access to health will continue to have household distributions.
- c) Areas from 1200 to 1600m which are generally considered to be of low transmission potential but may have the occasional epidemic due to poor immunity and changing weather conditions. LLIN distribution will continue in these settings.
- d) Highlands regions between 1600 to 2000m in altitude such as Mount Hagen which have low malaria endemicity and generally easy access to health services. These are low priority areas due to current funding constraints, however, RAM is trying to find additional funds to cover these areas
- e) In urban and peri-urban areas such as Port Moresby which are low lying areas with easy access to health, nets will not be distributed during funding constraints. Nets to these areas will be supplied through the private sector.

As a result of this stratification and when funds had been reduced such as at the end of 2014, areas above 2000m no longer received nets and areas from 1600 to 2000m only received under five campaigns in 2015 and 2016. However, due to the LLIN donation from the Against Malaria Foundation (AMF) in 2017, all areas are now receiving household distribution of nets-except areas above 2000m, and some urban areas such as NCD, Goroka, Mount Hagen and Mendi. However, for the years 2019 and 2020 funding for areas between 1600-2000 metres still remains tentative but it is expected that RAM will find donors to cover these areas.

Much of Jimi District lies in areas where malaria is endemic (400-1200m) with most of the other villages lying in areas between 1200 to 1600m where malaria is epidemic in nature. A few other village do lie above 1600m but these are few and scattered. This is a zone where generally only the transmission of *P.vivax* may occur, Therefore in 2018, for practical reasons, all areas in all districts were included for LLIN household distribution at a rate of approximately one nets for every two people.



Fig.3 – Carrying Nets In Olna Region

One of the conditions of the AMF donation is that RAM would strengthen the way in which surveys are carried out. These new innovative processes are described in the Methodology Section. These methodologies now being carried out since the beginning of 2017. The major change to the survey methodology suggested by AMF is that previously a village meeting was called after a survey was carried out where names of family members were read out to ensure that all households had been surveyed. Instead of this process, a summary of every village

surveyed is posted for 24 hours in a public place so that villages can ensure that all their family members have been included in the survey. As a further verification process, members of RAM and local health staff team carry out random house surveys of 6% of households in every village to ensure that the survey process has been carried out correctly.

For household LLIN distributions, regardless of where they are carried out must include a survey and a distribution phase though implementation methods may considerably vary depending on specific circumstances. RAM's approach has been to concentrate on program quality thus RAM develop methodologies that ensure that all recipients in an area actually receive nets and that this can be reported accurately.

The other major change to the original PNG programme of 2004 to 2009 carried out by the NDOH is that nets are allocated to families on a needs basis rather than simply the number of people in the family. Data analysis of National Capital District (NCD) data has shown that this gives a ratio of nets needed to be about 47 for every 100 people. In the previous LLINs distribution of Round-3 in 2006 to 2010, nets were allocated at a rate of one net to every 2.5 people. With the programme only receiving 80% of LLIN needs, and most provinces distributing for example two nets to families of three, in practically every province, nets ran out before the end of the distribution. The RAM programme makes all attempts to assure that this distribution anomaly does not happen by collecting all population information at the beginning of the program and then allocate the nets based on family needs. This strategy is practiced to ensure that all families receive nets throughout any given province. The only scenario where survey and net distribution may be done simultaneously- is in very remote locations where it is not practically possible to return a second time. This is particularly the case in remote villages which can only be reached by boat and it is costly and impractical to return to the villages for a second time.

In terms of coordination, RAM officers are allocated to specific LLGs or health centres where they coordinate the programme together with local health staff. In this capacity, RAM officers act as facilitators in terms of technical guidance to district health teams in each LLG as well as acting as financial officers and assuring quality control of activities taking place.

Schedule

This distribution took place in the ninth year in which RAM has been involved in the distribution of nets in collaboration with Provincial Health Authorities in PNG. Survey and distributions were carried out as per the table below.

Operations started in Koinambe a month earlier than planned due to a malaria outbreak that was reported in the area so RAM decided that this area should be given a priority. The rest of the team started a month later after completing their pre-scheduled work in Chimbu Province.

Many areas are reachable by road, but three areas namely Kol, Ambulua and Tsendiap could only be reached by airplane.

TABLE TWO
General Timetable Of Activities In Jiwaka

District	Survey		Distribution	
	Start	Finish	Start	Finish
Koinambe	12.02.18	16.02.18	19.02.18	20.02.18
Jimi (Other Areas)	17.03.18	01.04.18	20.03.18	15.04.18

Methodology

Prior to planning and implementation, a master list of all villages of Jiwaka was drawn up using data from the 2000 Census and the last RAM survey of 2015. Villages in the list were organised by LLG and Ward. In this master list, the estimated population for 2018 for each village is recorded in two ways, first estimated population figures from the 2000 Census and the estimated annual growth rate for Jiwaka and then by taking the population surveyed in 2015 and applying the annual growth rate to each village.

In all areas, Health Centres form the hub from which distribution takes place to the respective villages in each health centre's catchment area. Therefore, with the planning data at hand, the project manager of RAM works together with the Provincial Health Office to allocate every village to its nearest health centre (government or Church Based) and outlines how each village is reached from each health centre. From this it is possible to create a budget, estimate how many nets are needed to be sent to each health centre and work out any other logistic considerations such as use of airplanes or boats to deliver nets to some remote areas.

Once all logistical needs are calculated and nets delivered to the province or district, a RAM team will travel to the province. Once there in the province, RAM officers are allocated to work with each health centre which becomes the centre of operations for that area.

With the arrival of RAM officers, each health facility identifies health staff members or non-health volunteers to be involved with the programme. If local health staff are selected then they are referred as District Health Team (DHT) but if a non-health staff is selected then s/he is termed as a Team Leader. Both DHTs and Team Leaders are responsible for the survey and distribution of nets. Each DHT and Team Leader work only in the area in which the health facility is based.

Before any activities take place, RAM officers are expected to work with health staff and other team leaders to make detailed plans (micro-planning) of their activities for training, survey, verification and distribution of nets. This process involves- making maps of the area, deciding how many teams are needed, and then making detailed work plans for each of the team members. This process also involves verifying that no villages have been left out of the census list and that the whole area is covered.

Also prior to field activities in any given LLG or health centre, a social awareness campaign was carried out in all villages informing villagers of the upcoming survey and distribution. This was also used as an opportunity for RAM officers to become familiar with each area. During this process, key malaria messages were also discussed with villagers such as the need to use LLINs every night.

During the social awareness campaign, a daylong training meeting is normally held at each health facility for all DHT members in that area who jointly carry out the micro-planning exercise. These training and micro-planning sessions as well as all other activities associated with the programme are coordinated by RAM project officers together with health counterparts at provincial and district levels. RAM officers also have the responsibility to ensure the LLINs operation kept in line with the original budget.

Survey

The survey was carried out in the following way.

- 1) When arriving at a village and before starting the census process, a meeting was held with village elders explaining the process.
- 2) If village elders have an up to date list of all village occupants, the team would use this list to compile a census.
- 3) Where a village is small, e.g. less than 30 families, team members may carry out the census by themselves.
- 4) Where villages were large, village volunteers were identified with the assistance of the village chiefs, elders, health staff and councillors. One volunteer was chosen for each group of about 50 families with volunteers chosen by natural divisions in the village e.g. clans where one volunteer would make a list of only one clan. These volunteers were trained to carry out the survey by actually surveying houses with the team leaders supervising and assessing the recording. Once the team leader was confident that the volunteers knew the survey methodology, they were left to continue with the household survey with survey teams returning within an agreed period to verify the work of the survey volunteers, collect survey books and also to pay the survey volunteer, provided the work was carried out correctly. The training of volunteers may occur in groups or individually depending on access to the village and its proximity to other villages.
- 5) For each household surveyed, all family members who normally reside at the household for a minimum of nine months were recorded by Name, Age, Sex and Relationship to head of household. All names and other information was recorded in the survey book with one survey form being used for each household.
- 6) After surveying a household, a white copy of the census form was given to the head of household or most senior person present in the household.
- 7) Where a whole household was absent, information was taken from the neighbours and the white survey form left with them.
- 8) In all cases, after the census/list was finished, all the information about the households and number of household members is entered into a summary sheet. This list is then hung in a public place where all villages can verify that the right number of family members for each household has been recorded and that all families have been included in the survey. After the list has been in a public place for 24 hours, then the volunteer requests for the RAM officer and or DHT to visit the village.



Fig.4 Carrying Nets In Koinambe

- 9) RAM officers and DHTs must visit three households randomly from each survey book (6%) and verify that the survey has been carried out correctly. Only when this has been done, then the volunteer can be paid.
- 10) If a village was surveyed by more than one volunteer, then volunteers were asked to work together so that lists can be hung together and the village volunteers can be verified at the same time. This process also ensures that households do not appear on more than one list. After this process, both the volunteers and the village elders sign a form to verify that this was done.
- 11) All village volunteers received a standard payment of 20 kina a day. Experience has shown that volunteers can usually only survey about 30 families a day, so for the most part, they would receive up to two days allowance to complete a survey book.
- 12) All volunteers were also given a small training manual. Contained in this training manual are key health education messages about malaria which volunteers are expected to discuss with households. This perhaps is the only project in PNG that is able to reach down to potentially every household in the country.

To aid with the survey, the master plan with names of all census units in all the wards in the district had been printed out and given to all the DHTs and team leaders. This document also provides the projected population per census unit as well as other information which might be useful to the area concerned.

After collecting survey data from each village, the information is immediately compared with the data on the master sheet. Where the surveyed population is very different from the projected population, the project staff make enquiries into the reasons for these discrepancies.

Following the survey, all data was entered into a computer where possible or entered into a master sheet of the area concerned. For each village, nets were allocated to each family on a needs basis and this is also entered into the computer or master sheet. This process ensured that all villages received nets and that there would be no shortfalls.

The needs basis in PNG is based on the assumption that children under the age of six sleep with their parents, after which boys and girls are grouped separately from their parents. Nets are also allocated based on the number of children in the house, their ages, and whether there are other dependents living in the households such as grandparents. A full description of the allocation system can be obtained from RAM officers but suffice to say a family of four could receive between one to four nets depending on the sex and age of family members.

Nets are allocated to each LLG based on assumed populations of each LLG and it was important prior to the distribution to ensure that when allocations had been carried out to families and villages that there were enough nets available to cover each and every family.

Distribution

There was no official launch for the LLINs distribution in Jiwaka. However, prior to distribution there was a social awareness phase where the project teams informed communities about the arrival of the distribution teams, especially those accessible by road.

The LLINs were then distributed to teams depending on the needs of each village. The LLINs were then distributed by village or wards depending on whether villages were close together. In this latter case, a central location was identified in the ward and then distribution of nets was carried out. In terms of distribution sites, villages were organised in different ways to make the flow of nets easy and effective. However, the actual organisation depended on each team and the structure of the various groups receiving nets.

All net packaging was opened at distribution site with a district code printed on each net e.g. JW18 for Jiwaka 2018. This code is added to identify nets to assist in future monitoring exercises as well as discouraging householders from selling the nets on the open market.

Some examples of the process used to control the crowd includes;

- Arranging the people according to the serial numbers in the survey books e.g. 72001 - 72050 and then calling the names and the serial numbers.
- Call the names of the owners of the households, collect the white copy and give the nets.
- Wait for everyone to come to the distribution site, collect all the white copies and sort the copies with the pink copies. Call the names on the white copies and give the nets.

Some of the following control methods were used.

- Everyone who presented with a white copy was given LLINs at the distribution site with LLINs only given to the owner of the house or a member of the house whose name is written on the back of the survey form.
- Those people who lost the white receipts were left to the end of each distribution, with nets only being issued if the name of the person collecting the nets was found on the back of the pink copies.
- For those families who were absent at the time of distribution, their names were written in a form – MOSQUITO NETS HELD IN TRUST BY VILLAGE CHIEFS FORM and the nets allocated to missing families were given to chiefs or any person entrusted by the community with the forms for these families to collect their LLINs later.
- Householders are now being asked to make a thumb print as proof of delivery of nets to a household. The Global Fund had formally asked that householders should sign for delivery of nets. This was considered problematic as many householders are illiterate and even where householders can write, this process takes a long time in what is often a very chaotic and charged environment where speed is of the essence.

It should also be noted that surveys and distributions took place at more or less the same time in some remote places of Jiwaka province. This is particularly true for mountainous villages or small islands which might take several hours or days to reach. In these instances, estimations based on the 2000 Census data and local knowledge used to pre-allocate nets. Teams were then dispatched to these areas with nets. On arrival in these remote places, surveys took place and were immediately followed by a distribution based on the survey results.

Other details

In the case of Jiwaka Province, all LLINs were delivered to Lae by ship from Vietnam (via Singapore) in two containers where they were custom cleared. These containers were temporarily stored in Lae before being transported by road to Mount Hagen. On container was then taken Banz from where it was offloaded and taken Jimi. The nets for Tsendiap, Kol and Ambulua remained in Mount Hagen from where they were taken to Mount Hagen airport for airlifting to these locations.

Results

The programme surveyed in Jimmy District a total of 54,629 people to which were distributed 26,797 LLINs. This resulted in distribution of 49.1 nets for every 100 people in the province. Table Three shows the distribution by district while Table Four shows the distribution by LLG.

Table Three shows an overall growth rate from 2000 of 2.26 but since 2015 it is 3.47 which is a very high growth rate. This data could also indicate that in 2000 the population was over

estimated. Table Four also reflects the same situation and shows that the populations are staying where they are and not moving to urban areas.

TABLE THREE
Nets Distributed At District Level In Jiwaka

District	Census Population 2000	Population Of Targeted Areas In 2015	Population Surveyed 2018	House Holds Surveyed 2018	Nets Issued 2018	Growth Rate Against 2015 Survey	Growth Rate Against 2000 Survey	Nets Distributed Per 100 People
Jimi	37,385	49,320	54,629	10,297	26,797	3.47	2.26	49.1
Totals	37,385	49,320	54,629	10,297	26,797	3.47	2.26	49.1

TABLE FOUR
Nets Distributed At LLG Level In Jiwaka

LLG	District	Population Of Targeted Areas In 2015	Target Population 2018	Population Surveyed 2018	House Holds Surveyed 2018	Nets Issued 2018	Growth Rate Against 2015 Survey	Nets Distributed Per 100 People
Jimi Rural	Jimi	33,662	36,783	37,125	7,114	18,150	3.32	48.9
Kol Rural	Jimi	15,658	17,110	17,504	3,183	8,647	3.78	49.4
Totals		49,320	53,893	54,629	10,297	26,797	3.47	49.1

Referring to Table Five, it can be seen that a further 335LINs were donated to health centres as nets were surplus to requirement and in most cases could not be easily returned to a central location, particularly from health centres which could only be reached by aeroplane. These nets would be used by pregnant mothers and for hospital beds where needed.

TABLE FIVE
Nets Donated To Health Centres

District	LLG	HC	Donated
Jimi	Jimi Rural	Tsemdiap HC	121
Jimi	Kol Rural	Kol HC	131
Jimi	Kol Rural	Ambulua HC	83
Final			335

TABLE SIX
Cost Of Programme In Jiwaka (All in Kina)

Expense Types	Budget	Actual	Variances	%Variance
Human Resources	K89,862.93	K58,220.28	31,642.65	64.8
Fuel Cost	K10,404.00	K11,995.70	-1,591.7	-15.3
Car Hire Cost	K52,500.00	K80,500.00	-28,000.0	-53.3
Aircraft Hire Cost	K27,500.00	K28,860.00	-1,360.0	-4.9
Stationeries/Supplies	K3,000.00	K1,413.52	1,586.5	47.1
5% Contingency	K9,213.35	K5,816.80	3,396.6	63.1
Total	K192,480.28	K186,806.30	5,674.0	96.6

Referring to Table Six, it can be see that the overall operational cost of the programme was 186,806.30 Kina (Approximately US\$145,647) resulting in a unit cost of about 6.97 Kina or US\$2.14 per net delivered which was about 3.5% under the anticipated overall budget. There

were overspends in car hire and fuel and savings in human resources. The high cost of delivery in this province is due to many places only being reached by air and trekking and very poor condition of roads meaning that all travel took much longer than normal.

The project also looked at radio or cell phone coverage in the different parts of Jiwaka. Referring to Table Seven, the data suggests that in Jiwaka, there is generally a reasonable coverage of both Digicel and radio coverage. This being the case it is surprising that the ownership of radios in houses is so poor especially when most cell phones also have radios which means that many family do not also own a phone.

TABLE SEVEN
Cell and Radio Coverage In Jiwaka

District	House Holds Surveyed	Villages	Digicel	Bmobile	Houses with Radios	Villages with Radio Network
Jimi	10,297	129	109	0	1,812	107
Total	10,297	129	109	0	1,812	107



Fig.5 – Distribution In Tabibuga – Writing Details (Left) and Calling Out Names (Right)

Conclusions

Overall, it can be said that the project was a success both in terms of results and collaborative work done by staff from RAM provincial and district health authorities, and Catholic, Anglican and Evangelical Bible Church Health Services i.e. those who have a presence in the province. Through this collaboration, the data suggests that all villages and practically all families in those villages received nets.

The major achievement of the programme was also demonstrating that the new verification process introduced by RAM was practical and was generally accepted by both health staff, communities and volunteers as the survey system is now more transparent. Due to this transparency, RAM officers generally received far less complaints during this distribution cycle than previous distribution cycles.

As with other provinces in the country where RAM has operated in over the last seven years, the methodologies used this time appeared practical and were openly welcomed by both villagers and implementers, particularly the practice of hanging up the list of names in the middle of the village following a survey: this allowed communities to feel that they were part of a transparent process. This is not to say that perhaps some extra people managed to slip into the books, but in general, it was felt that the system was fair and included practically everyone concerned. The use of the master lists also ensured that all villages were reached and accounted for.

The review of the data prior to the distribution was also important. This ensured that all villages and families received the correct numbers of nets. The 2000 Census Lists were very important to ensure that survey teams reached all villages: without the complete list of villages, it would be very difficult to make a detailed report.

The greatest complaint still received by communities was the number of nets they received. Even though the team explain the logic of how the allocation of nets is calculated, some families were expecting one net per person, others expected it to be based on a fixed allocation based on the number of people in the family, and yet others thought they would be given nets based on the number of nets they stated they already had. This highlights that a better system of explaining the allocation system needs to be developed. In general, unlike some previous districts covered by RAM and DHTs of Jiwaka assisted in the allocation of the nets which meant they were in a better position to explain the distribution system on the ground. Nevertheless, despite all the difficulties involved, it would appear that the vast majority of community members accepted the outcome and there were no real problems or complaints encountered.



Fig.6 – Distributions In Tabibuga

Acknowledgements

On behalf of the Rotarians Against Malaria household distribution team who worked in Jimi District in Jiwaka Province, we would like to sincerely acknowledge and thank the Jiwaka Provincial Health Authority and all District Health Staff of Jimi Districts for the excellent help and cooperation received during the LLIN distribution programme.

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For the district staff, we would like to thank Joseph Mumbo (District Health Manager) and all his team who tirelessly took part in the programme, particularly, RAM would like to acknowledge and mention the following people who were instrumental in the planning and implementation of the programme namely:

No.	Name of person	Position	Location
1	James Balgme	OIC	Ambulua
2	Joshua Pundia	Nursing Officer	Ambulua
3	Merolyn Mond	CHW	Ambulua
4	Joseph Agia	Board Chairman	Ambulua
5	Abel Owen	CHW	Abibuga HC
6	Peter Kewa	CHW	Abibuga HC
7	Paul Ray	CHW	Tsenga HC
8	Jimi Edena	OIC	Tsendiap HC
9	Benson Kimin	Outgoing OIC	Tsendiap HC
10	Patricia Less	CHW	Tsendiap HC
11	Miriam Ivanua	CHW	Tsendiap HC
12	Godwin Amenek	CHW	Tsendiap HC
13	Melton Samai	Chairman	Tsendiap HC
14	Joseph David	D/Chairman	Tsendiap HC
15	Albert Kuma	Planner	Kurumul
16	Sr. Mary Karu	CHW	Togoban HC
17	Mark Tongil	CHW	Olna HC
18	Kelp Nitai	CHW	Waramanz HC
19	Mr. Bradley Gideon	Health Secretary	Anglican, Mt.Hagen
20	Joe Anzu	OIC	Olna HC
21	Dominic Wena	A/OIC	Kol HC
22	Joe Wolo	Caretaker	Kol HC
23	Lucy Peio	CHW	Koinambe HC
24	Joyce Kumbli	CHW	Koinambe HC

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Last but not the least, RAM would also like to extend our acknowledgement and appreciation to all the hard-working Community Volunteers for assisting in conducting the household surveys and assisting with the distribution of nets.

Appendix One – History Of LLIN Distribution In PNG

The use of Insecticide Treated Nets (ITNs) started in PNG in 1985 when the PNG Institute of Medical Research (IMR) conducted one of the first trials demonstrating the health impact of treating mosquito nets with insecticide. The study, done near Madang, showed a reduction of malaria incidence and prevalence in children below five years of age sleeping under permethrin-treated nets. The protective effect of insecticide-treated nets (ITNs) was also confirmed in many other trials around the world. As a consequence of such findings, the national malaria control program in PNG started emphasizing the use of ITNs in 1989. However, no regular or large-scale distribution of ITNs was carried out at this time.

In the following years, coverage with mosquito nets and other control interventions remained patchy and low in many parts of PNG. It was during this period that Rotarians Against Malaria (RAM) was created from the Port Moresby Rotary Club in 1997. Using a donation of 150,000 treated nets given to them from the National Department of Health (originally from AusAid), RAM successfully ran a revolving fund of nets in which nets were sold at a price which allowed the proceeds to buy more nets. RAM did this successfully for many years distributing about 45,000 treated nets a year from 2000 to 2004.

Prior to 2004, most treated nets had to be re-treated every six months or a year which requires a lot of work and organisation. In early 2004 everything changed with the introduction of Long Lasting Insecticidal Nets (LLINs) which would last for 20 heavy duty washes and effectively no longer required to be treated repeated. This change in nets also coincided with the introduction of the Global Fund into PNG known as the Global Fund Round 3.

From 2005 to 2009 the malaria programme in PNG received and delivered about 2.3 million nets throughout the country at a rate of one net for every 2.5 people. The delivery of nets to village level was under the provincial health authorities and reached most parts of the country with Rotarians Against Malaria (RAM) being responsible in delivering the containers of nets to the provinces from Port Moresby and Lae where the nets arrived from overseas.

While the programme was very successful in some areas it was not so successful in others. Problems included slow release of funds from central to provincial level, some provinces not following technical guidelines given resulting in some areas not been covered, and technical and financial reporting leaving a lot to be desired in many of the provinces. When further funds became available in what is known as the Global Fund Round Eight, it was decided that Rotarians Against Malaria (RAM) would take over the coordination of the LLIN programme.

This change has resulted in RAM being responsible for the overall coordination of the LLIN distribution of LLINs in the country particularly in the areas of quantification, procurement, reporting and delivery to provincial and district level. However, the actual delivery of nets to village level is a collaboration between RAM, provincial health authorities and district health and health centre staff.

Fig.1 shows the distribution of nets to districts and provinces from 2006 to 2009 while Fig.2 shows the distribution of nets from 2010 to 2014 and Fig.3 shows the distribution from 2015 to 2017 which includes under five distributions in 2016 and 2017. Under Five distributions had been carried out in areas above 1600m and in Port Moresby and Lae City due to lack of funds. This situation changed when support from Against Malaria Foundation was received.

Up until June 2017, a total of 8,223, 853 had been distributed under the coordination of RAM. Therefore, with the 2.5 million nets distributed from 2006 to 2009, this means that about 10.5 million nets have been delivered to household level in PNG since 2006. This is more than one net per every person in PNG. RAM has also distributed about another 1.2 million nets to health centres for distribution to pregnant women and for prisons and boarding schools.

It should also be noted that alongside developments related to treated mosquito nets, the first cases of chloroquine-resistant malaria were reported in 1976 (20). This progressed rapidly to widespread resistance of *P.falciparum*, and to a slightly lesser extent *P.vivax*, to chloroquine, amodiaquine and sulphadoxine-pyrimethamine (SP). In studies conducted between 2003 and 2005, even combination regimens of these drugs faced up to 29% resistance of *P. falciparum*². This situation together with Global Fund Round 8 also saw the introduction of artemether lumfantrine branded as Malawan, IPT (Intermittent Preventative Treatment) for antenatal women.

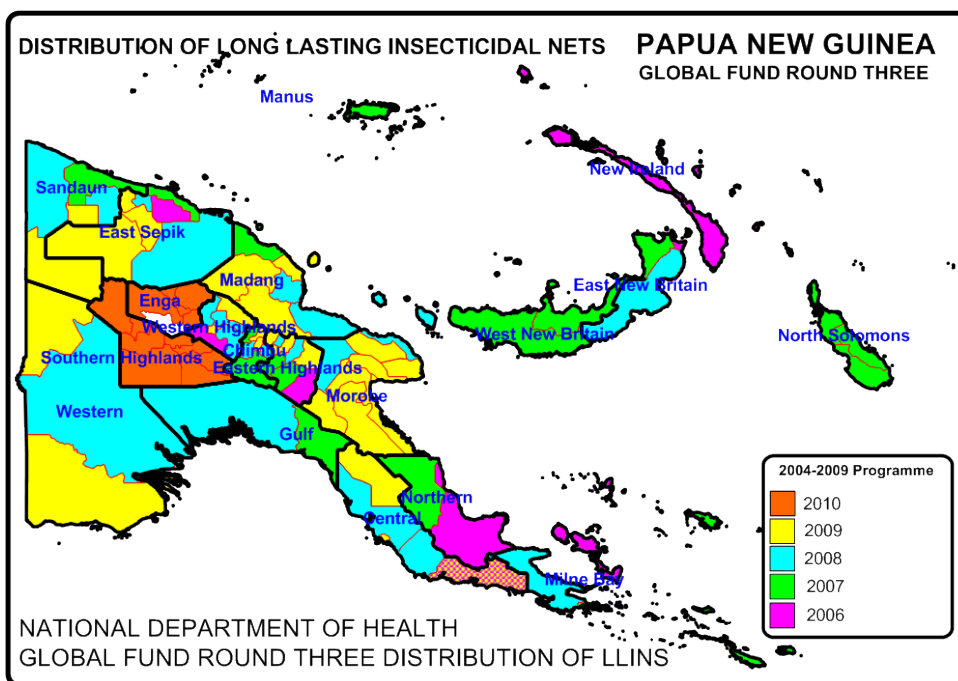


Fig. 1 Distribution Of Nets Under National Department Of Health From 2006 To 2010

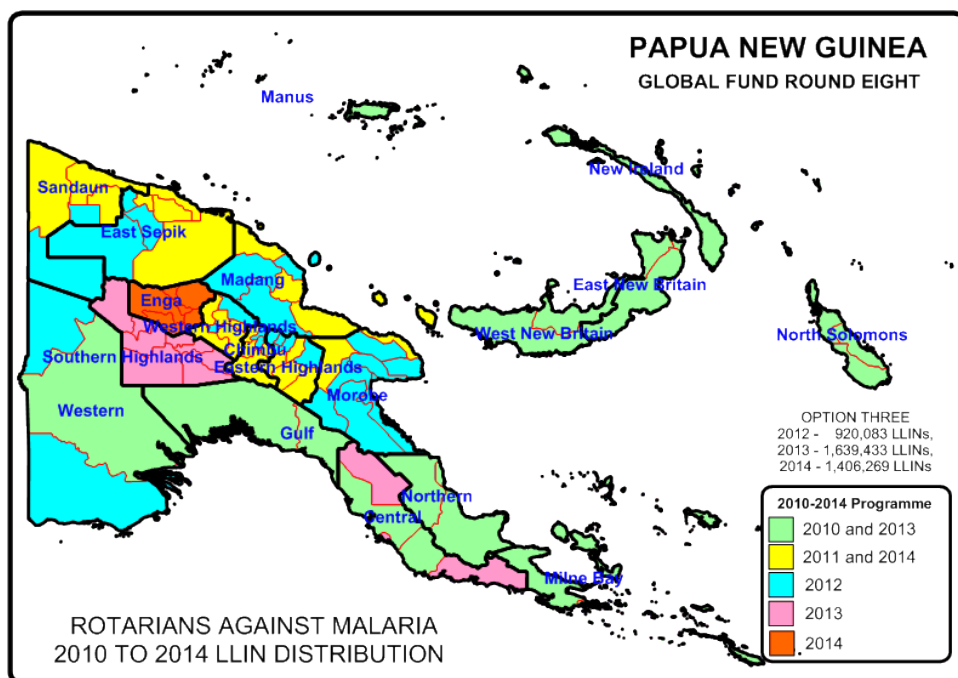


Fig.2 Distribution of LLIN Programme 2010 to 2014

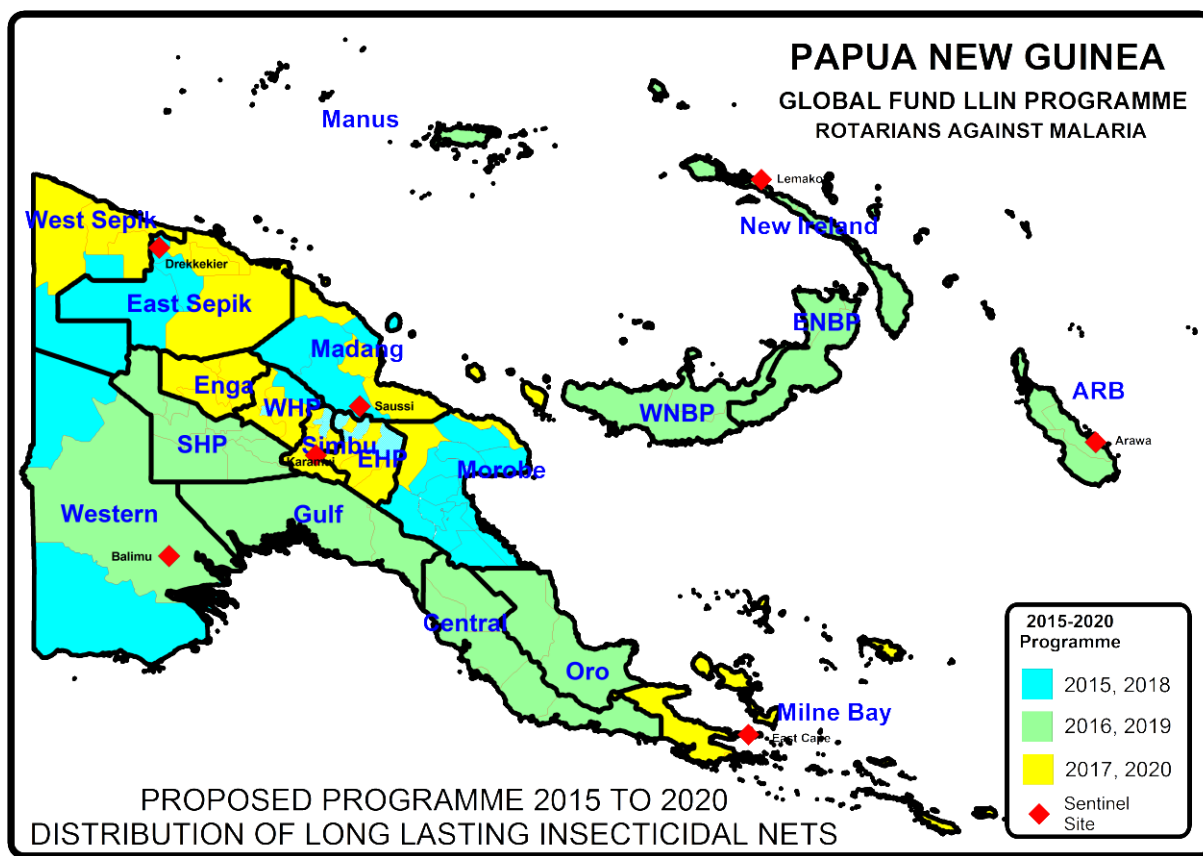


Fig.3 LLIN Distribution Programme 2015 to 2017

TABLE ONE - LLINs Delivered In PNG Under Coordination Of RAM From 2010

Period	Dates	Districts	Provinces	Nets Delivered
Phase One (2010-2011)	Nov 09 - Oct 11	50 Districts	18 Provinces	1,890,448
Year 3 (2012)	Nov 11 - Sep 12	27 Districts	10 Provinces	832,671
Year 4 (2013)	Oct 12 - Sep 13	28 Districts	12 Provinces	1,210,391
Year 5 (2014)	Oct 13 - Sep 14	23 Districts	11 Provinces	1,374,791
Year 5 (2014) No Cost Extension	Oct 14 - Dec 14	Okapa, Lufa, Madang, Angoram, Maprik, Yangoru Saussi, Wew ak, Aitape Lumi, Nuku and Vanimo Green	EHP, Madang, East Sepik and Sandaun	454,806
Year 6 (2015)		29 Districts	11 Provinces	932,822
Year 7 (2016)		27 Districts	13 Provinces	805,597
Year 8 (2017)		36 Districts	13 Provinces	1,543,947
Year Nine	Jan - Mar 2018	Aitape Lumi, Wew ak, Angoram, Mount Hagen, Kompam, Jimi, Gumine, Sinasin Yonggomugl and Kundiaw a Gembogl	Enga, Eaast Sepik, Sandaun, Western Highlands, Chimbu and Jiwaka	281,196
New Funding Model (2015-2017)				3,282,366
Round Eight (2010 - 2014)				5,763,107
Overall Total Phase One and Phase Two And NFM				9,326,669

Appendix Two – Malaria In Jiwaka and Western Highlands Compared With Other Provinces

- Fig.1 shows the decrease of malaria from 2007 to 2015 in all provinces, Fig. 2 shows the actual malaria incidence in Western Highlands (of which Jiwaka once belonged) compared with other provinces and Fig.3 shows annual malaria trends from 2012 to 2016. In Jiwaka and Western Highlands, it can be seen from Fig.1 that malaria decreased from 2007 to 2015 by 86% which is one of the highest reductions of malaria in the country alongside Eastern Highlands and Southern Highlands. This is also reflected in Fig.2 which shows that the incidence of malaria in Western Highlands and Jiwaka is 25 per 1000 people which is one of the lowest recorded malaria incidences in the country after Enga and Eastern Highlands.

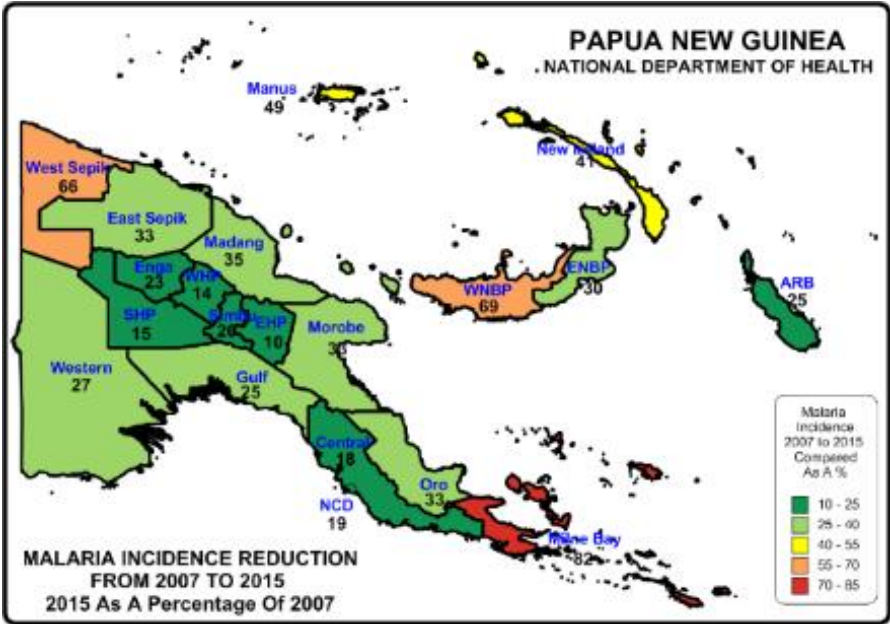


Fig.1 – Relative Reduction Of Malaria In Provinces Of PNG

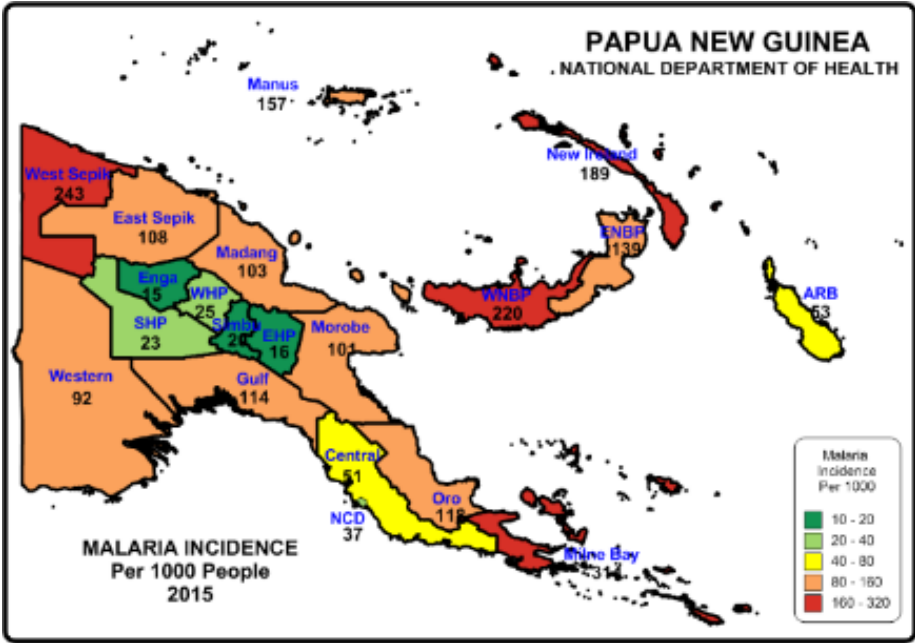


Fig.2 – Reported Malaria Incidence In 2015

- Fig. 3 shows that the trend of incidence of malaria in Western Highlands and Jiwaka since 2012 as compared with other provinces while Fig.4 shows the malaria incidence reported since 2000 against LLIN distributions. The impact of LLINs is very clear in Western Highlands and Jiwaka. After the first large distribution carried out in 2008 malaria has continued to reduce practically every year since this time.

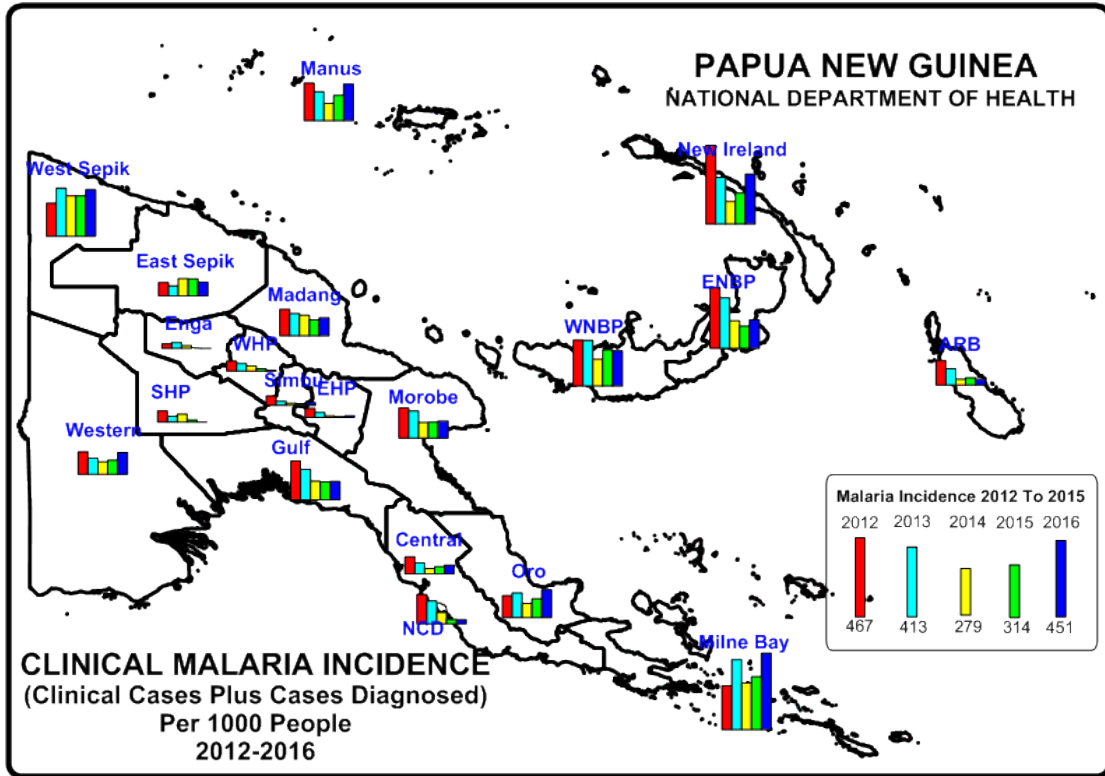


Fig. 3 - Reported Malaria Incidence In PNG From 2012 To 2016

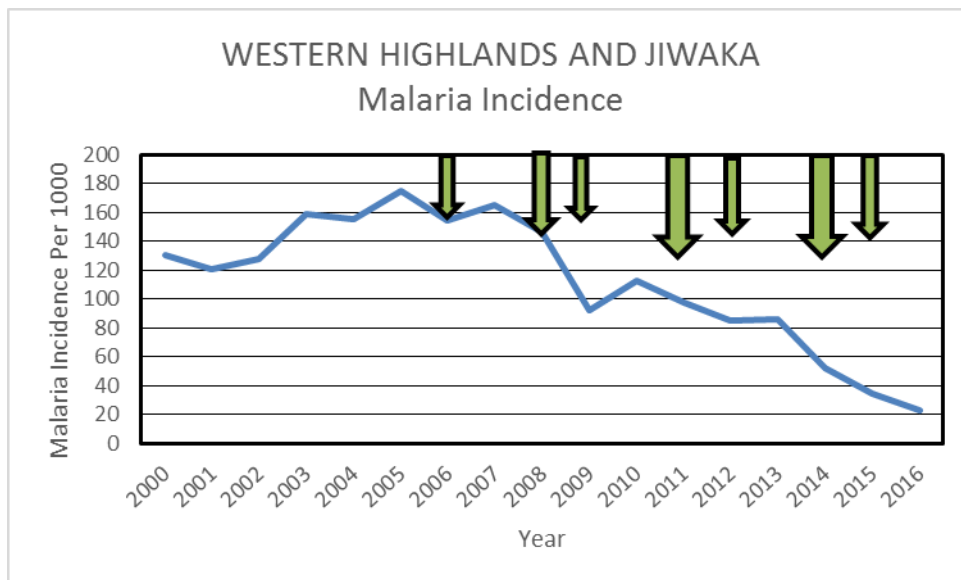


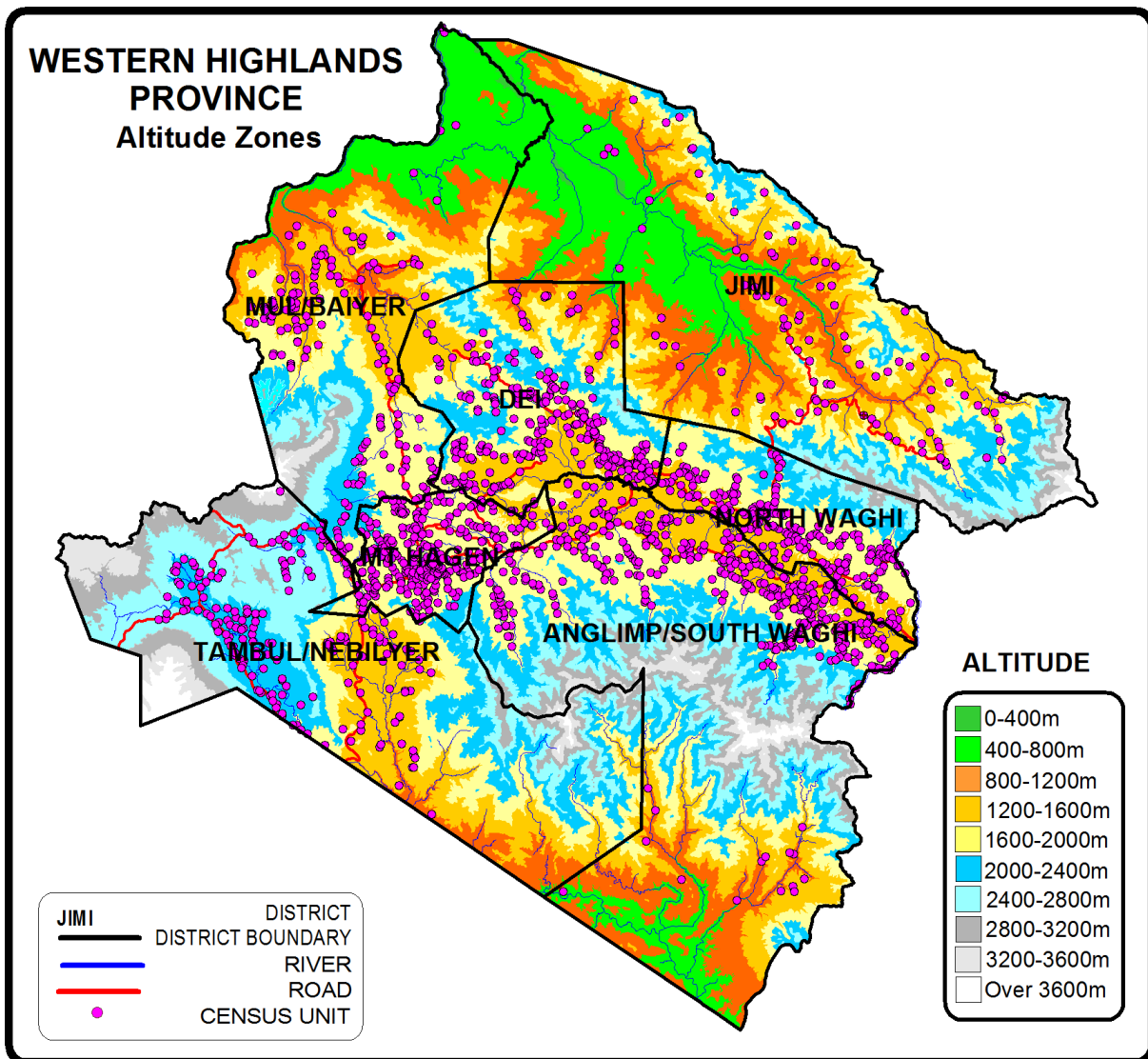
Fig. 4 – Malaria Incidence Versus Distribution Of Nets

(Green Arrows represent years of Household Distribution – 2008 shows s the distribution in Tambul Nebiliyer, 2008 in North Waghi, Anglimp South Waghi (now Jiwaka), Dei, Mul Bayer (Western Highlands) and 2009 distributions in Mount Hagen and Jimi. After 2010 large arrows represent distributions in North Waghi, Anglimp South Waghi, Dei, Mul Bayer and Tambul Nebiliyer and Small Arrows show distributions in Mount Hagen and Jimi.

Appendix Three - Malaria By Altitude

From Fig. 1 and data bases of village populations, it can also be calculated that about 2.0% of the population of Western Highlands and Jiwaka live below 1200m altitude where malaria can be considered highly endemic and stable. The people who live below 1200m all live in Jimi District or the low-lying areas of Mul Bayer. Similarly, about 39% of the population live in the malaria epidemic zone between 1200 to 1600m and once again, the majority of these people live either in Jimi and Mul Bayer Districts. For the remaining parts of Western Highlands and Jiwaka Provinces, 50% live in areas of potential *P. vivax* transmission while the remaining 9% live in altitudes above 2000m where malaria is not considered a problem.

Fig. 1 Altitude Zone In Western Highlands And Jiwaka Province



Appendix Four – Other Photographs



Difficulties With Roads In Jimmy



Distributions In Koinambe



WHO And RAM Staff Involved With Malaria Outbreak Response In Koinambe

OTHER PICTURES



Landslide In Koinambe (Left) And Trekking In Koinambe

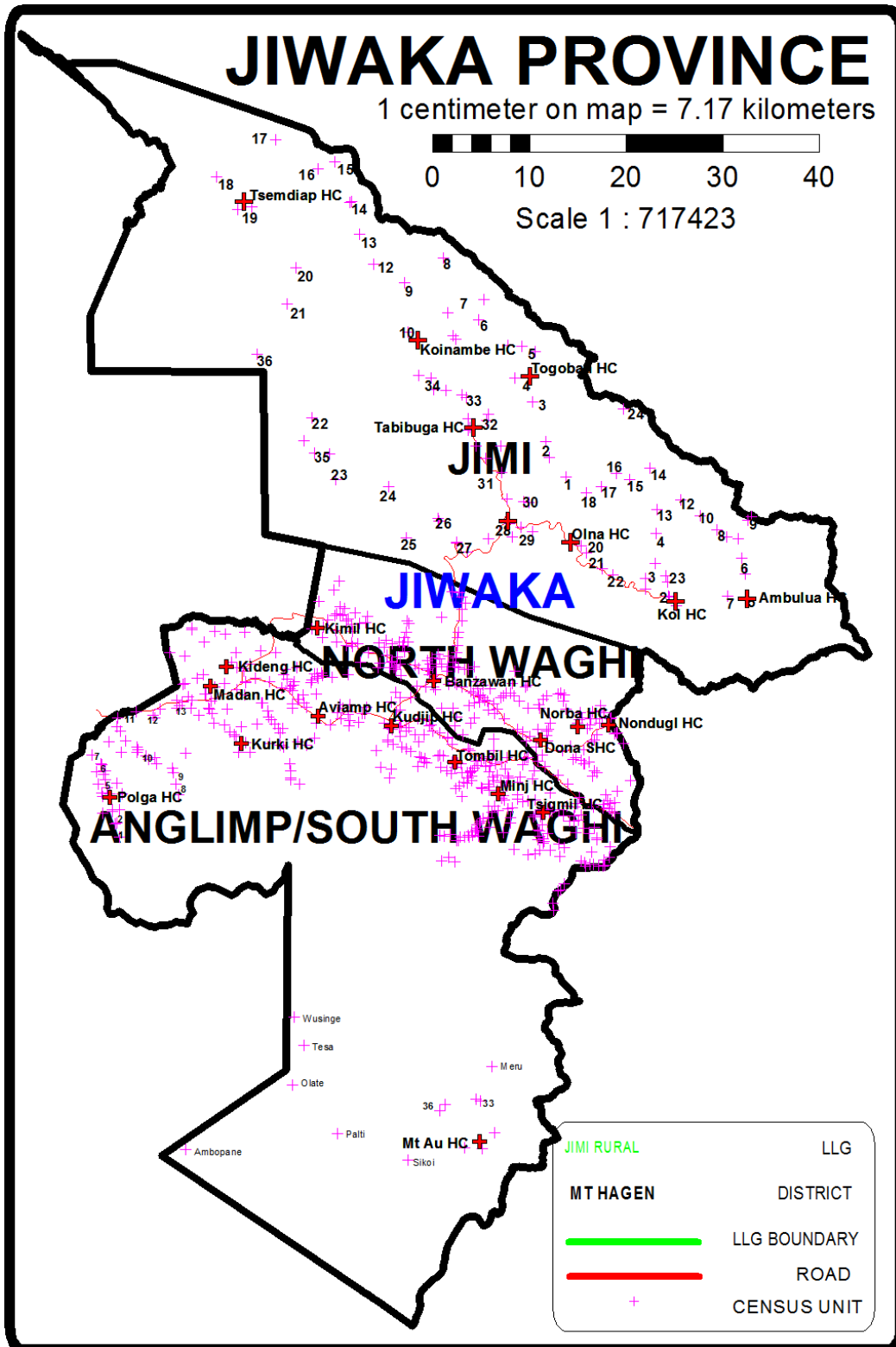


Happy Customers In Olna



More Happy Customers In Olna

Appendix Five - Map Of Jiwaka Showing Census Points Of 2000 Census



ANNEX ONE

WESTERN HIGHLANDS PROVINCE
JIMI DISTRICT POPULATION 2018
LLIN DISTRIBUTION PLANNING SUMMARY SHEET

LLG	WARD	Villages	Estimated 2018 Data Based On 2000 Census	Estimated 2018 Data Based On 2015 Data	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Houses With Radios	Radio Networks	Comments
JIMI DISTRICT			53,893	53,893		54,629	10,297	26,797		129	109	0	1,812	107	
JIMI RURAL			32,904	36,783		37,125	7,114	18,150		73	70	0	1,425	68	
1	Mogini		404	363		460	50	216		1	1	0	0		
		Mogini	404	363	Tabibuga HC	460	50	216	12.04.18	1	1	0	0	FM	3 Hr Trek
2	Koriom		921	667		710	111	333		2	2	0	0		
		Koriom	711	458	Togoban HC	418	66	197	06.04.18	1	1	0	0		5 Hrs Trek
		Jinim	210	209	Togoban HC	292	45	136	06.04.18	1	1	0	0		6 Hrs Trek
3	Kwiop		601	785		950	191	444		2	2	0	0		
		Kwiop	601	785	Togoban HC	463	100	216	31.03.18	1	1	0	0	Eagle FM	Road/ 1 .30 Hrs Trek
		Dayamba		NEW	Togoban HC	487	91	228	31.03.18	1	1	0	0	Eagle FM	Road / 2 Hrs Trek
4	Togoban		1,711	1,897		2,198	460	1,023		2	2	0	24		
		Togoban	1,214	1,367	Togoban HC	1,477	313	686	01.04.18	1	1	0	24		Road / Surrounding
		Masob	497	530	Togoban HC	721	147	337	29.03.18	1	1	0	0	Eagle FM	Road / 2 Hrs
5	Kwima		2,086	2,599		2,741	608	1,302		3	3	0	28		
		Kwima	575	828	Koinambe HC	1,188	285	598	19.02.18	1	1	0	27	Eagle Fm	Road
		Deka	629	1,172	Koinambe HC	720	123	315	19.02.18	1	1	0	1	Eagle Fm	Road
		Apnai	882	598	Koinambe HC	833	200	389	19.02.18	1	1	0	0	Eagle Fm	Road/Trek
6	Kupeng		1,257	1,531		1,640	310	793		3	3	0	18		
		Kupeng	839	777	Koinambe HC	968	171	474	20.02.18	1	1	0	7	Eagle Fm	Road/Trek
		Komongwai	418	518	Koinambe HC	329	68	163	20.02.18	1	1	0	7	Eagle Fm	Road/Trek
		Injim		236	Koinambe HC	343	71	156	20.02.18	1	1	0	4	Eagle Fm	Road
7	Kompiai		1,852	1,512		1,549	306	733		3	3	0	78		
		Kompiai	819	628	Koinambe HC	615	118	287	19.02.18	1	1	0	71	Eagle FM	Road
		Kwiama	577	413	Koinambe HC	428	89	205	19.02.18	1	1	0	7	Eagle Fm	Road/Trek
		Kuwasekum/Mengik	457	471	Koinambe HC	506	99	241	19.02.18	1	1	0	0	Eagle FM	Road/Trek
8	Tsuwenkai		862	732		873	150	434		1	1	0	2		
		Tsuwenkai	862	732	Koinambe HC	873	150	434	20.02.18	1	1	0	2	Eagle FM	Road/Trek
9	Bokopai		1,051	615		901	190	422		1	1	0	48		
		Bokopai	1,051	615	Koinambe HC	901	190	422	19.02.18	1	1	0	48	Eagle FM	Road
10	Yumbigema		637	778		623	150	304		1	1	0	27		
		Yumbigema	637	778	Koinambe HC	623	150	304	20.02.18	1	1	0	27	Eagle FM	Road/2 Hr Trek
11	Koinambe		848	988		872	184	413		1	1	0	132		
		Koinambe	848	988	Koinambe HC	872	184	413	20.02.18	1	1	0	132	Eagle FM	Road
12	Kandabiamp		774	1,377		890	174	415		2	2	0	164		
		Kandabiamp	774	922	Koinambe HC	753	150	346	20.02.18	1	1	0	141	Eagle FM	4 Hr Trek
		Kukema		455	Koinambe HC	137	24	69	20.02.18	1	1	0	23	Eagle FM	4 Hr Trek
13	Tsembant		476	412		790	157	392		2	2	0	24		
		Tsembant	476	412	Koinambe HC	390	65	189	20.02.18	1	1	0	24	Eagle FM	5 Hr Trek
		Tsendbant			Tsendiap HC	400	92	203	26.03.18	1	1	0		Eagle FM	5 Hr Trek
14	Ginjiji		825	860		807	200	405		2	2	0	0		
		Ginjiji	365	437	Tsendiap HC	437	100	210	26.03.18	1	1	0		Eagle FM	8 Hr Trek
		Bukimb	460	423	Tsendiap HC	370	100	195	26.03.18	1	1	0		Eagle FM	8 Hr Trek
15	Gondobend		447	510		449	100	221		1	1	0	0		
		Gondobend	447	510	Tsendiap HC	449	100	221	26.03.18	1	1	0		Eagle FM	8 Hr Trek
16	Waim		434	491		507	119	250		1	1	0	0		
		Waim	434	491	Tsendiap HC	507	119	250	26.03.18	1	1	0		Eagle FM	12 Hr Trek
17	Tsarep		484	657		586	161	290		1	1	0	0		
		Tsarep	484	657	Tsendiap HC	586	161	290	26.03.18	1	1	0		Eagle FM	12 Hr Trek
18	Merent		272	296		300	50	138		1	1	0	0		
		Merent	272	296	Tsendiap HC	300	50	138	26.03.18	1	1	0		Eagle FM	8 Hr Trek
19	Tsendiap		745	885		889	180	454		4	4	0	0		
		Tsendiap	254	237	Tsendiap HC	258	50	140	26.03.18	1	1	0		Eagle FM	Trek
		Simenek	254	292	Tsendiap HC	288	50	140	26.03.18	1	1	0		Eagle FM	Trek
		Tsendiap B/Coll	238	90	Tsendiap HC	135	30	71	26.03.18	1	1	0		Eagle FM	Trek
		Station		267	Tsendiap HC	208	50	103	26.03.18	1	1	0		Eagle FM	Trek
20	Tumbunki		291	432		469	93	216		1	1	0	0		
		Tumbunki	291	432	Tsendiap HC	469	93	216	26.03.18	1	1	0		Eagle FM	12 Hr Trek
21	Runimp		111	139		0	0	0		0	0	0	0		
		Runimp	111	139	Tabibuga HC										Abandoned
22	Wum		453	497		279	61	154		1	1	0	14		
		Mesa	453	497	Tabibuga HC	279	61	154	10.04.18	1	1	0	14	NBC-WHP	Road (Dei)
23	Tsenga		760	839		536	116	287		2	1	0	37		
		Tsenga	634	839	Tabibuga HC	536	116	287	15.04.18	1	1	0	37	NBC-WHP	Road (Dei)
		Kumuk	125	0	Tabibuga HC					1					Included with Telta ward#35
24	Maikmol		451	326		319	50	148		1	1	0	30		
		Maikmol	451	326	Tabibuga HC	319	50	148	03.04.18	1	1	0	30	FM	Road/4 Hr Trek
25	Toli		520	646		477	99	255		1	1	0	51		
		Toli	520	646	Tabibuga HC	477	99	255	01.04.18	1	1	0	51	FM	4 Hr Trek
26	Ongolmol		836	971		1,040	180	540		2	2	0	41		
		Ongolmol	584	694	Tabibuga HC	731	130	379	04.04.18	1	1	0	28	FM	Road
		Kilpang	252	278	Tabibuga HC	309	50	161	04.04.18	1	1	0	13	FM	Road
27	Kaul		1,126	1,669		1,459	199	703		3	3	0	35		
		Kaul	352	608	Tabibuga HC	453	70	219	08.04.18	1	1	0	8	FM	Road
		Kaul Kua	291	729	Tabibuga HC	807	100	394	08.04.18	1	1	0	24	FM	Road
		Koskala	483	332	Tabibuga HC	199	29	90	08.04.18	1	1	0	3	FM	Road
28	Karap		1,785	2,014		2,404	390	1,187		4	4	0	131		
		Karap	347	578	Tabibuga HC	396	84	210	09.04.18	1	1	0	67	FM	Road
		Konza	536	696	Tabibuga HC	745	124	376	09.04.18	1	1	0	5	FM	Road
		Namba	336	272	Tabibuga HC	372	60	183	10.04.18	1	1	0	33	FM	Road
		Tup	565	468	Tabibuga HC	891	122	418	09.04.18	1	1	0	26	FM	Road
29	Manemp		1,132	1,172		1,422	245	681		3	3	0	35		

LLG	WARD	Villages	Estimated 2018 Data Based On 2000 Census	Estimated 2018 Data Based On 2015 Data	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Houses With Radios	Radio Networks	Comments
		Manemp	467	491	Tabibuga HC	561	95	261	09.04.18	1	1	0	12	FM	Road
		Waramambol	270	304	Tabibuga HC	294	50	138	09.04.18	1	1	0	0	FM	Road
		Gulka	395	378	Tabibuga HC	567	100	282	09.04.18	1	1	0	23	FM	Road
30	Magin		554	523		722	122	339		1	1	0	56		
		Magin	554	523	Tabibuga HC	722	122	339	09.04.18	1	1	0	56	FM	Road
31	Korenu		2,103	2,453		2,454	463	1,213		4	3	0	117		
		Korenu	598	848	Tabibuga HC	772	131	372	10.04.18	1	1	0	15	FM	Road
		Nampa	425	328	Tabibuga HC	377	53	187	09.04.18	1	0	0	0	FM	Road
		Gugum	445	582	Tabibuga HC	526	108	260	10.04.18	1	1	0	56	FM	Road
		Wanaku	634	695	Tabibuga HC	779	171	394	10.04.18	1	1	0	46	FM	Road
32	Tabibuga		2,229	2,391		2,509	468	1,262		6	6	0	129		
		Gogurmol	326	551	Tabibuga HC	516	92	256	10.04.18	1	1	0	38	FM	Road
		Baura	140	229	Tabibuga HC	316	45	155	10.04.18	1	1	0	45	FM	Road
		Dapaka	245	207	Tabibuga HC	213	42	102	10.04.18	1	1	0	20	FM	Road
		Warames	817	655	Tabibuga HC	732	150	389	02.04.18	1	1	0	19	FM	Road
		Bumbi	249	473	Tabibuga HC	488	94	247	12.04.18	1	1	0	0	FM	Road
		Tabibuga Stsn	451	276	Tabibuga HC	244	45	113	10.04.18	1	1	0	7	FM	Road
33	Tsingiropa		1,179	1,284		1,317	241	645		3	3	0	133		
		Tsingiropa	359	362	Tabibuga HC	280	38	139	03.04.18	1	1	0	0	FM	Road
		Jimian	463	485	Tabibuga HC	598	97	288	03.04.18	1	1	0	62	FM	Road
		Braimba	358	437	Tabibuga HC	439	106	218	02.04.18	1	1	0	71	FM	Road
34	Kwipun		1,532	1,511		1,778	330	913		4	4	0	21		
		Kwipun	222	223	Tabibuga HC	322	50	168	03.04.18	1	1	0	0	FM	Road
		Karekum	546	505	Tabibuga HC	479	90	236	03.04.18	1	1	0	5	FM	Road
		Baiya	441	433	Tabibuga HC	509	108	263	03.04.18	1	1	0	10	FM	Road
		Mongoi	323	351	Tabibuga HC	468	82	246	03.04.18	1	1	0	6	FM	Road
35	Telta		770	734		633	111	326		2	1	0	13		
		Telta	392	446	Tabibuga HC	633	111	326	11.04.18	1	1	0	13	NBC-WHP	Road
		Tukumunga	378	288	Tabibuga HC					1					Covered under Telta
36	Menjim No.2		385	1,228		572	95	299		1	1	0	37		
		Menjim No.2	385	1,228	Tabibuga HC	572	95	299	12.04.18	1	1	0	37	NBC-WHP	ges included are:Mau,Tipimb & Bak
				0											
KOL RURAL			20,989	17,110		17,504	3,183	8,647		56	39	0	387	39	
1	Maipka/Ambka		1,711	1,826		1,169	224	631		3	3	0	16		20989.22242
		Maipka Bongo	879	785	Kol HC	453	96	256	20.03.18	1	1	0	15	FM, AM	Air/Road
		Aimeka Kulamel	703	788	Kol HC	557	91	285	20.03.18	1	1	0	0	FM, AM	Air/Road
		Kol Station	128	254	Kol HC	159	37	90	20.03.18	1	1	0	1	FM, AM	Air/Road
2	Wamku		1,436	1,115		917	194	515		4	3	0	47		
		Wamku	267	190	Kol HC					1					Included in Kol station
		Bokonai	571	354	Kol HC	350	77	191	20.03.18	1	1	0	9	FM, AM	Air/Road
		Kolmulo	339	307	Kol HC	334	67	193	20.03.18	1	1	0	26	FM, AM	Air/Road
		Zine	259	263	Kol HC	233	50	131	20.03.18	1	1	0	12	FM, AM	Air/Road
3	Kilmin		683	446		722	122	408		4	4	0	2		
		Kilmin	277	131	Kol HC	166	28	94	20.03.18	1	1	0	0	FM, AM	2 Hr Trek
		Yambedop	196	165	Kol HC	97	15	58	20.03.18	1	1	0	1	FM, AM	2 Hr Trek
		Kuibangim	210	150	Kol HC	230	37	127	20.03.18	1	1	0	1	FM, AM	2 Hr Trek
		Bangim			Kol HC	229	42	129	20.03.18	1	1	0	0	FM, AM	
4	Meginpol		936	716		564	128	321		4	4	0	51		
		Meginpol	270	146	Kol HC	140	31	82	21.03.18	1	1	0	10	FM, AM	2 Hr Trek
		Kilmanka	454	293	Kol HC	132	32	74	21.03.18	1	1	0	16	FM, AM	2 Hr Trek
		Murboki	185	146	Kol HC	237	50	133	21.03.18	1	1	0	16	FM, AM	2 Hr Trek
		Meginpol C/S	27	130	Kol HC	55	15	32	21.03.18	1	1	0	9	FM, AM	2 Hr Trek
5	Mongum		1,246	877		1,006	164	491		3	0	0	0		
		Mongum	518	344	Ambulua HC	349	65	179	24.03.18	1	0	0	0		Trek
		Ambnum	518	405	Ambulua HC	491	63	234	24.03.18	1	0	0	0		Trek
		Ngond Kendei	210	128	Ambulua HC	166	36	78	24.03.18	1	0	0	0		Trek
6	Mame		797	676		634	130	298		3	0	0	0		
		Mame	187	214	Ambulua HC	219	45	102	24.03.18	1	0	0	0		2 Hr Trek
		Danduam	391	258	Ambulua HC	247	50	114	24.03.18	1	0	0	0		2 Hr Trek
		Kool	219	204	Ambulua HC	168	35	82	24.03.18	1	0	0	0		2 Hr Trek
7	Kunmol		405	409		609	106	293		3	0	0	0		
		Kunmol	234	166	Ambulua HC	309	44	154	25.03.18	1	0	0	0		2 Hr Trek
		Ngazai	79	95	Ambulua HC	117	24	55	25.03.18	1	0	0	0		2 Hr Trek
		Kendei	92	148	Ambulua HC	183	38	84	25.03.18	1	0	0	0		2 Hr Trek
8	Guma		659	673		883	200	416		2	0	0	0		
		Guma	235	311	Ambulua HC	443	100	212	26.03.18	1	0	0	0		3 Hr Trek
		Goimbo	424	362	Ambulua HC	440	100	204	26.03.18	1	0	0	0		3 Hr Trek
9	Gepal		744	579		223	54	116		2	0	0	0		
		Gepal	454	297	Ambulua HC	129	35	68	26.03.18	1	0	0	0		3 Hr Trek
		Bial	290	282	Ambulua HC	94	19	48	26.03.18	1	0	0	0		3 Hr Trek
10	Yewaremul		905	569		823	143	364		1	0	0	0		
		Yewaremul	905	569	Ambulua HC	823	143	364	26.03.18	1	0	0	0		5 Hr Trek
11	Dungo		650	377		728	142	331		2	0	0	0		
		Dungo	509	304	Ambulua HC	478	92	227	26.03.18	1	0	0	0		6 Hr Trek
		Kilwa Dungo	141	73	Ambulua HC	250	50	104	26.03.18	1	0	0	0		6 Hr Trek
12	Bubulsunga		617	562		479	112	275		2	2	0	17		
		Bubulsunga	140	249	Kol HC	285	63	161	21.03.18	1	1	0	0	FM, AM	8 Hr Trek
		Komplankia	477	313	Kol HC	194	49	114	21.03.18	1	1	0	17	FM, AM	8 Hr Trek
13	Omun		421	417		324	84	191		1	1	0	1		
		Omun	421	417	Kol HC	324	84	191	21.03.18	1	1	0	1	FM, AM	8 Hr Trek
14	Kalingimpkul		280	70		347	50	163		1	1	0	4		
		Kalingimpkul	280	70	Olna HC	347	50	163	06.04.18	1	1	0	4	93 FM	2 days trek
15	Bupkile		840	820		1,113	150	522		1	1	0	11		
		Bupkile	840	820	Olna HC	1,113	150	522	06.04.18	1	1	0	11	93 FM	2 days trek
16	Bial		545	123		809									

LLG	WARD	Villages	Estimated 2018 Data Based On 2000 Census	Estimated 2018 Data Based On 2015 Data	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Houses With Radios	Radio Networks	Comments
		Kosap	703	844	Olna HC	827	99	388	04.04.18	1	1	0	14	93 FM	6 hours trek
18	Kurunga		470	446		973	150	454	0	2	2	0	5		
		Kurunga	470	446	Olna HC	732	100	344	03.04.18	1	1	0	4	93 FM	5 hours trek
		Konmadang		NEW	Olna HC	241	50	110	03.04.18	1	1	0	1	93 FM	15mins by vehicle/2 hours trek
19	Kouila		1,493	1,241		1,406	270	673	0	5	5	0	74		
		Kouila	692	527	Olna HC	330	72	163	05.04.18	1	1	0	5	93 FM	Station
		Korala	316	344	Olna HC	141	26	66	05.04.18	1	1	0	6	93 FM	10 mins by vehicle
		Ziki	445	370	Olna HC	527	100	247	05.04.18	1	1	0	40	93 FM	4 hrs trek
		Olna H/ Centre	40	0	Olna HC	80	15	38	05.04.18	1	1	0	3	93 FM	HC vicinity
		Domi		NEW	Olna HC	328	57	159	05.04.18	1	1	0	20	93 FM	15 mins by vehicle
20	Nokuna		995	1,009		899	150	444	0	3	3	0	9		
		Nokuna	310	370	Olna HC	338	50	167	04.04.18	1	1	0	5	93 FM	30 mins by vehicle
		Kose	381	353	Olna HC	287	50	142	04.04.18	1	1	0	4	93 FM	50 mins by vehicle
		Wali	304	285	Olna HC	274	50	135	04.04.18	1	1	0	0	93 FM	20 mins by vehicle
21	Yambedop		643	616		535	100	262	0	1	1	0	8		
		Yambedop	643	616	Olna HC	535	100	262	04.04.18	1	1	0	8	93 FM	30 mins by vehicle
22	Waramanz 1		2,285	2,172		1,514	311	711	0	7	7	0	128		
		Asmila (Waramanz 1)	147	239	Waramanz SHC	419	88	197	03.04.18	1	1	0	40	93 FM	1hr vehicle/1hr/40mins trek
		Alapbol	144	199	Waramanz SHC	164	36	77	05.04.18	1	1	0	17	93 FM	1hr vehicle/30mins trek
		Gobo	1,119	790	Waramanz SHC	367	72	172	04.04.18	1	1	0	38	93 FM	1hr vehicle/2hrs/30mins trek
		Gobo Community School	48	137	Waramanz SHC	54	12	25	04.04.18	1	1	0	0	93 FM	1hr vehicle/2hrs/30mins trek
		Waramanz 2 (Aral)	693	605	Waramanz SHC	225	38	106	04.04.18	1	1	0	27	93 FM	1hr vehicle/2hrs trek
		Konden		NEW	Waramanz SHC	149	37	70	07.04.18	1	1	0	0	93 FM	
		Zimbdamp	134	202	Waramanz SHC	136	28	64	04.04.18	1	1	0	6	93 FM	1hr vehicle/1hr/20mins trek
23	Gakip		675	527											
		Gakip	210	174	Kol HC										Included in Kui
		Kui	187	175	Kol HC										same village as Kuibangim
		Wolukane	277	178	Kol HC										Election related tribal fight -not exist
24	Junk Aral		851	0											
		Kukapang	345	0	Kol HC										Trek
		Maipka Yangali	72	0	Kol HC										Trek
		Foroko	434	0	Kol HC										Trek

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