

ROTARIANS AGAINST MALARIA



LONG LASTING INSECTICIDAL NET DISTRIBUTION REPORT

WESTERN HIGHLANDS PROVINCE Mount Hagen District

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

With Support From Against Malaria Foundation and Global Fund

1 March - 20 April 2018



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Annex One Detailed Distribution Data For Mount Hagen District

Executive Summary

Western Highlands is a highlands province of PNG with mountains that rise up to over 3,600 metres in the south west with low lying areas in the north going as low as 400 meters (See Appendix Three). It is made up of four districts Dei, Mul Bayer, Tambil Nebliyer (all of which received nets in 2017). and Mount Hagen District which now received nets in 2018. Mount Hagen is further made up of Mount Hagen Rural and Mount Hagen Urban. Due to a new malaria stratification of PNG, high altitude urban areas such as Mount Hagen Urban will no longer receive nets. Thus Mount Rural only received nets in 2018.

A family level survey and distribution of Long Lasting Insecticidal Nets (LLINs) was carried out between 1 March and 20 April 2018 in Mount Hagen Rural of Mount Hagen. This whole area surrounds Mount Hagen Urban (Mount Hagen City) and is completely accessible by road.

Table One shows the estimated population and actual population found in Mount Hagen Rural along with the number of LLINs distributed. In total, 55,268 LLINs were distributed to a population of 113,203 people. This resulted in distribution of 48.8 nets for every 100 people in the province.

TABLE ONE – Population And Nets Distributed In 2018

District	Census Population 2000	Population Censured In 2012	Population Surveyed 2018	House Holds Surveyed 2018	Nets Issued 2018
Mt Hagen Rural	59,074	82,946	113,203	22,835	55,268
Totals	59,074	82,946	113,203	22,835	55,268

A further 124 LLINs were donated to health centres as nets were surplus to requirement at specific health centres and were donated to the health centres for distribution to pregnant mothers and for hospital beds where needed.

The overall operational cost of the programme was K195,942.76 Kina (Approximately US\$60,290) resulting in a unit cost of about 3.55 Kina or US\$1.09 per net delivered which was about 9% over the anticipated overall budget. There were overspends in car hire, fuel and human resources.

Overall, the distribution went very well in Western Highlands with no problems. The only major issue was that the border between Mount Hagen Rural and Mount Hagen Urban join each other and it is difficult in places to know where one stopped and the other started. Therefore it is believed that some people from the Urban Area managed to get themselves included in the distribution which resulted in higher than expected population. However, high growth rates are also possible as Mount Hagen (both Rural and Urban) are an area of major growth to which people from other parts of the highlands come to settle.

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 nets to together with nets from the Global Funds to ensure that all of Mount Hagen Rural was covered. However, the Global Fund (GF) provided the delivery costs of nets at the family level. Without these two donors, the delivery of nets into Western Highlands would not have been possible.

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



Fig.1 – Training Volunteers In Balg and Tentenga Health Centres

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)

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.



Fig.2 Road Side Difficulties (Slippery Roads and Road Blocks) In And Around Mount Hagen

Much of Mount Hagen District lies in areas where malaria transmission is considered low and probably for the most part transmission of *P.vivax* only (1600 – 2000m). However, the north western part of the district lies in zone below 1600 metres in zones which are considered epidemic in nature along the Waghi Valley (1200 – 1600m).

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.



Fig.3 – Volunteer Training (Left) And Village List Posted In Central Location (Right) In Kagamuga

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. Most of the programme was carried out from March 1 to March 27. However, due to a village being missed accidentally, a team returned to complete the work in April as per Table Two.

TABLE TWO
General Timetable Of Activities In Western Highlands

District	Survey		Distribution	
	Start	Finish	Start	Finish
Mt Hagen Rural	01.03.18	20.03.18	15.03.18	27.03.18
Kaim (Ward 23)	20.04.18	20.04.18	21.04.18	21.04.18

Methodology

Prior to planning and implementation, a master list of all villages of Western Highlands 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 Western Highlands 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 Unloading Containers At Mount Hagen Hospital (Left) And Distribution In The Rain (Right)

- 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 Western Highlands. 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. WH18 for Western Highlands 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 Western Highlands 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 Western Highlands Province, all LLINs were delivered to Lae by ship from Vietnam (via Singapore) in three containers where they were custom cleared. These containers were temporarily stored in Lae before being transported by road to Mount Hagen.

Results

Table Three shows that the programme surveyed in Mount Hagen Rural a total of 113,203 people to which were distributed 55,268 LLINs. This resulted in distribution of 49.0 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 seems to indicate that there has been a very high growth rate in Mount Hagen Rural. While Mount Hagen is the largest commercial centre in the area and many rural people come to Mount Hagen to settle, it is felt that this growth rate does not reflect this immigration of people. It is felt that this is much more likely that people in Mount Hagen Urban who live close to the border has been claiming to belong to the villages in Mount Hagen Rural. This proved to be very difficult to control as it is not clear where exactly the border is and where one village in Mount Hagen Rural started and where Mount Hagen Rural started.

TABLE THREE
Nets Distributed At LLG Level In Western Highlands

District	Census Population 2000	Population Censured In 2012	Population Surveyed 2018	House Holds Surveyed 2018	Nets Issued 2018	Growth Rate Against 2012 Survey	Growth Rate Against 2000 Survey	Nets Distributed Per 100 People
Mt Hagen Rural	59,074	82,946	113,203	22,835	55,268	5.32	3.68	48.8
Totals	59,074	82,946	113,203	22,835	55,268	5.32	3.68	48.8

TABLE FOUR
Nets Donated To Health Centres

District	LLG	HC	Donated
Mt Hagen	Mt Hagen Rural	Togoba HC	27
Mt Hagen	Mt Hagen Rural	Rebiamul	97
Final			124

Referring to Table Four, it can be seen that a further 124 LLINs were donated to health centres as nets were surplus to requirement. These nets would be used by pregnant mothers and for hospital beds where needed.

TABLE FIVE
Cost Of Programme In Western Highlands (All in Kina)

Expense Types	Budget	Actual	Variences	% Variences
Human Resources	K42,963.07	K54,860.73	-K11,897.66	-27.7
Fuel Cost	K13,872.00	K18,979.24	-K5,107.24	-36.8
Car Hire Cost	K113,000.00	K117,600.00	-K4,600.00	-4.1
Stationeries/Supplies	3000	K1,273.87	K1,726.13	42.5
5% Contingency	K6,621.75	K3,228.92	K3,392.83	48.8
Total	K179,456.82	K195,942.76	-K16,485.94	-9.2

Referring to Table Five , it can be see that the overall operational cost of the programme was K195,942.76 Kina (Approximately US\$60,290) resulting in a unit cost of about 3.55 Kina or US\$1.09 per net delivered which was about 9% over the anticipated overall budget. There were overspends in car hire, fuel and human resources. However, it is believed that the cost may be lower than this as it is thought that some of the car costs have been attributed to Mount Hagen when they may have been used for part of the time in other provinces.

The project also looked at radio or cell phone coverage in the different parts of Western Highlands. Referring to Table Six, the data suggests that in Western Highlands, there is generally a good coverage of cell networks but surprising many villages are reporting no radio networks. This also does not explain why radio ownership is also generally low with only about 30% of households owning a radio.

TABLE SIX
Cell and Radio Coverage In Western Highlands

District	Villages	Digicel	Bmobile	Citifon	Houses with Radios	Radio Network
Mt Hagen	307	291	197	113	6,951	235
Total	307	291	197	113	6,951	235

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 Western Highlands 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.5 – Distributions In Togoba

Acknowledgements

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

In particular, we would like to thank, at provincial level, Dr Benson Safi (Director of Public Health), Nelson Mannaseh (Provincial Malaria Supervisor) and Mr Kerry Kubu (Rural Health Coordinator) for working closely with the RAM team in providing the direction and assistance whilst in the province.

For the district staff, we would like to thank all those 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:

TABLE SEVEN
Acknowledgements

No.	Name of person	Position	Location
1	Malcom Yuants	CHW	Togoba HC
2	Sai Hanguai	HEO	Togoba HC
3	Mrs. Anna Koubuli	HEO	Tentenga HC
4	Anis Mata	CHW	Tentenga HC
5	Mrs. Susan Simon	SIC	Balg
6	Mr. Titus Tull	District Disease Control Officer	Kilau HC
7	Mr. Senis Heruno	CHW	Ogulben HC
8	John Anis	CHW	Ogulben HC
9	David Karipu	OIC	Rabiamul HC

RAM would like to acknowledge the support received from service providers like Airport Car Hire, Manawa Car Hire and Pison Car Hire for providing transport and sincere appreciation to the church run facilities under, Catholic, Seven Day Adventist (SDA) and Faith Church Health Services for allowing their staff to work with the RAM team.

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.

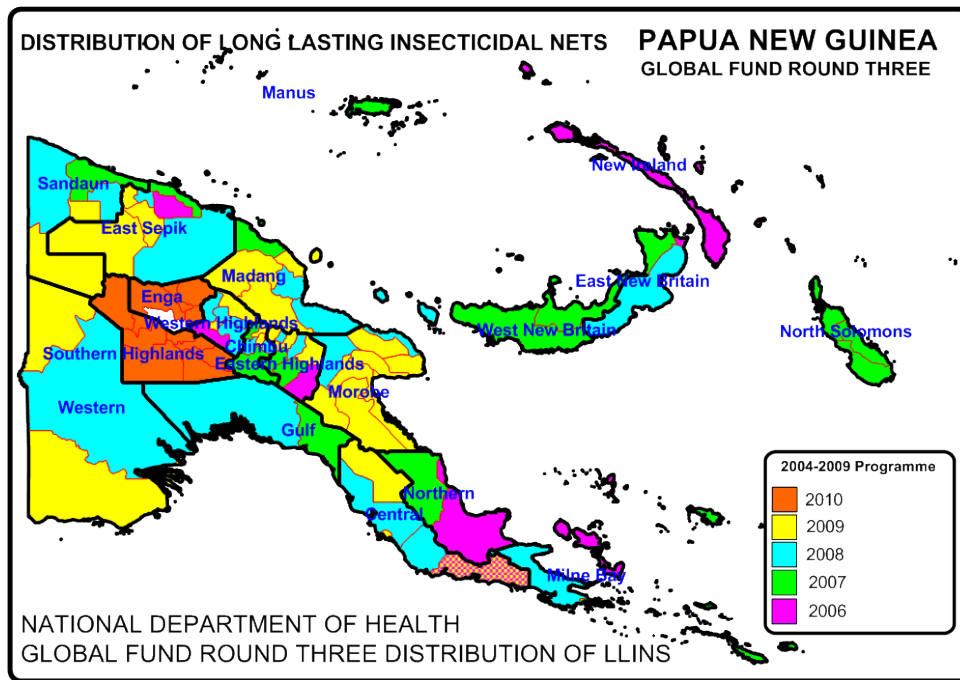


Fig. 1 Distribution Of Nets Under National Department Of Health From 2006 To 2010

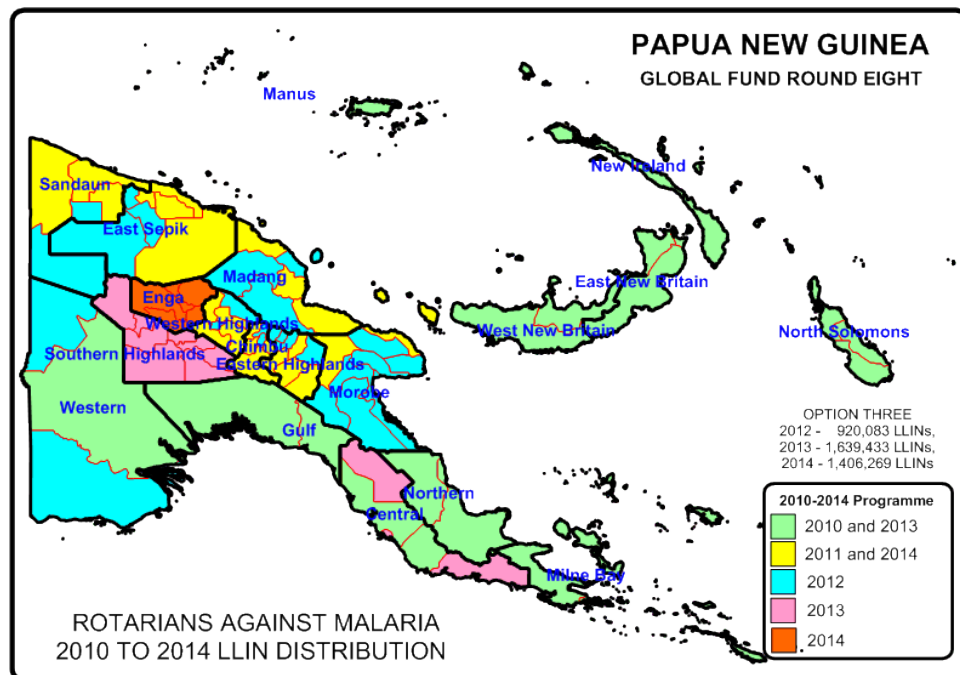


Fig.2 Distribution of LLIN Programme 2010 to 2014

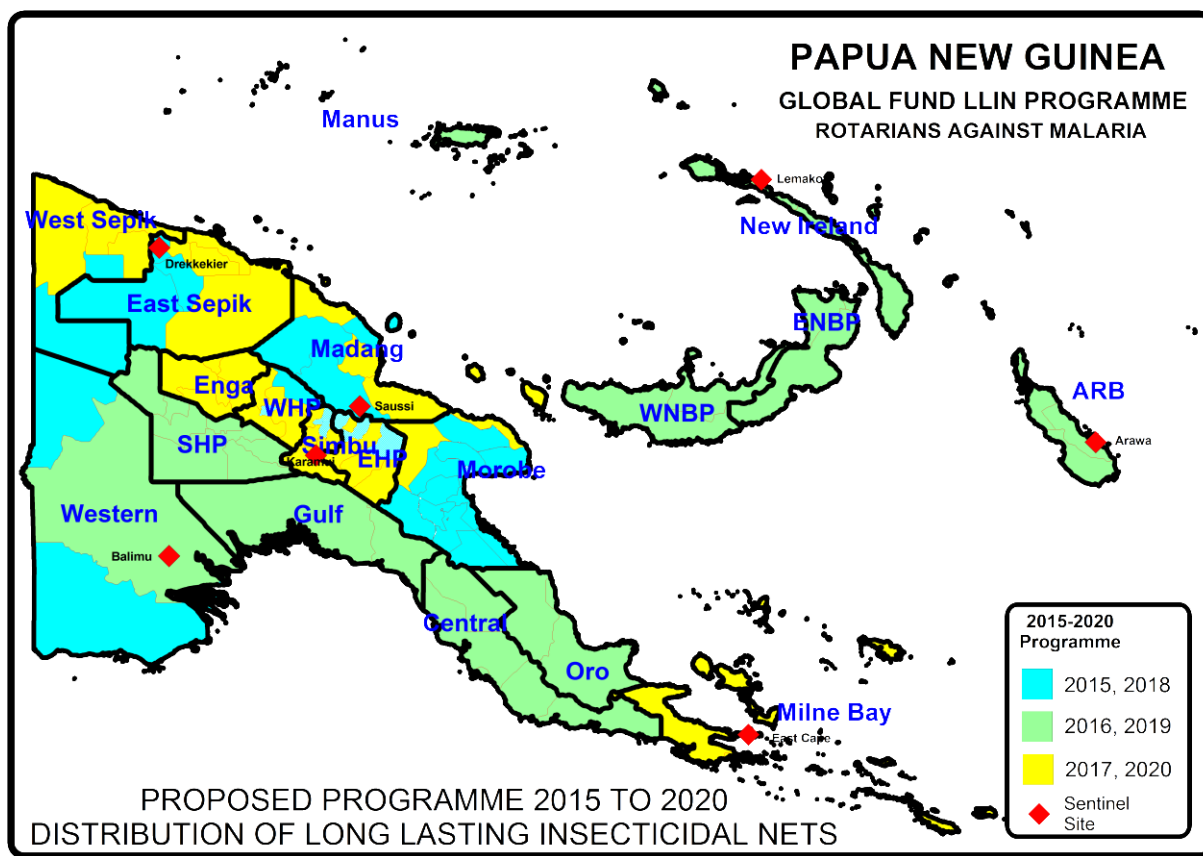


Fig.3 LLIN Distribution Programme 2015 to 2017

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.

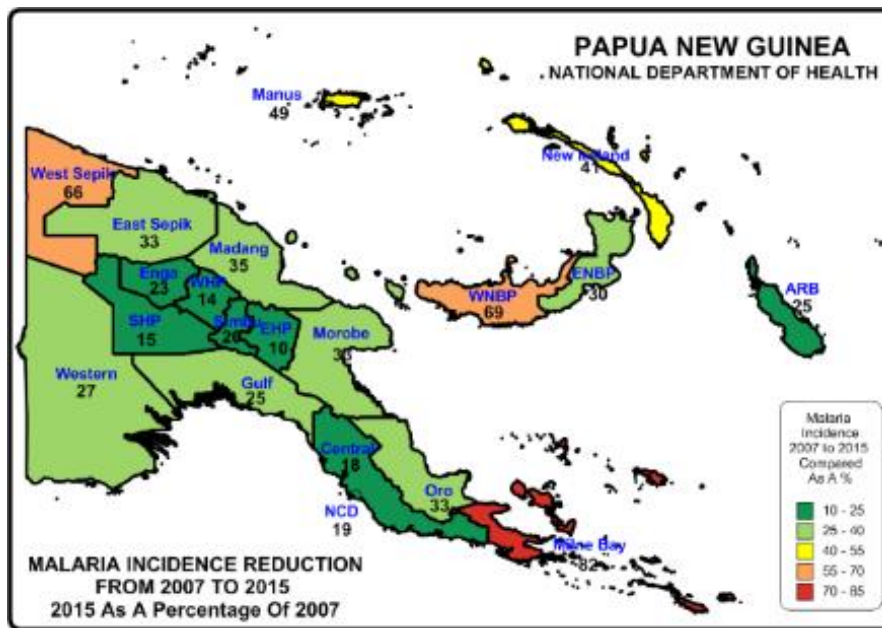


Fig.1 – Relative Reduction Of Malaria In Provinces Of PNG

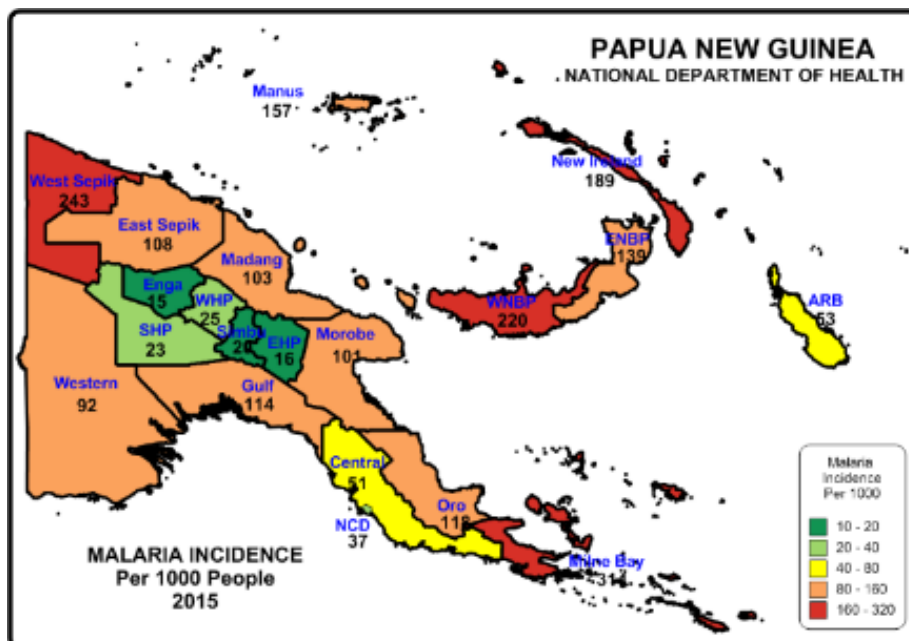


Fig.2 – Reported Malaria Incidence In 2015

- 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.

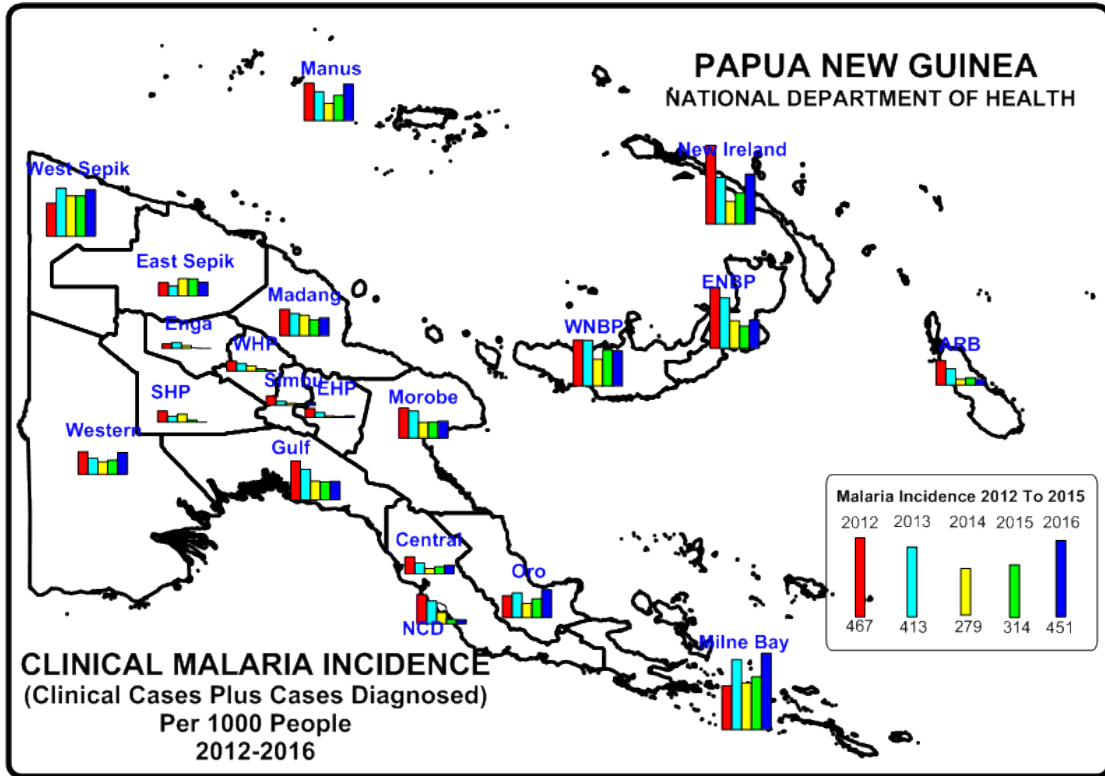


Fig. 3 - Reported Malaria Incidence In PNG From 2012 To 2016

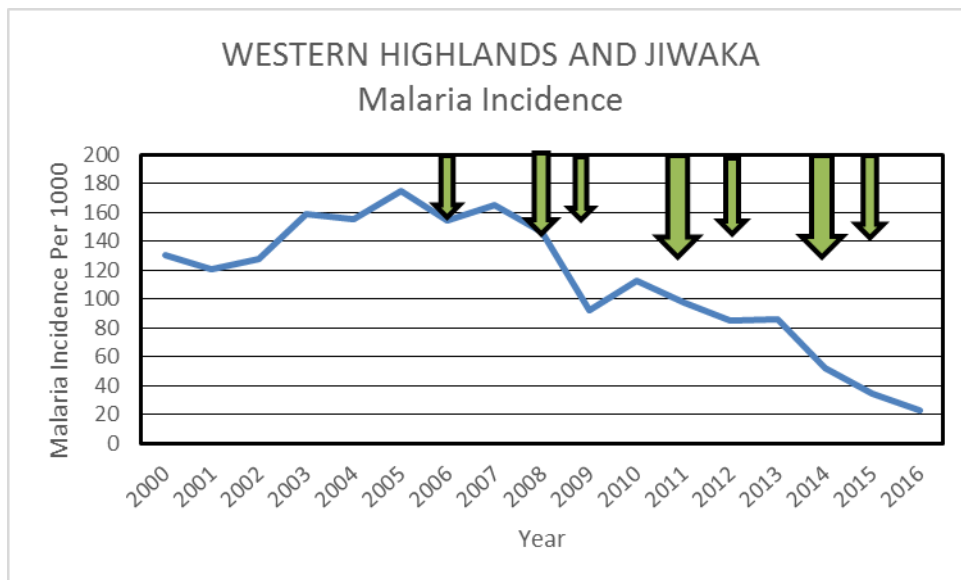


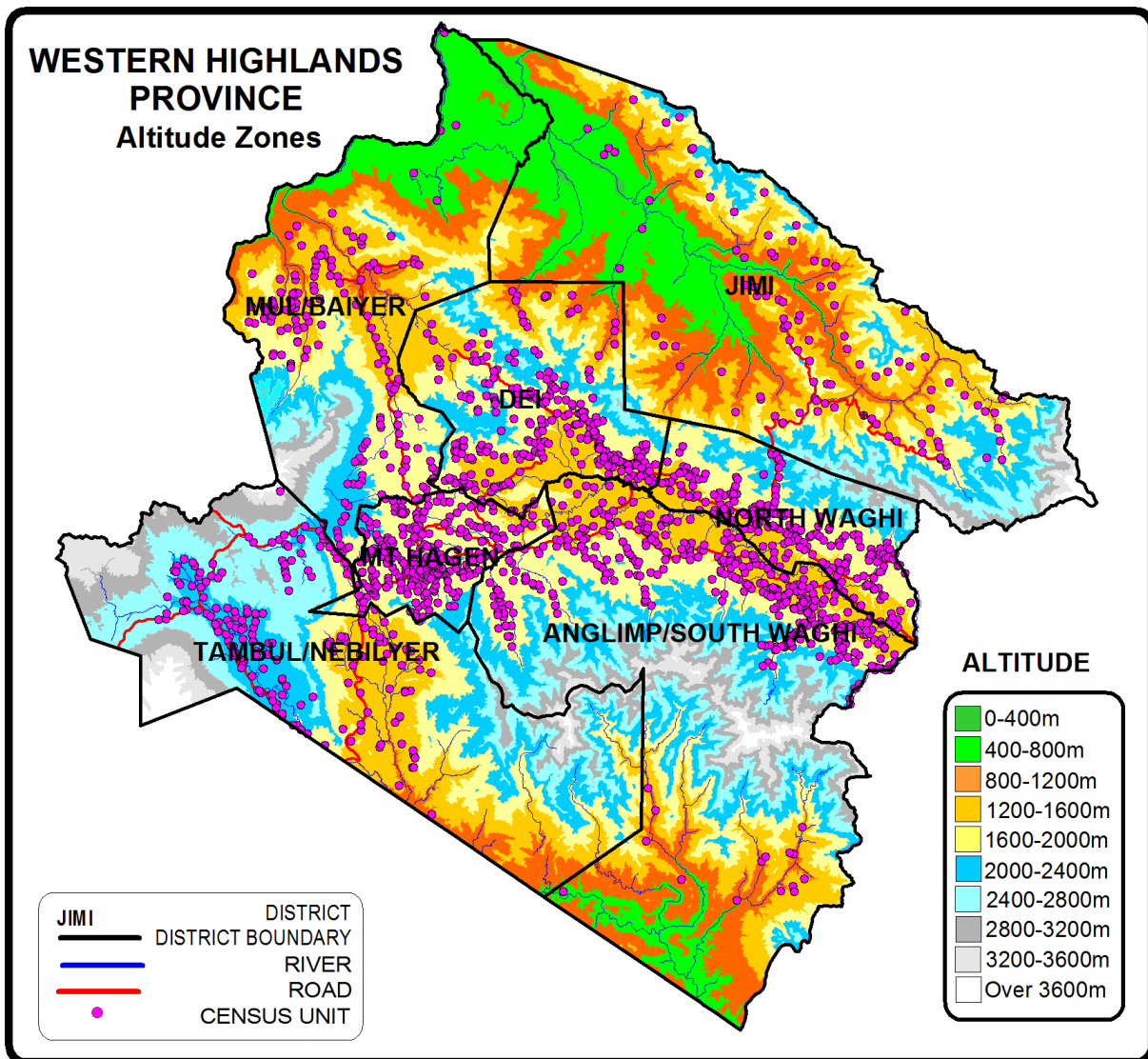
Fig. 4 – Malaria Incidence Versus Distribution Of Nets

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

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 Mount Hagen 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



Getting Political Support from the CEO of Mount Hagen



Distributions In The Rain At Balg



Distributions In Kagamuga

OTHER PICTURES



Distributions In Kagamuga

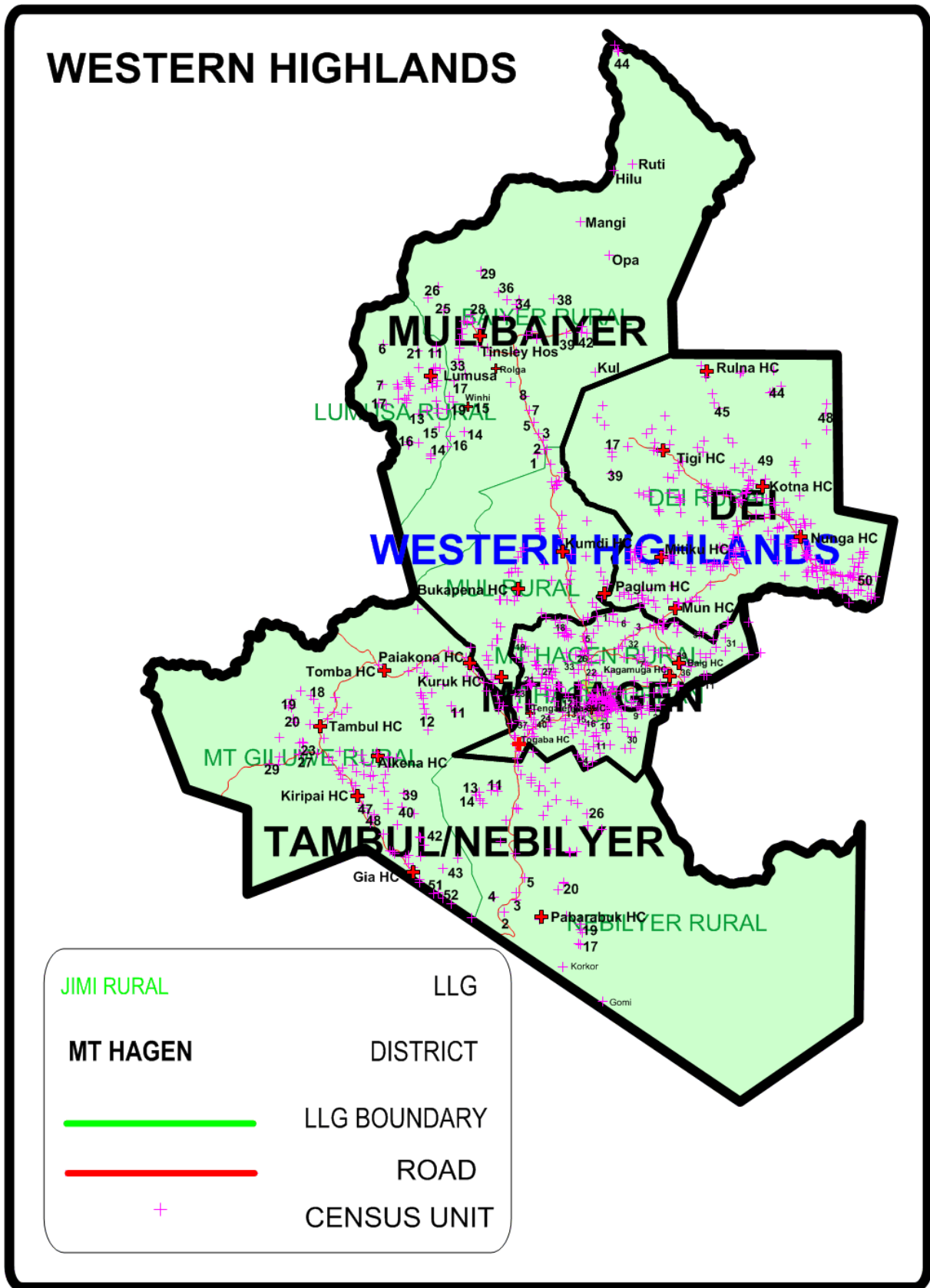


Happy Customers In Balg



Distributions In Rebiamul

Appendix Five - Map Of Western Highlands Showing Census Points Of 2000 Census



ANNEX ONE

WESTERN HIGHLANDS PROVINCE
MOUNT HAGEN DISTRICT POPULATION 2018
LLIN DISTRIBUTION REPORT SUMMARY SHEET

LLG	WARD	VILLAGE	Estimated 2018 Population Based On 2000 Census	Estimated 2018 Population Based On 2012	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Citifon	Houses With Radios	Radio Networks	Comment
MOUNT HAGEN DISTRICT			149,886	146,007		113,203	22,835	55,268		307	291	197	113	6,951	235	
MT HAGEN RURAL			101,832	108,771		113,203	22,835	55,268		307	291	197	113	6,951	235	
1	Kumunga		3,036	3,382		2,984	682	1,517		9	9	9	9	174		
		Kumunga	398	466	Kagamuge HC	495	131	244	18.03.18	1	1	1	1	36	Eagle FM	Road
		Panga	450	310	Kagamuge HC	478	100	241	18.03.18	1	1	1	1	15	Eagle FM	Road
		Gor	336	233	Kagamuge HC	94	28	51	21.03.18	1	1	1	1	0	Eagle FM	Road
		Yupa	333	307	Kagamuge HC	250	50	129	23.03.18	1	1	1	1	5	Eagle FM	Road
		Kupet	286	426	Kagamuge HC	219	54	106	21.03.18	1	1	1	1	3	Eagle FM	Road
		Kumbilika	398	444	Kagamuge HC	434	100	220	23.03.18	1	1	1	1	14	Eagle FM	Road
		Kekla/Gelka	159	362	Kagamuge HC	341	50	169	21.03.18	1	1	1	1	50	Eagle FM	Road
		Kumunga 2	452	362	Kagamuge HC	411	100	220	18.03.18	1	1	1	1	50	Eagle FM	Road
		Kumbaimb	224	472	Kagamuge HC	262	69	137	21.03.18	1	1	1	1	1	Eagle FM	Road
2	Kiliga		2,425	2,217		2,659	458	1,329		7	7	7	0	137		
		Kiliga	315	234	PHO	320	49	166	24.03.18	1	1	1	0	0	AM/FM	Road
		Kalina	245	450	PHO	277	50	135	24.03.18	1	1	1	0	9	AM/FM	Road
		Kiapela	472	394	PHO	417	74	206	23.03.18	1	1	1	0	6	AM/FM	Road
		Kirkamp	238	216	PHO	404	49	207	23.03.18	1	1	1	0	6	AM/FM	Road
		Mamda	414	164	PHO	552	100	280	23.03.18	1	1	1	0	63	AM/FM	Road
		Koma	591	525	PHO	494	100	241	23.03.18	1	1	1	0	46	AM/FM	Road
		Mambela	150	234	PHO	195	36	94	23.03.18	1	1	1	0	7	AM/FM	Road
3	Kelua 2		4,058	5,211		5,158	1,019	2,542		14	13	5	5	410		
		Kelua	491	494	Kagamuge HC	945	197	493	23.03.18	1	1	1	1	173	Eagle FM	Road
		Epp	84	681	Kagamuge HC					1						Included under Kelua
		Ambra	285	429	Balg HC	177	35	83	26.03.18	1	1	0	0	0		Road
		Baniwan	162	155	Balg HC	65	10	31	26.03.18	1	1	0	0	0		Road
		Gena	379	429	Balg HC	268	56	129	26.03.18	1	1	0	0	0		Road
		Bagalaga	53	238	Balg HC	224	48	111	26.03.18	1	1	0	0	0		Road
		Kumka	341	426	Kagamuge HC	333	50	161	21.03.18	1	1	1	1	50	Eagle FM	Road
		Pore	326	550	Balg HC	709	134	333	26.03.18	1	1	0	0	0		Road
		Kuta	245	216	Balg HC	220	46	103	26.03.18	1	1	0	0	0		Road
		Kumul	264	233	Balg HC	273	50	128	26.03.18	1	1	0	0	0		Road
		Kuntlapeng	274	251	Kagamuge HC	525	112	266	21.03.18	1	1	1	1	66	Eagle FM	Road
		Kutipiga	412	370	Kagamuge HC	558	137	282	24.03.18	1	1	1	1	85	Eagle FM	Road
		Puntibugi	483	601	Kagamuge HC	618	94	308	17.03.18	1	1	1	1	36	Eagle FM	Road
		Bani	278	139	Balg HC	243	50	114	26.03.18	1	1	0	0	0		Road
4	Kuguma		1,896	3,003		2,368	533	1,154		6	6	6	6	6		
		Kuguma	374	632	Rebeamul UC	280	69	136	25.03.18	1	1	1	1	0	99.5 FM	Road
		Wanipgama	76	555	Rebeamul UC	156	40	76	25.03.18	1	1	1	1	0	99.5FM	Road
		Olwanga/Kugua	215	293	Rebeamul UC	104	27	51	25.03.18	1	1	1	1	0	99.5FM	Road
		Kilma	593	613	Rebeamul UC	650	150	318	26.03.18	1	1	1	1	0	99.5 FM	Road
		Kilga	288	282	Rebeamul UC	617	150	302	26.03.18	1	1	1	1	0	99.5 FM	Road
		Kantil/Perga	350	629	Rebeamul UC	561	97	271	27.03.18	1	1	1	1	6	99.5FM	Road
5	Kelua 1		1,072	930		1,620	329	831		3	3	3	3	131		
		Kelua 1	495	542	Kagamuge HC	779	150	402	25.03.18	1	1	1	1	76	Eagle FM	Road
		Yamunduga	459	205	Kagamuge HC	586	130	307	23.03.18	1	1	1	1	7	Eagle FM	Road
		Kelua Community School	119	183	Kagamuge HC	255	49	122	17.03.18	1	1	1	1	48	Eagle FM	Road
6	Kik		1,853	1,471		2,296	486	1,157		6	6	4	0	124		
		Kik	202	297	PHO	423	92	212	15.03.18	1	1	1	0	16	NBC/FM	Road
		Apgam	317	201	PHO	562	147	296	15.03.18	1	1	1	0	0	NBC/FM	Road
		Maip 2	648	527	PHO	758	128	378	20.03.18	1	1	1	0	102	NBC/FM	Road
		Kombrom 1	215	125	Balg HC	162	37	76	26.03.18	1	1	0	0	0		Road
		Kombrom 2	193	190	Balg HC	141	32	66	26.03.18	1	1	0	0	0		Road
		Kombrom 3	278	131	PHO	250	50	129	15.03.18	1	1	1	0	6	NBC/FM	Road
7	Tega		6,840	7,316		9,500	1,679	4,653		11	11	11	11	677		
		Tega 1	822	673	Kagamuge HC	844	150	408	17.03.18	1	1	1	1	0	Eagle FM	Road
		Tega 2	602	961	Kagamuge HC	587	116	288	17.03.18	1	1	1	1	0	Eagle FM	Road
		Pultimb 1	615	368	Kagamuge HC	886	143	405	24.03.18	1	1	1	1	60	Eagle FM	Road
		Pultimb 2	722	356	Kagamuge HC	694	136	346	24.03.18	1	1	1	1	46	Eagle FM	Road
		Dobel	1,355	2,063	Kagamuge HC	2,613	504	1,304	18.03.18	1	1	1	1	325	Eagle FM	Road
		Waghi	514	294	Kagamuge HC	353	70	189	19.03.18	1	1	1	1	36	Eagle FM	Road
		Kubakena	622	377	Kagamuge HC	832	163	404	17.03.18	1	1	1	1	49	Eagle FM	Road
		Goldline Lodge	221	310	Kagamuge HC	651	100	320	18.03.18	1	1	1	1	53	Eagle FM	Road
		Goumua	459	918	Kagamuge HC	380	97	198	18.03.18	1	1	1	1	53	Eagle FM	Road
		Makatamb 1	453	571	Kagamuge HC	929	100	444	20.03.18	1	1	1	1	1	Eagle FM	Road
		Makatamb 2	455	424	Kagamuge HC	731	100	347	20.03.18	1	1	1	1	54	Eagle FM	Road
8	Koglamp		4,535	4,941		4,729	908	2,193		6	6	6	0	322		
		Koglamp			PHO	486	98	221	26.03.18	1	1	1	0	48	NBC/FM	Road
		Kontila	579	1,564	PHO	526	95	240	26.03.18	1	1	1	0	14	NBC/FM	Road
		Bomrui & Luth. Church	1,048	651	PHO	1,082	248	500	26.03.18	1	1	1	0	98	NBC/FM	Road
		Poimind	693	1,457	PHO	853	150	407	26.03.18	1	1	1	0	74	NBC/FM	Road
		Kirininga	934	230	PHO	630	96	284	26.03.18	1	1	1	0	37	NBC/FM	Road
		Raglaimp	1,281	1,039	PHO	1,152	221	541	26.03.18	1	1	1	0	51	NBC/FM	Road
9	Tiling		3,870	4,050		3,976	675	1,941		12	11	11	0	155		
		Tiling	317	887	PHO	276	50	132	23.03.18	1	1	1	0	1	NBC/FM	Road
		Kurumi	576	642	PHO	471	100	227	23.03.18	1	1	1	0	13	NBC/FM	Road
		Pou	574	390	PHO	414	74	175	23.03.18	1	1	1	0	6	NBC/FM	Road
		Moparui	465	430	PHO	379	63	181	23.03.18	1	1	1	0	22	NBC/FM	Road

LLG	WARD	VILLAGE	Estimated 2018 Population Based On 2000 Census	Estimated 2018 Population Based On 2012	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Citifon	Houses With Radios	Radio Networks	Comment
		Kuga	388	427	PHO	407	76	200	23.03.18	1	1	1	0	12	NBC/FM	Road
		Kuri	334	289	PHO	312	50	150	23.03.18	1	1	1	0	0	NBC/FM	Road
		Wagapil	496	399	PHO	348	56	179	23.03.18	1	1	1	0	15	NBC/FM	Road
		Kala	390	261	PHO	590	68	299	23.03.18	1	1	1	0	58	NBC/FM	Road
		Kamuk	240	228	PHO	267	50	138	23.03.18	1	1	1	0	11	NBC/FM	Road
		Roma			PHO	276	38	138	23.03.18	1	1	1	0	9	NBC/FM	New Village
		Kolkingi	90	96	PHO	236	50	122	23.03.18	1	1	1	0	8	NBC/FM	Road
		Mount Kuta		0	Rebeamul UC					1					NBC/FM	Included under Kuta Wd 11
10	Kingaldui 1		1,241	1,182		1,717	212	823		6	6	6	6	85		
		Bila	124	190	Rebeamul UC	211	25	103	17.03.18	1	1	1	1	16	FM 99.5	Road
		Jalua	160	153	Rebeamul UC	201	26	98	17.03.18	1	1	1	1	3	FM 99.5	Road
		Konba	293	349	Rebeamul UC	273	30	134	17.03.18	1	1	1	1	16	FM 99.5	Road
		Kugmumb	522	321	Rebeamul UC	325	25	159	17.03.18	1	1	1	1	23	FM 99.5	Road
		Kunmong	141	170	Rebeamul UC	137	13	67	17.03.18	1	1	1	1	10	FM 99.5	Road
		Rabiamul Station		New	Rebeamul UC	570	93	262	18.03.18	1	1	1	1	17	FM 99.5	Road
11	Korobuk		1,996	2,713		2,703	433	1,314		8	8	8	8	103		
		Korobuk	183	734	Rebeamul UC	248	50	122	18.03.18	1	1	1	1	0	99.5 FM	Road
		Kilipinga	205	252	Rebeamul UC	332	50	163	20.03.18	1	1	1	1	17	99.5 FM	Road
		Kuta	255	220	Rebeamul UC	314	43	150	18.03.18	1	1	1	1	8	99.5 FM	Road
		Pou	307	224	Rebeamul UC	357	50	175	18.03.18	1	1	1	1	17	99.5 FM	Road
		Gamba/Kontpang	250	204	Rebeamul UC	259	58	125	25.03.18	1	1	1	1	0	99.5 FM	Road
		Gatik (Kurkum)	98	312	Rebeamul UC	419	50	205	18.03.18	1	1	1	1	25	99.5 FM	Road
		Kia	234	155	Rebeamul UC	323	40	155	18.03.18	1	1	1	1	2	99.5 FM	Road
		Pipirpeng	464	611	Rebeamul UC	451	92	219	20.03.18	1	1	1	1	34	99.5 FM	Road
12	Biaprui		2,972	2,352		3,167	668	1,557		14	14	14	14	497		
		Biaprui	369	229	Rebeamul UC	361	72	180	24.03.18	1	1	1	1	64	99.5 FM	Road
		Ban	412	251	Rebeamul UC	255	50	125	27.03.18	1	1	1	1	50	99.5 FM	Road
		Gelka	45	64	Rebeamul UC	40	8	20	25.03.18	1	1	1	1	8	99.5 FM	Road
		Nokwarui	171	222	Rebeamul UC	211	50	103	24.03.18	1	1	1	1	42	99.5 FM	Road
		Tipmul	50	99	Rebeamul UC	241	50	118	24.03.18	1	1	1	1	49	99.5 FM	Road
		Kelowagi	153	142	Rebeamul UC	249	50	122	23.03.18	1	1	1	1	50	99.5 FM	Road
		Waipeng	47	33	Rebeamul UC	26	5	13	25.03.18	1	1	1	1	5	99.5 FM	Road
		Minjip	481	408	Rebeamul UC	481	100	237	26.03.18	1	1	1	1	96	99.5 FM	Road
		Kala	312	152	Rebeamul UC	231	50	114	27.03.18	1	1	1	1	28	99.5 FM	Road
		Numnump	138	99	Rebeamul UC	209	50	102	24.03.18	1	1	1	1	25	99.5 FM	Road
		Andakapela	353	289	Rebeamul UC	253	50	124	24.03.18	1	1	1	1	22	99.5 FM	Road
		Kimpilpalga	350	281	Rebeamul UC	148	33	73	24.03.18	1	1	1	1	0	99.5 FM	Road
		Ouri	91	82	Rebeamul UC	225	50	110	25.03.18	1	1	1	1	10	99.5 FM	Road
		Kala 2			Rebeamul UC	237	50	116	26.03.18	1	1	1	1	48	99.5 FM	Road
13	Keltiga		2,248	1,882		2,321	416	1,136		7	7	7	7	188		
		Keltiga	272	226	Rebeamul UC	295	50	145	20.03.18	1	1	1	1	1	99.5 FM	Road
		Datinga	345	369	Rebeamul UC	252	49	123	20.03.18	1	1	1	1	49	99.5 FM	Road
		Kintipenta	243	226	Rebeamul UC	485	84	238	20.03.18	1	1	1	1	3	99.5 FM	Road
		Kakrui	331	371	Rebeamul UC	211	50	103	20.03.18	1	1	1	1	1	99.5 FM	Road
		Kilant	336	93	Rebeamul UC	445	83	217	20.03.18	1	1	1	1	83	99.5 FM	Road
		Bul	405	307	Rebeamul UC	279	50	137	20.03.18	1	1	1	1	50	99.5 FM	Road
		Kelowagi 2	315	290	Rebeamul UC	354	50	173	23.03.18	1	1	1	1	1	99.5 FM	Road
14	Gabina		2,046	1,269		1,871	299	908		4	4	4	0	218		
		Gabina	650	166	PHO	661	99	319	15.03.18	1	1	1	0	95	NBC/FM	Road
		Kirininga	350	324	PHO	687	100	329	15.03.18	1	1	1	0	28	NBC/FM	Road
		Koldom	428	346	PHO	253	50	127	15.03.18	1	1	1	0	45	NBC/FM	Road
		Kumuipana	619	433	PHO	270	50	133	15.03.18	1	1	1	0	50	NBC/FM	Road
15	Palimb 2		3,841	2,940		3,139	658	1,538		9	9	9	9	70		
		Wanmul	419	367	Rebeamul UC	269	50	132	20.03.18	1	1	1	1	0	99.5 FM	Road
		Gumas	300	240	Rebeamul UC	469	100	228	20.03.18	1	1	1	1	0	99.5 FM	Road
		Pereka	333	267	Rebeamul UC	465	80	230	20.03.18	1	1	1	1	12	99.5 FM	Road
		Pulgbulg	700	367	Rebeamul UC	249	50	122	20.03.18	1	1	1	1	2	99.5 FM	Road
		Rump	210	155	Rebeamul UC	249	50	122	20.03.18	1	1	1	1	0	99.5 FM	Road
		Kralmul	164	281	Rebeamul UC	176	29	86	20.03.18	1	1	1	1	27	99.5 FM	Road
		Kogma	283	196	Rebeamul UC	274	50	133	23.03.18	1	1	1	1	9	99.5 FM	Road
		Kamunga	477	534	Rebeamul UC	503	100	247	20.03.18	1	1	1	1	0	99.5 FM	Road
		Ketilakumb	955	534	Rebeamul UC	485	149	238	20.03.18	1	1	1	1	20	99.5 FM	Road
16	Palimb 1		3,711	3,204		3,592	527	1,695		7	7	7	7	278		
		Palimb 1	724	416	Rebeamul UC	588	67	282	23.03.18	1	1	1	1	68	99.5 FM	Road
		Timbilmul	317	254	Rebeamul UC	114	20	55	23.03.18	1	1	1	1	0	99.5 FM	Road
		Welia	552	522	Rebeamul UC	656	98	321	21.03.18	1	1	1	1	83	99.5 FM	Road
		Wipmul/Palimrui	1,160	1,091	Rebeamul UC	1,336	200	600	25.03.18	1	1	1	1	93	99.5 FM	Road
		Kulgmamp	338	382	Rebeamul UC	361	49	173	21.03.18	1	1	1	1	30	99.5 FM	Road
		Kupulga	407	250	Rebeamul UC	320	50	157	23.03.18	1	1	1	1	0	99.5 FM	Road
		Kuning	214	289	Rebeamul UC	217	43	107	23.03.18	1	1	1	1	4	99.5 FM	Road
17	Koge 1		1,617	2,869		2,233	433	1,105		10	10	10	10	250		
		Koge 1	281	296	Kagamuge HC	381	88	187	23.03.18	1	1	1	1	32	Eagle FM	Road
		Puldung	188	665	Kagamuge HC	212	49	105	22.03.18	1	1	1	1	17	Eagle FM	Road
		Panga	202	288	Kagamuge HC	155	29	74	23.03.18	1	1	1	1	29	Eagle FM	Road
		Moparong	202	189	Kagamuge HC	151	30	76	22.03.18	1	1	1	1	15	Eagle FM	Road
		Raltinga	165	106	Kagamuge HC	94	25	48	22.03.18	1	1	1	1	7	Eagle FM	Road
		Kurung	169	675	Kagamuge HC	343	71	175	22.03.18	1	1	1	1	32	Eagle FM	Road
		Pugump	98	184	Kagamuge HC	169	40	87	22.03.18	1	1	1	1	40	Eagle FM	Road
		Maip	90	0	Kagamuge HC	445	50	212	17.03.18	1	1	1	1	50	Eagle FM	Road
		Pugumb Tea	117	196	Kagamuge HC	138	18	68	22.03.18	1	1	1	1	18	Eagle FM	Road
		Koge Peng	105	271	Kagamuge HC	145	33	73	22.03.18	1	1	1	1	10	Eagle FM	Road
18	Koge 2		1,905	2,375		2,373	524	1,215		9	9	9	0	160		
		Koge 2	143	0	PHO	185	46	102	17.03.18	1	1	1	0	1	NBC/FM	Road

LLG	WARD	VILLAGE	Estimated 2018 Population Based On 2000 Census	Estimated 2018 Population Based On 2012	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Citifon	Houses With Radios	Radio Networks	Comment
		Maik	207	0	PHO	214	49	112	17.03.18	1	1	1	0	1	NBC/FM	Road
		Yeimulg	474	811	PHO	542	100	272	19.03.18	1	1	1	0	95	NBC/FM	Road
		Amil 1	212	418	PHO	250	50	112	19.03.18	1	1	1	0	8	NBC/FM	Road
		Kurutip	160	236	PHO	193	46	99	19.03.18	1	1	1	0	0	NBC/FM	Road
		Amil 2	157	168	PHO	213	50	109	19.03.18	1	1	1	0	7	NBC/FM	Road
		Kupulum	248	250	PHO	184	50	101	19.03.18	1	1	1	0	13	NBC/FM	Road
		Romp	91	252	PHO	161	40	83	19.03.18	1	1	1	0	10	NBC/FM	Road
		Mak	212	240	PHO	431	93	225	19.03.18	1	1	1	0	25	NBC/FM	Road
19	Minimp		2,410	2,425		2,585	573	1,255		12	12	0	0	268		
		Minimp	286	375	Tentenga HC	377	85	183	15.03.18	1	1	0	0	7		Road
		Kunim	97	96	Tentenga HC	72	18	35	15.03.18	1	1	0	0	6		Road
		Wanim	221	141	Tentenga HC	98	23	47	15.03.18	1	1	0	0	0		Road
		Kumbalmul	190	176	Tentenga HC	180	45	86	15.03.18	1	1	0	0	39		Road
		Malai	191	277	Tentenga HC	461	100	224	15.03.18	1	1	0	0	1		Road
		Kontkona	303	284	Tentenga HC	259	55	127	15.03.18	1	1	0	0	53		Road
		Gatna	122	99	Tentenga HC	131	31	63	15.03.18	1	1	0	0	30		Road
		Tekmul	167	197	Tentenga HC	121	31	58	15.03.18	1	1	0	0	22		Road
		Mala	241	302	Tentenga HC	422	83	205	15.03.18	1	1	0	0	82		Road
		Tala	186	150	Tentenga HC	123	24	59	15.03.18	1	1	0	0	4		Road
		Pulparui	328	289	Tentenga HC	200	42	96	15.03.18	1	1	0	0	19		Road
		Wakanam	78	39	Tentenga HC	141	36	72	15.03.18	1	1	0	0	5		Road
20	Ogelbeng		360	961		939	211	459		2	2	2	0	127		
		Ogelbeng C/sch & V/Cen	97	364	PHO	455	100	223	19.03.18	1	1	1	0	121	NBC/FM	Road
		Ogelbeng Luth. Seminary	264	597	PHO	484	111	236	19.03.18	1	1	1	0	6	NBC/FM	Road
21	Anga		2,127	1,189		2,470	589	1,211		7	7	2	0	146		
		Anga (Mandau)	224	404	Tentenga HC	321	72	154	16.03.18	1	1	0	0	0		Road
		Bagl	598	0	Balg HC	661	150	329	26.03.18	1	1	0	0	0		Road
		Kelua	314	0	Kagamuge HC	391	118	211	25.03.18	1	1	1	0	118	Eagle FM	Road
		Kaim	78	0	Balg HC	268	47	125	20.04.18	1	1	1	0	28	Eagle FM	Road
		Minbulga	228	265	Tentenga HC	286	72	138	16.03.18	1	1	0	0	0		Road
		Kerepel	315	229	Tentenga HC	244	50	114	16.03.18	1	1	0	0	0		Road
		Goigata	371	291	Tentenga HC	299	80	140	16.03.18	1	1	0	0	0		Road
22	Pulgimp		967	1,536		1,681	392	825		6	6	6	0	6		
		Pulgimp	105	685	PHO	135	29	67	21.03.18	1	1	1	0	0	NBC/FM	Road
		Keiokti	181	158	PHO	403	100	202	21.03.18	1	1	1	0	0	NBC/FM	Road
		Keipilkakona	238	149	PHO	308	86	160	21.03.18	1	1	1	0	2	NBC/FM	Road
		Wiangrui	159	234	PHO	278	50	120	21.03.18	1	1	1	0	0	NBC/FM	Road
		Kentai	115	309	PHO	396	77	193	21.03.18	1	1	1	0	0	NBC/FM	Road
		Monga	169	0	PHO	161	50	83	21.03.18	1	1	1	0	4	NBC/FM	Road
23	Mulga		2,424	2,608		2,838	574	1,386		9	9	0	0	143		
		Mulga	467	579	Tentenga HC	351	92	169	17.03.18	1	1	0	0	14		Road
		Kokop	291	267	Tentenga HC	243	44	119	17.03.18	1	1	0	0	16		Road
		Kiltga	221	224	Tentenga HC	230	41	113	17.03.18	1	1	0	0	3		Road
		Katpeng	331	406	Tentenga HC	426	92	209	17.03.18	1	1	0	0	0		Road
		Owatung	115	125	Tentenga HC	108	23	52	17.03.18	1	1	0	0	10		Road
		Tengtenga	812	752	Tentenga HC	964	172	471	17.03.18	1	1	0	0	21		Road
		Kupelga	43	39	Tentenga HC	121	27	58	17.03.18	1	1	0	0	1		Road
		Pupral	53	88	Tentenga HC	294	65	145	17.03.18	1	1	0	0	65		Road
		Kamang	90	125	Tentenga HC	101	18	50	17.03.18	1	1	0	0	13		Road
24	Ketiga		3,141	2,935		2,690	564	1,299		9	9	0	0	126		
		Ketiga	510	498	Tentenga HC	548	119	268	16.03.18	1	1	0	0	44		Road
		Elgpeng	402	301	Tentenga HC	337	60	162	16.03.18	1	1	0	0	5		Road
		Bumula	114	98	Tentenga HC	106	24	51	16.03.18	1	1	0	0	0		Road
		Kupulga	250	203	Tentenga HC	87	24	43	16.03.18	1	1	0	0	2		Road
		Kilg	464	462	Tentenga HC	357	111	174	16.03.18	1	1	0	0	26		Road
		Mundkimp	303	222	Tentenga HC	348	27	166	16.03.18	1	1	0	0	8		Road
		Moikep	472	512	Tentenga HC	402	100	191	16.03.18	1	1	0	0	10		Road
		Waipeng	428	524	Tentenga HC	386	79	187	16.03.18	1	1	0	0	31		Road
		Keltiga Primary School	198	115	Tentenga HC	119	20	57	16.03.18	1	1	0	0	0		Road
25	Pungaminga		1,843	1,801		1,490	562	750		5	5	5	0	279		
		Pungaminga	507	405	Togoba HC	277	86	139	23.03.18	1	1	1	0	54	Eagle FM	Road
		Kunpeng	502	507	Togoba HC	476	100	239	21.03.18	1	1	1	0	80	Eagle FM	Road
		Kemeng	584	676	Togoba HC	358	276	183	23.03.18	1	1	1	0	99	Eagle FM	Road
		Temeng	105	59	Togoba HC	175	50	89	23.03.18	1	1	1	0	18	Eagle FM	Road
		Waninga Peng	145	154	Togoba HC	204	50	100	21.03.18	1	1	1	0	28	Eagle FM	Road
26	Kogmul		2,556	2,247		3,124	601	1,537		9	9	9	0	227		
		Kogmul	407	252	PHO	461	100	236	20.03.18	1	1	1	0	20	NBC/FM	Road
		Palamanda	229	229	PHO	179	50	90	20.03.18	1	1	1	0	19	NBC/FM	Road
		Kelua	207	118	PHO	138	43	75	20.03.18	1	1	1	0	9	NBC/FM	Road
		Puglimp	405	288	PHO	456	78	221	20.03.18	1	1	1	0	61	NBC/FM	Road
		Kentildi	317	373	PHO	621	132	311	20.03.18	1	1	1	0	83	NBC/FM	Road
		Wanka	296	556	PHO	505	49	238	20.03.18	1	1	1	0	15	NBC/FM	Road
		Timur	293	281	PHO	246	50	124	20.03.18	1	1	1	0	0	NBC/FM	Road
		Koldom	148	150	PHO	268	49	128	20.03.18	1	1	1	0	9	NBC/FM	Road
		Pondpond	253	0	PHO	250	50	114	20.03.18	1	1	1	0	11	NBC/FM	Road
27	Pits		1,162	1,698		1,730	403	834		12	11	0	0	155		
		Pits	198	246	Tentenga HC	200	50	98	15.03.18	1	1	0	0	5		Road
		Kundumunga	71	291	Tentenga HC	124	29	60	15.03.18	1	1	0	0	0		Road
		Pami	264	226	Tentenga HC	219	50	101	15.03.18	1	1	0	0	29		Road
		Olakit	90	192	Tentenga HC	109	26	51	15.03.18	1	1	0	0	5		Road
		Kuntika Timila	215	0	Tentenga HC	89	25	45	15.03.18	1	1	0	0	22		Road
		Pupural	114	197	Tentenga HC	278	70	135	15.03.18	1	1	0	0	10		Road
		Pungum	33	178	Tentenga HC	229	50	112	15.03.18	1	1	0	0	23		Road
		Koma	22	122	Tentenga HC	84	20	39	15.03.18	1</						

LLG	WARD	VILLAGE	Estimated 2018 Population Based On 2000 Census	Estimated 2018 Population Based On 2012	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Citifon	Houses With Radios	Radio Networks	Comment
		Kuntke	36	0	Tentenga HC	256	50	125	15.03.18	1	1	0	0	49		Road
		Terel	17	246	Tentenga HC	75	20	36	15.03.18	1	1	0	0	1		Road
		Olatu	40	0	Tentenga HC	67	13	32	15.03.18	1	1	0	0	3		Road
		Olgagimpana	62	0	Tentenga HC					1						Non Existant
28	Togoba No.1		3,798	4,044		3,428	896	1,709		7	6	6	0	31		
		Togoba 1	364	453	Togoba HC	528	200	264	22.03.18	1	1	1	0	0	Eagle FM	Road
		Epulga	696	1,377	Togoba HC	1,322	219	659	22.03.18	1	1	1	0	0	Eagle FM	Road
		Walimul	398	469	Togoba HC	465	150	234	22.03.18	1	1	1	0	0	Eagle FM	Road
		Kend	490	388	Togoba HC	317	83	157	22.03.18	1	1	1	0	12	Eagle FM	Road
		Waninga	667	185	Togoba HC					1					Eagle FM	Covered in Ward 38
		Ulga	326	435	Togoba HC	288	100	143	23.03.18	1	1	1	0	12	Eagle FM	Road
		Pauga	857	738	Togoba HC	508	144	252	23.03.18	1	1	1	0	7	Eagle FM	Road
29	Kagamuga		1,922	3,077		3,136	620	1,459		3	3	0	0	0		
		Ganga	572	535	Balg HC	309	73	143	22.03.18	1	1	0	0	0		Road
		Jikaora	571	632	Balg HC	474	111	220	22.03.18	1	1	0	0	0		Road
		Bagl	779	1,910	Balg HC	2,353	436	1,096	22.03.18	1	1	0	0	0		Road
30	Kingaldui 2		2,308	2,788		2,492	465	1,216		8	8	8	8	131		
		Kingaldui 2	615	542	Rebeamul UC	264	50	127	16.03.18	1	1	1	1	24	99.5 FM	Road
		Wangil	55	341	Rebeamul UC	195	30	96	16.03.18	1	1	1	1	4	99.5 FM	Road
		Rondon	341	488	Rebeamul UC	241	41	118	16.03.18	1	1	1	1	13	99.5 FM	Road
		Kuia	415	583	Rebeamul UC	220	50	108	16.03.18	1	1	1	1	0	99.5 FM	Road
		Kilghi	364	287	Rebeamul UC	332	44	159	16.03.18	1	1	1	1	26	99.5 FM	Road
		Rogia	498	258	Rebeamul UC	337	50	166	16.03.18	1	1	1	1	25	99.5 FM	Road
		Kontpang	19	289	Rebeamul UC	409	100	199	16.03.18	1	1	1	1	6	99.5 FM	Road
		Golgpona			Rebeamul UC	494	100	243	17.03.18	1	1	1	1	33	99.5 FM	Road
31	Baisu		7,081	6,883		6,166	1,104	2,924		13	11	0	0	0		
		Baisu Gate	452	386	Balg HC	424	88	199	20.03.18	1	1	0	0	0	Eagle FM	Road
		Raglamp	500	1,021	Balg HC	922	229	440	20.03.18	1	1	0	0	0	Eagle FM	Road
		Kopla	600	124	Balg HC					1						Included under Kogla
		Ipp	988	1,155	Balg HC	928	146	443	20.03.18	1	1	0	0	0	Eagle FM	Road
		Kipgil	393	241	Balg HC	142	26	67	20.03.18	1	1	0	0	0	Eagle FM	Road
		Ombin	272	524	Balg HC	717	128	341	20.03.18	1	1	0	0	0	Eagle FM	Road
		Kalteng	650	597	Balg HC					1						Included under Ombin
		Rugi	536	482	Balg HC	838	100	398	20.03.18	1	1	0	0	0	Eagle FM	Road
		Nambi	440	476	Balg HC	647	97	304	20.03.18	1	1	0	0	0	Eagle FM	Road
		Tibi	174	244	Balg HC	426	83	201	20.03.18	1	1	0	0	0	Eagle FM	Road
		Main Ambra	143	728	Balg HC	450	92	211	20.03.18	1	1	0	0	0	Eagle FM	Road
		Tapenda Plnt	331	233	Balg HC	160	28	80	20.03.18	1	1	0	0	0	Eagle FM	Road
		Baisu Cis	1,603	671	Balg HC	512	87	240	20.03.18	1	1	0	0	0	Eagle FM	Road
32	Wimbuka		2,582	1,988		3,296	743	1,679		10	10	10	10	433		
		Wimbuka (Kelua 2)	372	302	Kagamuge HC	308	50	152	25.03.18	1	1	1	1	2	Eagle FM	Road
		Jimi	272	171	Kagamuge HC	346	71	176	17.03.18	1	1	1	1		Eagle FM	Road
		Waiaoronga	234	202	Kagamuge HC	428	131	225	24.03.18	1	1	1	1	131	Eagle FM	Road
		Kotengora	346	250	Kagamuge HC	306	89	158	24.03.18	1	1	1	1	69	Eagle FM	Road
		Kuntiporonga	209	227	Kagamuge HC	178	38	89	25.03.18	1	1	1	1	0	Eagle FM	Road
		Kutipulnga (Tentaldi)	181	208	Kagamuge HC	182	26	89	25.03.18	1	1	1	1	26	Eagle FM	Road
		Raltinga	317	178	Kagamuge HC	205	50	109	25.03.18	1	1	1	1	49	Eagle FM	Road
		Kintalrong	334	320	Kagamuge HC	539	123	270	24.03.18	1	1	1	1	27	Eagle FM	Road
		Langa			Kagamuge HC	452	115	239	25.03.18	1	1	1	1	82	Eagle FM	Road
		Ambra	315	131	Kagamuge HC	352	50	172	20.03.18	1	1	1	1	47	Eagle FM	Road
33	Kilam		2,058	2,628		3,167	692	1,586		8	8	8	0	323		
		Kilam	519	492	PHO	719	150	368	16.03.18	1	1	1	0	88	NBC/FM	Road
		Kerua	45	253	PHO	171	33	83	16.03.18	1	1	1	0	4	NBC/FM	Road
		Romp	109	252	PHO	317	71	166	16.03.18	1	1	1	0	6	NBC/FM	Road
		Kudumngakumul	197	321	PHO	378	99	182	16.03.18	1	1	1	0	23	NBC/FM	Road
		Willibapeng	133	265	PHO	179	50	102	16.03.18	1	1	1	0	15	NBC/FM	Road
		Willibapor	155	301	PHO	185	39	93	16.03.18	1	1	1	0	15	NBC/FM	Road
		Tipuka	317	246	PHO	346	50	173	16.03.18	1	1	1	0	46	NBC/FM	Road
		Kelta	584	498	PHO	872	200	419	16.03.18	1	1	1	0	126	NBC/FM	Road
34	Kenta		1,881	2,939		4,464	971	2,116		12	12	0	0	0		
		Kenta	226	284	Balg HC	511	100	247	24.03.18	1	1	0	0	0	Eagle FM	Road
		Patikona	155	127	Balg HC	225	41	106	24.03.18	1	1	0	0	0	Eagle FM	Road
		Gula	62	184	Balg HC	51	16	24	24.03.18	1	1	0	0	0	Eagle FM	Road
		Mapa	117	160	Balg HC	187	41	89	24.03.18	1	1	0	0	0	Eagle FM	Road
		Ambra	133	805	Balg HC	793	196	378	24.03.18	1	1	0	0	0	Eagle FM	Road
		Pemrui	255	196	Balg HC	499	100	233	24.03.18	1	1	0	0	0	Eagle FM	Road
		Kuk	321	504	Balg HC	617	150	295	24.03.18	1	1	0	0	0	Eagle FM	Road
		Kuk/Resource			Balg HC	482	100	229	24.03.18	1	1	0	0	0	Eagle FM	Road
		Kongop	198	90	Balg HC	238	50	113	24.03.18	1	1	0	0	0	Eagle FM	Road
		Kulgmuka	122	177	Balg HC	149	28	70	24.03.18	1	1	0	0	0	Eagle FM	Road
		Rou	112	165	Balg HC	258	49	119	24.03.18	1	1	0	0	0	Eagle FM	Road
		Ambra Plnt	179	248	Balg HC	454	100	213	24.03.18	1	1	0	0	0	Eagle FM	Road
35	Koibuga		1,848	1,378		0	0	0		4	0	0	0	0		
		Koibuga	945	529	Balg HC					1						Not Found
		Pungmamp	324	333	Balg HC					1						Not Found
		Pilga	293	248	Balg HC					1						Not Found
		Wakia	286	267	Balg HC					1						Not Found
36	Kagamuga Rural		2,856	2,656		2,918	531	1,382		6	4	0	0	0		
		Kagamuga Rural	707	0	Balg HC					1						Included under Bagl
		Kogla	726	937	Balg HC	752	142	348	22.03.18	1	1	0	0	0	Eagle FM	Road
		Dakana	445	486	Balg HC	573	100	269	22.03.18	1	1	0	0	0	Eagle FM	Road
		Yei	245	254	Balg HC	580	99	273	22.03.18	1	1	0	0	0	Eagle FM	Road
		Mup	436	574	Balg HC	1,013	190	492	22.03.18	1	1	0	0	0	Eagle FM	Road

LLG	WARD	VILLAGE	Estimated 2018 Population Based On 2000 Census	Estimated 2018 Population Based On 2012	Health Centre	Population Surveyed	House Holds Surveyed	Nets Issued	Date Of Distribution	Villages	Digicel	Bmobile	Citifon	Houses With Radios	Radio Networks	Comment
		Lantiora	298	404	Balg HC					1						Included under Ganga Wd 29
37	Kulg		2,153	2,525		2,799	628	1,364		6	6	1	0	158	Eagle FM	
		Kulg	533	728	Tentenga HC	631	128	303	16.03.18	1	1	0	0	28	Eagle FM	Road
		Koltom	414	626	Tentenga HC	533	150	259	16.03.18	1	1	0	0	42	Eagle FM	Road
		Koibuga	215	196	Tentenga HC	243	50	119	16.03.18	1	1	0	0	10	Eagle FM	Road
		Omugmug	624	466	Tentenga HC	483	100	233	16.03.18	1	1	0	0	37	Eagle FM	Road
		Daka	367	510	Tentenga HC	474	100	232	16.03.18	1	1	0	0	39	Eagle FM	Road
		Abtuly			Togoba HC	435	100	218	22.03.18	1	1	1	0	2	Eagle FM	Road
38	Waninga		1,448	2,036		1,565	372	793		4	4	4	0	143		
		Waninga	324	185	Togoba HC	865	248	437	23.03.18	1	1	1	0	76	Eagle FM	Road
		Togoba Station	783	1,401	Togoba HC	271	40	140	23.03.18	1	1	1	0	0	Eagle FM	Road
		Togoba High School	66	294	Togoba HC	270	61	136	23.03.18	1	1	1	0	54	Eagle FM	Road
		Togoba Health Centre	276	156	Togoba HC	159	23	80	23.03.18	1	1	1	0	13	Eagle FM	Road
39	Kuguramp		1,974	1,940		0	0	0		3	0	0	0	0		
		Kuguramp	664	604	Togoba HC					1						Non Existant
		Korobul	322	431	Togoba HC					1						Non Existant
		Ruguwa	988	905	Togoba HC					1						Non Existant
40	Toboga 2		1,770	3,182		1,819	405	876		4	3	0	0	270		
		Ulga	352	1,104	Tentenga HC					1						Covered uner Nebilyer District in 2017
		Olgempona	365	435	Tentenga HC	720	127	348	17.03.18	1	1	0	0	121	Eagle FM	Road
		Kitpeng	459	660	Tentenga HC	533	137	257	17.03.18	1	1	0	0	78	Eagle FM	Road
		Kuntika	595	983	Tentenga HC	566	141	271	17.03.18	1	1	0	0	71	Eagle FM	Road
				0												