SOUWI VALLEY BASELINE REPORT ON HEALTH, EDUCATION AND LIVELIHOODS

A BASELINE RERPORT ON HEALTH EDUCATION AND LIVELIHOOD STATUS OF THE SOUWI VALLEY – A DESK REVIEW MARCH 2014

WCS Papua New Guinea program – Research Report No. 4

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Front Cover Photo: Young women and children of the Souwi Valley, by Ben Ruli

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EXECUTIVE SUMMARY

The delivery of essential services by the government in the Souwi Valley region of Papua New Guinea (PNG) has been very limited. Ikundi village, where this project is based in the Souwi Valley, has like many other remote villages in PNG been neglected by successive governments over the past decades. Health, education and the livelihoods of the people in Ikundi have undertaken no improvement, denying the locals' their rights and accessibility to basic services. This baseline desk review focuses on three thematic areas; (1) livelihoods, (2) education and (3) health in an attempt to identify the scale of social development in Ikundi in the past decades and prior to the Wildlife Conservation Society Papua New Guinea (WCS PNG) programme and its project partners' involvement. The results are necessary both to improve programme activities and to use as baseline data to assess progress or change.

Key conclusions were drawn from the data analysis with the following recommendations:

Livelihoods – Ikundi is rich with food supplied by the forest, river and gardens. However, due to poor diet knowledge and severe unseasonal drought incidences quality meals and food security are not guaranteed. Similarly economic poverty remains a livelihood challenge with limited accessibility to basic services due to the remoteness of the site. Therefore, food nutrition education needs to be incorporated into health programs for Ikundi and effective agricultural approaches aimed at improving food security need to be implemented. Economic poverty in the long term can only be improved through quality education and road infrastructure linking accessibility to basic services such as health, education and proper markets.

Education – Poor education has been an issue for Ikundi resulting in high illiteracy in the area. Enhancing networks with both the sub-national and local level governments of Morobe Province for the delivery of quality education in Ikundi is necessary, including considering funding options to subsidise the education facilities.

Health – The absence of a health facility and limited knowledge to execute health preventive measures has resulted in the poor health status of the people of Ikundi. High morbidity and mortality incidences, very low life expectancy and poor maternal child health, etc. are some of the consequences of this health dilemma. Therefore, having an established rural clinic together with education and awareness on the common health issues, preventions and treatments are vital to reduce the extreme health challenges the people of Ikundi have been facing for decades.

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INTRODUCTION

This report briefly covers a desk review of documentations on Ikundi village, in the Souwi Valley, in an attempt to identify the scale of social development in Ikundi in the past decades and prior to the Wildlife Conservation Society Papua New Guinea (WCS PNG) programme and its project partners' involvement. The baseline desk review focuses on three thematic areas; (1) livelihoods, (2) education and (3) health.

OBJECTIVES OF THE DESK REVIEW

The main objectives of the review are:

1. To identify the health, education and livelihood status of the Ikundi population;
2. To better inform WCS and its project partners about the current health, education and livelihood conditions of the people of Ikundi for improved programming;
3. To obtain baseline information that will be used to assess impact or change at the end of the project period. This is primarily for internal progress assessment but can also be used for external reporting.

DESCRIPTION OF THE STUDY AREA

GEOGRAPHICAL LOCATION

Ikundi geographically shares its border with three provinces; (1) Morobe Province (north-east of Ikundi, (2) Gulf Province (south of Ikundi), and (3) Eastern Highlands Province (north of Ikundi). It is politically administered by Menyama District Administration in Morobe Province.

The Souwi valley is 40km long with an altitudinal range of 600 – 2800 metres above sea level. Approximately ninety-five percent of the valley is covered with intact tropical rainforest ranging from lower-montane to upper-montane forest.

Access to its political administration station at Menyama is via a two to three day trek through thick forest, slippery tracks and harsh topography. This is the only access route to the outside world.

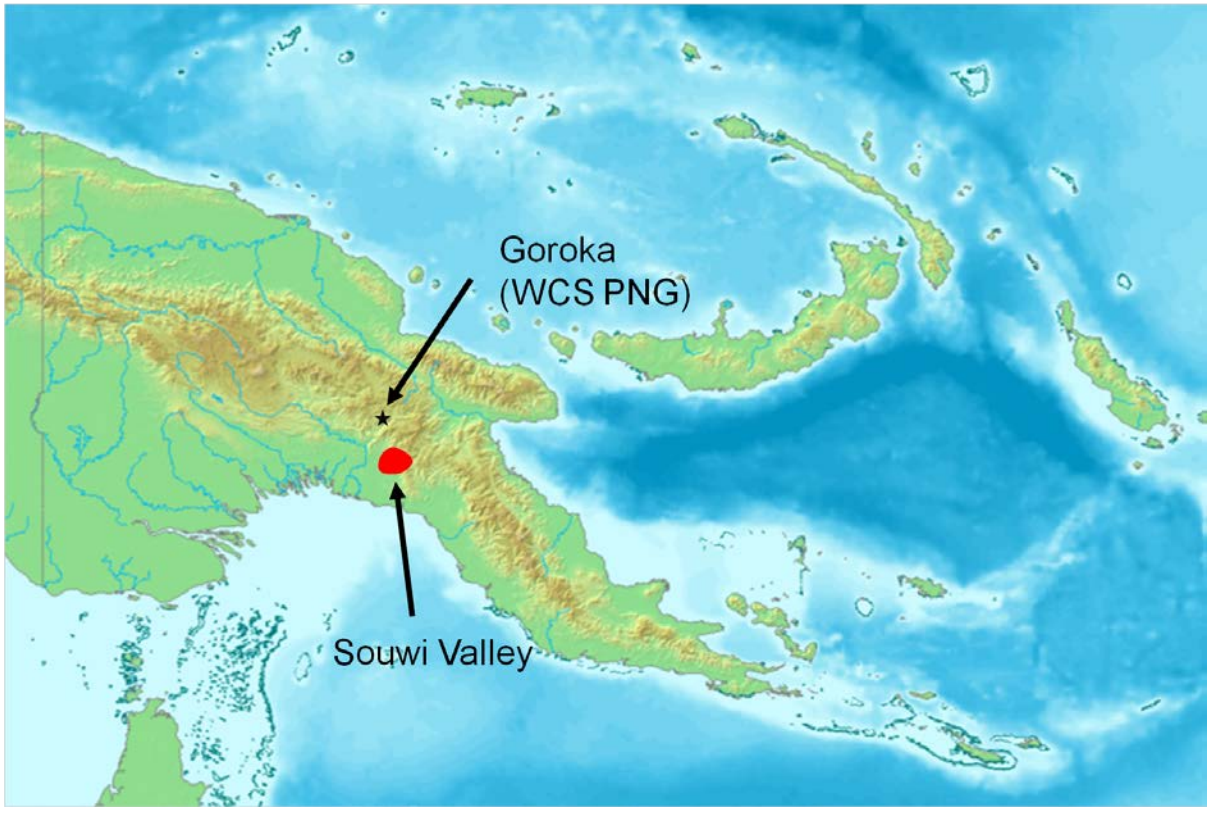

Figure 1: Souwi Valley geographical location

BASIC SERVICES

The delivery of essential services to Ikundi by the government has been very limited. Ikundi, like any other remote village in Papua New Guinea, has been neglected by successive governments over the past decades. Health, education and livelihood aspects of the people in Ikundi have undertaken no improvement, thus denying the locals their rights and accessibility to basic services.

Similarly there is no presence of infrastructure development such as road, bridge, health or education facilities. The exception was an unopened airstrip which had been manually constructed over decades primarily for the purpose of accessing health and other services. The airstrip was opened in 2011 with monetary support from the French Embassy and administration assistance from WCS. The French Embassy support was made possible through Pierre Lemonnier[1]. Today a plane can land in Ikundi; the only air carrier to date has been the Adventist Aviation Service (AAS), based in Goroka.

POPULATION OF THE STUDY AREA

According to a household census conducted by WCS in March 2012, the total population was 493. This is an increase of 200 over the 24 years since the previous census done in January 1988 by Pascale Bonnemere. A total of 99 families contributed to the 2012 total population. The results of the household census are shown in the table below.

ble 1: Ikundi Population in 2012, by different age groups and sex

Adults (Above 13 years)		Youths (9-13 years)		Children (3-8 years)		Infants (0-2 years)		
Male	Female	Male	Female	Male	Female	Male	Female	Total
102	123	19	32	83	88	24	22	493

NOTE: The age groups are defined according to the Ikundi tradition of marriage once puberty is reached (between the ages of 9-13). In addition, the Ikundi people are not literate to keep record of their birth dates and it was difficult to obtain their exact ages. The numbers for the different age classes were estimated according to the person who carried out the census.

[1] Pierre Lemmonier and his wife Pascale Bonnemere are French anthropologists who lived and worked among the Ikundi people since 1982.

METHODOLOGY

A desk review is the basic method used for this study. Documents from a variety of authors who have undertaken research in or visited Ikundi were collected and analysed according to the three thematic areas. The documents and sources are captured in the reference section.

LIMITATIONS OF THE DESK REVIEW STUDY

This study acknowledges the lack of data which could have been obtained through an actual baseline survey. These limitations have been highlighted where they occur. The available data on certain indicators have been analysed to give an indication of the situation.

DATA ANALYSIS AND RESULTS

As much as possible, indicators for each studied subject were identified. These formed the basis for analysis.

LIVELIHOOD INDICATORS

Income earning opportunities

The Ikundi are an economically unfortunate population. Income earning avenues for Ikundi people are very narrow. Their primary income noted in 1990 was the trade of bark cloth (*malo* in tok-pisin) which was mostly produced for personal use rather than cash income (Bonnemere and Lemonnier 2000). Similarly there were no cash crops or resource extractions. The little money circulating in Ikundi at that time came from trips made to plantations in the 1970s and from regular sales of bark cloth to neighbouring tribes.

The sale of bark cloth remains the primary income source for the people today, supplemented by the sale of tobacco, betelnut, homemade salt (extracted from leaves and burnt rocks) and pigs (Oxfam International 2011).

Income from the saleable items mentioned above is unknown due to lack of data. An estimate of K10 per item sold within the village and greater than K10 per item sold outside the village (in neighbouring communities or at Menyama station) is presumed.

Paid employment among the Ikundi population is very rare. The 2012 household census showed 3 persons out of the total 493 population to be working for an income. The type of paid job is unknown but is assumed to be low paid, most probably manual labour work. Most of the population remain living a subsistence life-style with little access to cash or employment opportunities.

Accessibility to markets

Accesibility to markets is very scarce due to the remoteness of the area and this geographic isolation is a financial handicap for the Ikundi population.

Assets

Assets or consumer goods are rarely part of the people's lifestyle. This shows their limited exposure to modernization and their intact connection with their traditional way of life. Their clothes are primarily made up of fibre skirts and bark cloth. These are also used as blankets and for protection from heat and rain by draping them over their heads (Bonnemere and Lemonnier 2000). However this traditional clothing and accessibility to consumer goods has gradually changed in the past decade. Western clothes and consumer goods (kitchen or household items like pots, plates, cups, knives, soap, rice, noodles, etc,) are now becoming common.

People in Ikundi only began to settle and build more structured shelters since 2009. In the past their houses were typically makeshift shelters which suited their gardening and hunting lifestyle which required them to frequently move along the valley.

Food Security – Sources of food

The people in Ikundi have an abundant and quality food supply from their gardens, forests and river (Bonnemere and Lemonnier 2000). The forest supplies them with leafy vegetables, fruits, nuts, mushrooms, megapodes, cassowary eggs and other animal protein. The Souwi River and streams contain an abundance of fish, prawns and eels and their gardens provide marita, sweet potato (kaukau), banana, Chinese taro (Singapore), taro, maize, sugarcane, and various greens.

Family diets and cooking methods

Despite the diverse food sources in Ikundi family diets are rarely balanced. Family meals mostly comprise of garden produce, especially tubers and bananas. Hunting and fishing are reserved to fulfil ceremonial roles including initiations, mourning during death, marriages and birth of a child (Bonnemere and Lemonnier 2000). The almost exclusive use of these important sources of protein for cereromonial purposes shows the locals' lack of knowledge on the nutritional value of their locally available food (Oxfam International 2011). Their minimal exposure to consumer goods also results in most families still using their traditional bamboo pots to cook their food.

Hungry periods

The usually abundant food supply of the Ikundi people is vulnerable to food insecurity during droughts. Both the 1997 drought and a six-month drought in 2010 completely dried up their cultivated crops, forest animals died of thirst and aquatic protein (eels, fish, prawns) rotted in pools. About 28 children in the 2010 drought died of starvation (Lemonnier 2001).

Families with domesticated animals

Pigs were the only domestic livestock in the 1980's and were raised by a few families mainly for exchange purposes rather than for sale (Bonnemere and Lemonnier 2000). In the 2012

household survey census conducted by WCS, families in Ikundi were looking after pigs, chickens and dogs. The pigs are now raised for commercial purpose and are sold both within Ikundi and at their neighbouring villages, primarily Andakombi which is a 2-3 day walk (Oxfam International 2011). Domesticated chickens are raised for sale and personal consumption. Dogs are mostly used for hunting.

Table 2: Families with domesticated animals in Ikundi in 2012

No. of families with pigs	No. of families with chickens	No. of families with dogs
42	26	32

Types of gardens

The Ikundi people are horticulturalists and maintain three types of garden distinguished by location (Bonnemere and Lemonnier 2000). These three garden types are as follows:

1. In the area or hamlet regarded as a family's main habitation, sweet potato, taro, bananas, onions (shallots), maize and sugarcane are planted around the house.
2. The oldest garden is at least two years old, is usually large, and contains crops that take about 12 months to mature before their first harvest. Bananas, sugarcane, Chinese taro and taro dominate these old gardens. This type of garden is usually located about 15-20 minutes walking distance from the hamlets but can be a 2-4 hour walk for those families whose clan lands extends to the lowlands of the valley.
3. The third type of garden is the newly established one situated in the forest. These gardens have been fallow for 20-30 years and were previously cultivated by their parents or grandparents.

Gardening techniques

Crop planting is done immediately after the first trees are felled in the newly established gardens. The women do the planting while the men continue clearing the forest. After clearing the trees, the men progress to fencing in order to keep wild forest animals away from their gardens. The completion of the new garden (clearing, planting, and fencing) takes about 5-6 months because the task is mostly undertaken by the nuclear family. Each nuclear family maintains at least 3 gardens at all times (Bonnemere and Lemonnier 2000).

Harvesting

The common cultivated crops have different harvesting times. Sweet potato takes about 6-8 months to mature whilst taro, Chinese taro and banana take almost a year to ripen. Cuttings are replanted during harvesting and a well-maintained garden will be used for another year (Bonnemere and Lemonnier 2000).

EDUCATION INDICATORS

Accessibility to education infrastructure and learning

Ikundi has been without an established formal education for decades. Accessing education facilities outside of Ikundi, like Menyama station or Andakombi, is impossible because of the distance (2-3 days walk) and remoteness of the site. As a result, the Ikundi population remained uneducated until the recent establishement of an elementary school.

An elementary school was first established in 2009 under the Menyama District Education of Morobe Province. Due to the lack of a teacher and learning materials it was not operational. The Ikundi elementary school was revived in 2012 when a male teacher from the nearby village of Sinde came to teach.

Student enrolment

The school has been in operation since 2012. The numbers of students enrolled in 2012 and 2013 are provided in the table below.

Table 3: Ikundi elementary school student enrolment

	No. of male students	No. of female students	Total enrolment
2012 enrolment	37	10	47
2013 enrolment	44	23	67

The results shows a good number of children in Ikundi now accessing formal education for the first time in but also indicates a growing enrolment, which cannot be taught by one teacher with limited resources. While the number of children enrolling is encouraging, the proportion of male to female students suggests the Ikundi population are prioritising education for boys. The school presently offers elementary prep and elementary one classes. These students will need to move up to elemementary two to complete their elementary level before proceeding to primary level to do grades 3 to 8. This is an issue in Ikundi which has no primary school; without access to a primary school the childrens' education level will remain low.

Literacy level

There is a low literacy level in Ikundi. Apart from the young elementary students who recently started learning to read and write, the Ikundi population generally are illiterate because of their inaccessibility to formal education.

HEALTH INDICATORS

Availability and accessibility to health service

Prior to 2014 there has been no clinic or health facility in Ikundi. The only health care the Ikundi people received between 1982 and 1998 was from the Lutheran health services (LHS) in Kwaplalim (about two days walk; Bonnemere and Lemonnier 2000).

An Oxfam report in 2011 highlighted the complete lack of public health activities and clinical services in Ikundi.

Between 2011 and 2012, there were about three medical trips made by the Goroka General Hospital Rural Outreach Team through WCS partnership with Clinton Health Access Iniative (CHAI), who funded the medical patrol program into Ikundi. Reports from these trips found similar health status of Ikundi people. Information from these trips are highlighted below.

Common diseases

Due to the lack of both health education and clinical health services in Ikundi, people have died from, and continue to be at risk of, preventable and curable diseases.

Between a one year period (1997-1998), malaria was noted to be the primary cause of death. The mortality rate calculated was 70%. Skin infections and pneumonia were the prevalent diseases at that time (Bonnemere and Lemonnier 2000).

Infant/Child Health Issues

Splenomegaly (enlarged spleen or pot belly), diarrhoea, pneumonia, malaria, malnutrition and hookworm infestation were reported to be common childhood diseases. This was confirmed through clinical examinations (Table 4) conducted by the Goroka General Hospital Rural Outreach team.

Table 4: Clinical diagnosis of paediatric cases (2 months – 13 years) in April 2012 by the Goroka General Hospital Rural Outreach Team

Diagnosis	Total number of children treated
Malaria/Splenomegaly	29
Worm Infestation/Dysentry	101
Helminthes Infestation	36
Skin Infection/sores	2
Malnutrition	171

Infant/child mortality rate

The WCS 2012 household survey census gave families the opportunity to record the number of children they had lost due to infant and child mortality. The results revealed high infant and child mortalities in Ikundi which are generally not recorded elsewhere. The 99 families in Ikundi have lost a total of 203 infants/children. The period in which these deaths took place is not known since they could not keep track of the exact time. But it was before 2012. This equates to an average of 2 infant/child deaths per family.

The high infant and child mortality rates were attributed to complete absence of immunization, close birth spacing, unsupervised deliveries, nutritional deficiencies and untreated infectious diseases (Goroka General Hospital April 2012). It was also noted that children died during birth and throughout the neonatal, infant and childhood periods with few surviving into adolescence. The high infant and child mortality is the reason for Ikundi couples having large numbers of births.

Maternal Issues

In the absence of a health facility or health worker in Ikundi, maternal health has been extremely poor (Goroka General Hospital April 2012). Many mothers have died from pregnancy related complications but no proper records were kept.

The main maternal health issues identified through the medical trips have been;

- Complete absence of antenatal check-ups.
- Frequent child births due to lack of family planning. Women are having more than five children (about 6-7 children) with closer spacing between births (spacing interval of less than a year). As a result they die from anaemia and postpartum haemorrhage (PPH-an exessive loss of blood after birth).
- Pregnancy at an early age. Ikundi women become pregnant as early as 15 years or younger.
- Women are unattended by a health worker during labour. First-time pregnant women are mostly supervised by older women during labour, however subsequent deliveries are unsupervised and women are left on their own.
- Women face complications during birth.
- There are no clean or safe deliveries in Ikundi. In the absence of a health facility, women give birth in the nearby bush.
- Blood loss during menstruation or delivery is considered "filthy" and men are kept away from their wives during these times (Oxfam International 2011). After delivery the mother and the baby are sheltered away from home in a makeshift shelter until the mother stops bleeding after about 4-5 days. Protection from temperature extremes in these shelters is limited.
- Untreated infections during pregnancies.

These results show a greater need for maternal and child health education and services for the Ikundi population.

General Adult Health Issues (Both men and women)

Medical cases identified in adults include helminthes infestation, respiratory tract infections, arthritis, malaria and enlarged spleen and skin infections. The table below shows the results obtained during the April 2012 medical visit where a total of 154 adult medical cases were examined and treated.

Table 5: Adult health issues in Ikundi in April 2012

Medical case	No. of adult patients
Helminthes infestation	57
Respiratory tract infections	42
Arthritis	29
Malaria with enlarged spleen	12
Skin infection	5

These results only include those adults who presented themselves during this clinical visit. In April 2012 helminthes infection was prevalent, followed by respiratory infections, arthitis, malaria with spleen enlarged spleen and skin infections. Respiratory infections were attributed to heavy smoking and sleeping near a fire.

Special case - Diarrhoeal outbreak

Between December 2011 and January 2012, Ikundi faced a diarroheal outbreak that killed 3 children and an adult woman (Goroka General Hospital January 2012). A health investigation team from Goroka Base Hospital (through WCS consultation with the Eastern Highlands Provincial Health Authority and CHAI) was sent into Ikundi in January 2012. A total of 342 patients were examined and treated. The prevalence and diagnosis of diseases and health issues from this trip are listed in Table 6.

The cause of the diarrhoeal outbreak during this visit was identified as over-consumption of marita[2] which was in season at the time. It was heavily used with staple foods like taro, banana and sweet potato as well as to cream green leafy vegetables. Marita cream left overnight and

[2] Local name for pandanus, a tropical tree with a twisted stem, long spiny leaves and edible fruit rich in protein and fat.

eaten the following day could have been exposed to cockroaches, flies, fungus and moulds. Marita preparation is done by hand and therefore bacteria from unwashed hands and poor hygeine may have also contributed to this outbreak. The over-consumption of unwashed or half-cooked green leafy vegetables was also identified as contributing to the diarrhoeal outbreak.

Table 6: Medical cases in Ikundi in January 2012

Medical case	No. of adults affected	No. of children affected	Total Ikundi patients
Diarrhoeal cases	40	102	142
Malaria with enlarged spleen	16	54	70
Lung infections	40	6	46
Other cases/diseases	38	46	84

This diarrhoeal outbreak highlights the lack of awareness regarding nutrition and proper food preparation among the Ikundi people.

Life Expectancy

The Ikundi people have a very low life expectancy (30-40 years) due to their vulnerability to diseases, lack of a health facility, and poor access to clinical and educational health services.

Common treatment and treatment provider

Sickness in Ikundi is normally treated with herbs provided by the village doctor and patients are often left to die when their condition deteriorates. Access to the nearest health facility in Kwaplalim or Menyama is difficult due to the distance and rugged topography (Goroka General Hospital April 2012). However, since early 2012 CHAI has been funding medical patrols into Ikundi, either once or twice a year, which enable people to access clinical service.

Mosquito nets in Ikundi

Treated mosquito nets were distributed to households in Ikundi, by the Menyama district health team, approximately one decade ago; however, due to the lack of knowledge regarding the importance of the treated mosquito nets they were not used (Oxfam 2011, Goroka General Hospital January 2012). As well as distributing nets education about the use and importance of treated mosquito nets is also essential.

SANITATION PRACTICES

Number of households with pit toilets

According to the WCS 2012 household census survey, only three out of the 99 families in Ikundi did not have a pit latrine. This confirmed Oxfam's findings that the majority of families had pit toilets. Although this was initially surprising, given the poor knowledge of the people in Ikundi regarding sanitation and hygiene, latrines are used more for privacy than sanitation purpose (Oxfam International 2011).

Household waste disposal

Inorganic solid waste such as bottles, plastics and cans were not seen in Ikundi. Fruit and vegetable peelings were observed in their backyard gardens as compost (Oxfam International 2011). The WCS 2012 household survey census revealed that only 6 of the 99 Ikundi families had a rubbish pit. The reason for not having a rubbish pit is unknown but may indicate that they are unecessary because the majority of their rubbish is biodegradable.

Water sources

Many small creeks, as well as the main Souwi River, run through Ikundi and are used as water sources. They provide the primary source of drinking and washing water in Ikundi and have been deemed suitable with a low likelihood of contamination (Goroka General Hospital April 2012). These water sources appear clean but they have not been tested for contamination (Oxfam 2011, Goroka General Hospital January 2012).

General hygiene

Personal hygiene is very poor among the Ikundi population. Hand washing before handling food and eating or after using the latrine is not practiced. Detergent for hand washing, bathing and laundry are infrequently available due to the limited access to consumer goods and low income (Oxfam International 2011).

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be drawn from the data and data analysis:

LIVELIHOODS

- The Ikundi population is living in economic poverty. Unemployment is high due to their low level of education, accessibility to proper markets is very poor and consumer goods are infrequently available. These factors, primarily due to the remote location, hinder the availability of basic livelihood services to the Ikundi people.
- Food insecurity is a great threat in Ikundi during drought periods. Starvation and death are presently inevitable during such times as their gardens, forest and river fail to sustain them.
- Their staple crops take over six months to ripen, and families have at least three gardens to ensure they have sufficient food throughout the year.
- A positive finding is that food supply is plentiful in Ikundi with their productive forest, gardens and river usually providing them with surplus food, other than in drought periods.
- The average daily family diet is unbalanced as people lack the understanding and knowledge on nutritional value of their locally available food. Thus, despite the plentiful food supply, the people are mostly undernourished.

EDUCATION

- The entire Ikundi population has remained uneducated and illiterate for decades and today their education and literacy standards remain poor.
- Despite the establishment of the elementary school, the academic progress of the young Ikundi children remains a great challenge given the absence of a primary school in the area.

HEALTH

- Prior to 2014 there has been a complete absence of health facilities in Ikundi.
- People are dying from preventable and curable diseases including malaria, splenomegaly (enlarged spleen or pot belly), worm or helminthes infestation, diarrhoea, and pneumonia. Malaria has been the principal cause of death.
- Infant, child and maternal mortality rates are very high and are a consequence of the complete absence of maternal and child health care.
- The Ikundi population is susceptible to diarrhoeal disease outbreaks due to a lack of knowledge or education on food preparation and personal hygiene.
- Life expectancy in Ikundi is very low (30-40 years). Mortality rates are particularly high during birth, the neonatal period, infancy and childhood.
- Accessibility to allopathic medicine is poor and Ikundi patients are mostly treated by the village doctor using herbal medicine. Patients are left to die when their health conditions fail to improve.

- There is poor education and awareness on the use of treated mosquito nets, and Ikundi families are not utilizing them.
- There is a lack of knowledge on the hygienic importance of having pit latrines. Families have pit latrines more for privacy purpose than sanitation.
- Household waste disposal is not a major issue in Ikundi as most waste is biodegradable.
- Drinking water sources appear to be safe however this has not been proven yet.

RECOMMENDATIONS

Based on these results the following recommendations were deemed appropriate to improve the basic livelihood, education and health status of the people of Ikundi:

1. Addressing economic poverty in the short- term in Ikundi village will remain a big challenge given its remote location, lack of road access and the high flight charter costs to the area. Therefore the focus should be on non-monetary measures to improve livelihoods.
2. Drought resistant crops, high yield crops and crops that take less time to ripen are necessary, accompanied with better gardening techniques and crop multiplication methods. These are required for food sustainability during critical periods.
3. Education and awareness about food nutrition, balanced diets, and hygienic food preparation need to be incorporated into food security or health programmes for Ikundi.
4. The main recommendation that can be drawn is for the provincial government to take ownership of the area under the Menyama District Education Department and to look into upgrading the elementary school into a primary level education.
5. Networking with the District government to pursue this vision is also necessary, including seeking potential funding sources to fund the establishment of the primary school, teacher's house and education facilities.
6. Establishing a health facility in Ikundi is a priority action and collaborative efforts have been underway between WCS PNG, the Clinton Health Access Initiative (CHAI), Eastern Highlands Provincial Health Authority and the Menyama District leadership. Construction, medical supplies, staffing and housing are the key focus areas and are essential for addressing and reducing the identified health issues.
7. Proper health records should be kept for all morbidity and mortality cases in Ikundi which can be used for assessing the locals' health development at the end of the project period and in the future.
8. Improved maternal and child health care, and health education and awareness are necessary and must be implemented during medical patrols. Both parents must be the primary recipients of this program.
9. To help minimise the locals' vulnerability to malaria, distribution of mosquito nets must be accompanied with good demonstration and education on the significance of using treated mosquito nets.

10. Education, demonstration and awareness on personal hygiene (basic hand washing practices, food preparation, proper cooking methods, disposal of household waste, pit latrines) are necessary and must be included in the health programmes for Ikundi.
11. The safety of drinking water sources needs to be confirmed.

The findings in this report highlight the difficulties and challenges the people in Ikundi have struggled with for many years. The intention of this report is to better inform WCS and its partners in their efforts to establish and improve programs addressing the livelihood, education and health issues of the people of Ikundi. The baseline information reported here will be used to assess impact or change at the end of the project period.

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