Environmental and Social Impact Assessment

June 2017

SOL: Tina River Hydropower Project (Part 8)

Prepared by the Government of Solomon Islands for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 9 June 2017)

Currency unit	–	Solomon Islands dollar (SBD)
SBD1.00	=	$0.1276
$1.00	=	SBD7.8308

NOTE

(i) In this report, "$" refers to US dollars.

A severe rainfall event can also cause indirect impacts to the Project by saturating soils on steep slopes making them less stable and prone to mass wasting. Where this happens along the access road, the road could be buried in debris or washed out.

15.3.3 Droughts

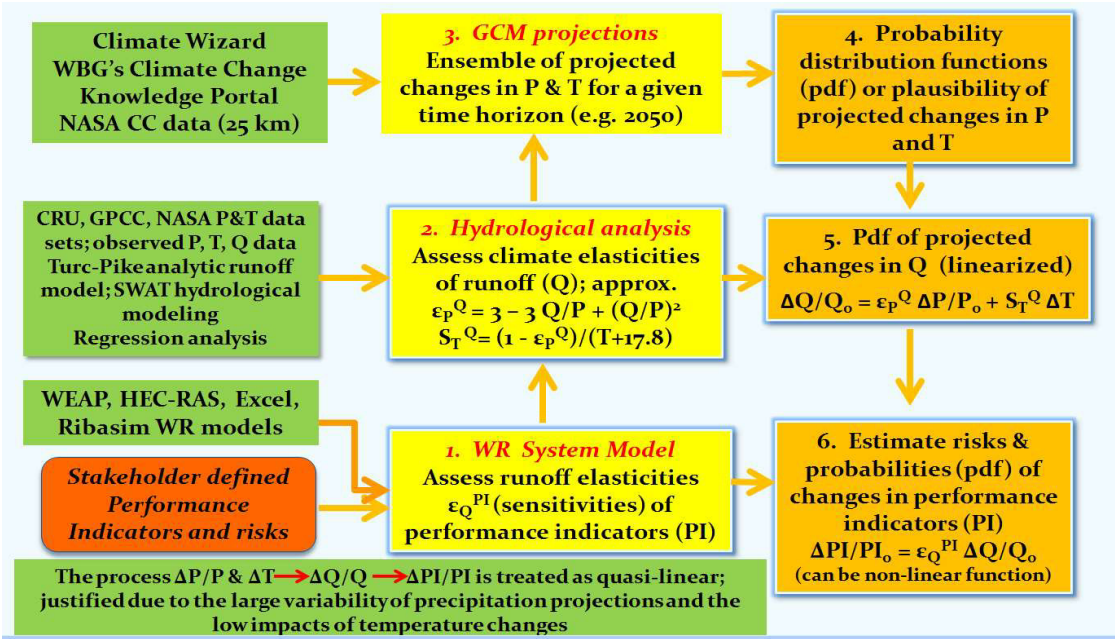
Owing to the reduced flows in the Tina River during the dry season, the TRHDP has been designed to operate as a peaking facility. Power will be generated during the peak load periods during the day, with water released to the river from the powerhouse tailrace. During the night, less power will be generated, and a minimum flow of 3.4m³/s will be released to the river below the powerstation (2.4 m³/s from one turbine plus 1 m³/s environmental flow plus tributary inflows), as the reservoir is refilled for the next cycle of power generation.

If climate change results in reduced average daily dry season flows in the Tina River, then power generation will be affected either by shortening the periods of peak generation during the daytime hours, or reducing the number of turbine/generator sets in operation at a given time. The net effect would be the same ¯ reduced power output for a given volume of water available.

15.3.4 Climate Risk Assessment

With the support of the World Bank, the Solomon Islands Government prepared a Climate Risk Assessment (CRA) of TRHP (the Project) by engaging an independent expert. The assessment was completed in June 2016. The objective of the CRA is to assess the impact of climate change on the Project, particularly on the hydrology which affects the economics of the Project. The bottom-up CRA methodology adopted is summarized in the schematic diagram below.

Figure 15-1 - Climate Risk Assessment Process



In view of the perceived economic life time of the Project, the CRA focused on the projected climate and runoff changes for the project area by 2050 and their impacts on the hydro-energy generated by the project. Conclusions are as follows:

- ¿ Changes in precipitation explain most of the inter-annual and long-term variability in stream flow. Precipitation changes projected by CMIP5 climate models are distributed fairly uniformly over the year; by 2050 projected changes range between a decrease with 15% and an increase with 15%, on average no significant change. Temperatures are projected to increase uniformly over the year, by 2050 mostly between 0.5 ^{0}C and 2 ^{0}C, on average with 1.3 ^{0}C.
- ¿ Based on an analysis of multiple ensembles of CMIP5 and CMIP3 climate projections, it is concluded that by 2050 the average basin runoff can vary between 80% (-20%) and 120% (+20%) of the present runoff due to the combined impacts of a 1.3 ^{0}C increase in temperature and potential shifts in precipitation between 85% (-15%) and 115% (+15%) of the present regime; by 2090 the range would likely be between 70% and 130% of the present runoff. On average no significant decrease in runoff is expected but ¯ as indicated here above - the spread between projections of individual climate models is moderate to significant, with an ensemble standard deviation of about 10% by 2050 and 15% by 2090. The analysis shows that only 3 out of 23 combinations of CMIP3 global circulation models and emission scenarios project reductions in river discharge exceeding 10%.
- ¿ Generated annual energy could vary most likely between -20% and +10% of the energy generated under the baseline hydrological conditions. This range of annual energy generation is reflected in the economic analysis.
- ¿ It is recommended to review at the detailed design stage the preliminary design capacity of the plantš spillway (assessed in 2011), since this estimate was indeed declared to be tentative and also since on a global scale tropical cyclones are projected to be more intense in the future. Climate models agree in general that globally there will be an increase in rainfall rates of the order of 20% within 100 km of the cyclone centre, which could cause for the Tina River basin an increase in extreme flows with 25% to 30%. The operation manual, dam break analysis and emergency preparation plans should also take the possibility of extremely high flash flood flows during tropical cyclone conditions into account.
- ¿ Few floods have been accurately measured in the Pacific and there is limited measured flood data to support flood related community risk initiatives, flood mitigation, or water related infrastructure design. Therefore, a concerted effort should be made to monitor rainfall at multiple locations across the upper Tina catchment and monitor river flows at or near the Tina Hydropower dam site. This will allow over time a better assessment of the hydro-meteorological baseline conditions, as well as permit the detection of positive or negative trends in precipitation and runoff caused by climate change.

A new stream gauging station was installed in December 2016 on the Tina River. The contractor is expected to be responsible for monitoring the river water level during construction. The contractor will also update the design of temporary and permanent structures based on these updated hydrological data and in line with the recommendations being made by the Dam Safety Advisory Panel which will be retained by the Solomon Islands Government throughout the construction period and the initial years of operation.

15.4 DAM SAFETY

The World Bank's operational policy 4.37 (see Section 3) requires that the TRHDP prepare and implement a Dam Safety Plan, and that qualified professionals be enlisted to design and operate the project, and prepare the various safety plans. The TRHDP has contracted world class hydropower engineers, who have examined the various environmental risks to the Project. The final layout and design will take into consideration the various effects of the environment on the Project that are discussed above, and produce the requisite safety and operations plans. In addition, the TRHDP PO has engaged a panel of engineering, geotechnical, environmental and social experts to evaluate the Project to ensure that all risks are addressed.

As noted in Chapter 13 Environmental and Social Management Plan, all plans relating to dam safety and response to operations related emergency events will be prepared by the TRHDP's Dam Safety Consultant. The Construction and Quality Assuranace Plan, and Operations and Maintenance Plan, are being developed by the TRHDP, and will be submitted for review and approval prior to Bank Appraisal. An Instrumentation and Emergency Response Plan will be developed by the TRHDP during the project design phase, and will be submitted for review and approval prior to project commissioning.

15.5 CONCLUSIONS

The Project will be designed and operated to withstand the various environmental calamities identified above, to ensure the structural integrity of all its components, especially the dam.

16. CONCLUSIONS

The Tina River Hydropower Development Project (TRHDP) Project Office (PO) is proposing to construct a peaking hydropower facility on the Tina River in northern Guadalcanal Province, Solomon Islands. The Project would be comprised of a 53m high RCC dam, 3.3km headrace tunnel and penstocks, and 3x5MW powerhouse. The Project would provide clean, reliable, renewable power for 80 to 100 years.

The environmental and social impact assessment of the Project was undertaken in accordance with the Solomon Islands˘Environment Act 1998, World Bank Performance Standards and guidelines, and relevant World Bank operational policies for safeguards. The ESIA demonstrates: 1) that a comprehensive assessment has been completed for the project, 2) the project-affected communities have been provided a clear understanding of the Project and have been properly consulted regarding their issues and concerns; 3) the guidelines for free, prior and informed consent (FPIC) have been followed and the Project satisfies the FPIC requirements; and 4) the TRHDP PO has engaged with customary land owners / Indigenous peoples since early in the planning process, to receive their input.

Based on the results of this environmental and social impact assessment, the TRHDP PO concludes the Tina River Hydropower Development Project is not likely to cause significant adverse environmental, socio economic / socio-community (including to Indigenous peoples) or other effects, taking into account the implementation of appropriate mitigation, management and monitoring measures, as identified in the assessment and mitigation chapters and the Environmental and Social Management Plan (Chapter 13) of this ESIA.

The most significant potential impact is the barrier presented by the 53m high dam to upstream and downstream migrating fish species. However, through a combination of mitigation measures that involve environmental flow (EF) releases, a trap-and-haul system to move upstream migrating juvenile fish past the dam, spillway flow releases to effect adult downstream eel migration, fish screens to prevent entrainment into the power intake and turbines, and an adaptive environmental management program to assess the success of these measures and adjust them accordingly, the potential significant impacts to migrating fish can be reduced to acceptable levels.

The Tina River is a clean and renewable resource for energy generation. Only 115.49ha of forested land will be cleared, of which only 9.5ha is undisturbed forest. Much of this area is within the relatively small footprint of the reservoir area. The developer˘s Biodiversity Action Plan will provide for an offset to achieve no net loss of biodiversity as a result of the conversion of natural habitat. It will include the protection of the remaining natural habitat in the Core Area,rehabilitation of at least 9.5 Ha of modified habitat in the Core Area, and measures to protect the upper catchment including forest monitoring and restrictions on access through the Core Area. No net loss of biodiversity will also be sought through support for the creation of a protected area in the upper Tina River catchment.

Most of the vegetation from within the reservoir will be removed. This will ensure that the volume of organic material to be inundated contributes very little GHG production as it decomposes. Other areas no longer required for construction will be revegetated with native plant species at the end of the construction period. Overall, the TRHDP will deliver electricity with very low GHG emissions per kWh of energy generated.

Greenhouse gas emissions from Solomon Islands are approximately 618,000 tCO2e/year. The estimated net GHG emissions abated attributable to the operation of the TRHDP represents an average of 49,000 tCO_2-equivalent. Emissions abated significantly exceed

SIG's INDC commitments to reduce GHG by 18,800 tons of carbon dioxide equivalent (tCO_2eq) per year by 2025 and by 31,125 tCO_2eq per year by 2030 with appropriate international assistance per year.

The effects of the Project, as discussed in this ESIA, have been examined using assessment methods and analytical tools that reflect current good international industry practice of environmental and socio-economic practitioners. After consideration of the potential residual effects, and taking into account the site selection, engineering design, and identified mitigation measures, the TRHDP PO believes that the Project can be constructed, operated, and decommissioned without significant adverse effects.

Further, it is the conclusion of this assessment that the Project will bring substantial net positive benefits, both locally to the communities within the Tina/Ngalimbiu River catchment, and to Guadalcanal in general. The Project will assist in reducing the current cost of electricity, reinforce and expand the electrical system of Guadalcanal, provide direct economic benefits to customary land owners, and provide a `green_ source of electrical generation.

Based on these conclusions, TRHDP PO requests that the Project be approved.

TINA RIVER HYDROPOWER DEVELOPMENT PROJECT

Environmental and Social Impact Assessment

Annexures and Appendices

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Annexures

APPENDICES

ANNEXURES

This report includes all Annexures to the ESIA Main Report. It contains valuable information such as minutes of meeting, photoplates of fishes, list of aquatic insects, etc. Annexure sequence in this report is classified in a chronological order and reflect the time at which information was gathered or obtained.

Station A1	Voraha/Becho river	05/08/2013

Location

Coordinates: S 9é35.713 - E 160é01.676

River : Voraha River (= Becho river)

Kp: 38.1km from the river mouth

Elevation: approx. 300m asl

River section: Upper Tina river

Nearest village: no village in the vicinity

Location: Station A1 is located on the Voraha/Becho river approx. 200m upstream of the confluence with the Mbembea river and 1km upstream of the TRHDP gauging station

The river seems to be designated either as Voraha or Becho (= Bicho, Mbicho) which are the two main tributaries.

The confluence with Mbembea river forms the Tina river.

Access: helicopter drop at Gauging station + upstream walk

Physical environment

Valley geomorphology : at station A1, the valley is oriented East to West. The valley is quite narrow upstream of the Voraha/Becho confluence, with gorges along the two tributaries. It becomes progressively wider downstream, from the Voraha/Becho confluence to the Mbeambea confluence.

River system: At station A1, the Voraha/Becho river drains approximately two third of the gauging station watershed. Two main tributaries, Vohana river, from the East and Becho river from the South, collect a dense fanlike network of fast flowing streams on the nortern slope of the Popomanaseu ridge oriented NW to SE (Mt Mbutohaina, 1649m, to Mt Turipukumlani, 1636m) and covered with cloud forest.

Banks & river bed: At station A1, the river bed is 15m in width. The right bank (bedrock) is very steep with a waterfall, whereas the left bank (boulders and cobbles) presents a slope of about 20% The substrate is dominated with cobbles from different origins. Presence of wood detritus.

Flow pattern: Sloppy river with high velocity. The river upstream of the confluence shows a long ladder of pools and running/riffle waters on a bed of pebbles. The velocity of the station, observed on a 10m radius, is 0,6-2,5m/s on running and riffle areas.

Water depth: ranging 0 to 1m during the visit. High water marks were observed 4m above the river.

Water quality: the water was clear (0,61NTU) although there was rain the day before. No source of pollution on the watershed. Conductivity was low (166,3ı S/cm).

Biological environment

Riparian vegetation: Rain forest on the slopes with giant ferns. Large deposit areas with regrowth (trees and shrubs). Banks are shadowed with a dense cover of riparian trees.

Aquatic vegetation: no aquatic plants or development of green algae.

Fish: rheophilic gobies are dominant with 5 species observed: Stiphodon semoni & S. rutilaureus, Awaous sp1 & sp2, and Sicyopterus sp. Large specimen of other species are likely to be found in pools, due to considerable distance from communities.

Human activities

The area in uninhabited (no domestic use & associated pollution) and beyond every day reach of Tina river communities. Though people from Tina occasionally access the place for hunting and fisheries (snorkeling and pole line fishing). No evidence of logging activities in the area.

Potential impacts of the project on river ecology & resources

The Voraha/Becho river at station A1 is situated upstream of the future reservoir and dam construction work area, whatever the selected final option. The river physical conditions (flow pattern, velocity, water quality ŭ) should not be affected by construction and exploitation.

Impact on fish migration: amphihaline fish juveniles will encounter difficulties to pass upstream of the hydropower facilities and colonize the upper watershed, depending on their specific migrating abilities and on the implementation of an efficient fishpass system. Combined with an increased fishing pressure due to an easier access, a significant impoverishment of aquatic live is expected in the Voraha & Becho rivers.

Station A1	Voraha/Becho river	05/08/2013

1A. Waterfall on the right bank of station A1

1B. Pool at the waterfall upstream station A1

1C. Fish sighting at station A1

1D. View of the substrate at station A1

1E. Rapids immediately downstream of stat.A1

1F. Detail of the bank (bedrock)

1G. Voraha river upstream of the confluence

1H. Voraha-Mbembea confluence

Station A2	Mbembea river	05/08/2013

Location

Coordinates: S 9é35.751 - E 160é01.842

River : Mbembea

Kp: 37.96km from the river mouth

Elevation : approx 300m asl

River section : Upper Tina river

Nearest village: no village in the vicinity

Location:

Station A2 is located on the Mbembea river approx. 100m upstream of the confluence with the Voraha/Becho river and 800m upstream of the TRHDP gauging station

The confluence with Voraha/Becho river forms the Tina river.

Access: helicopter drop at Gauging station + upstream walk

Physical environment

Valley geomorphology : the Mbembea valley, oriented South to North, is quite narrow upstream of station A2 and becomes larger at the confluence area.

River system: At station A2, the Mbembea river drains approximately one third of the Tina watershed at the gauging station. The river collects a dense network of fast flowing streams from the western part of the ridge (Mt Turipukumahi, 1636m to Mt Popomanaseu 2310m), covered with cloud forest.

Banks & river bed: At station A2, the river bed is estimated 7m in width. Big boulders (5m high) are dominants. The substrate is made of cobbles, pebbles and coarse sands, with some detritus of wood and leaflet from upper reach of the river. Banks are very steep on both sides (V_ shaped valley).

Flow pattern: Sloppy section with high velocity (estimated to more than 2m/s). Succession of fast running sections and pools due to the boulder arrangement. The flow is less important than in the Voraha/Becho river.

Water depth: up to 3m in pools. High water marks were observed 4m above the river level.

Water quality: the water was clear (1,07NTU) although there was rain the day before. No source of pollution on the watershed. Conductivity was low (135,7ı S/cm).

Biological environment

Riparian vegetation: Rain forest on the slopes. The river is partially shadowed with a dense cover of riparian trees. Creeping plants on the gorges. Regrowth trees and shrubs on lateral deposits.

Aquatic vegetation: No aquatic plants. Development of green algae from natural dissolved nutrients have been observed in shallow & calm places along the bank.

Fish: rheophilic gobies are dominant with 2 species observed: Stiphodon semoni & and Sicyopterus lagocephalus. Large specimen of other species are likely to be found in pools, due to considerable distance from communities.

Human activities

The area in uninhabited (no domestic use & associated pollution) and beyond every day reach of Tina river communities. Though people from Tina occasionally access the place for hunting and fisheries (snorkeling and pole line fishing). A shelter has been built on the left bank, between the confluence and the gauging station.

No evidence of logging activities in the area.

Potential impacts of the project on river ecology & resources

The Mbembea river at station A2 is situated upstream of the future reservoir and dam construction work area, whatever the selected option (6E or 6F). The river physical conditions (flow pattern, velocity, water quality ŭ) should not be affected by the project construction and exploitation.

Impact on fish migration: amphihaline fish juveniles will encounter difficulties to pass upstream of the hydropower facilities and colonize the upper watershed, depending on their specific migrating abilities and on the implementation of an efficient fishpass system. Combined with an increased fishing pressure due to an easier access, a significant impoverishment of aquatic live is expected in the Mbembea river.

Station A2	Mbembea river	05/08/2013

2A. Rapids on a bed of boulders

2B. Crossing a pool

2C. Ferns growing on cobble deposit

2D.Green algaes in a pool near the shore

2E. Fast flowing section, pebbles & bedrock

2F. Becho-Mbembea confluence (aerial view)

2G. Shelter on the left bank near the confluence.

2H. Becho-Mbembea confluence

Station A3	TRHDP gauging station	05/08/2013

Location

Coordinates: S 9é35.698 - E 160é02.036

River: Tina

Kp: 37.14km from the river mouth

Elevation: 267m asl

River section: Upper Tina river

Nearest village: no village in the vicinity

Location:

Station A3 is located on Tina river at the TRHDP gauging station, approximately 1 km downstream from the confluence of the two tributaries Voraha/Bocho and Mbembea which forms the Tina river.

Access: helicopter drop just near the station

Physical environment

Valley geomorphology: downstream of the Voraha/Mbembea confluence, the Tina valley, first oriented E-W, enlarges at the gauging station, forms a horse-shoe meander immediately downstream, and turns to a N/N-E direction, entering into a very steep and deep section of gorges for about 5km.

River system: At the gauging station, the Tina river drains a watershed of 115km2 and collects a dense fan-like network of fast flowing streams from the Mt Mbutohaina-Mt Popomanaseu ridge (cloud forest).The station is situated 20m from the Njarimbisu waterfall into the Tina river.

Banks & river bed: At station A3, the width of the river is approx. 40m. The substrate is dominated by gravels and coarse sand, plus cobbles and pebbles. Upstream of the gauging station, the right is made of bedrock, whereas the left bank presents an accumulation of boulders with regrowth vegetation, forming a flood channel. A pond of stagnant water isolated from the river was observed in the middle of this channel (6m in length and 0,8m in width).

Flow pattern: At the gauging station, the river forms at large and long pool with a frange of coarse sand deposit, framed upstream and downstream by rapid sections on a bed of small boulders. The average velocity was estimated 1-2 m/s. At the gauging station, TRHDP monitoring 2010-2012 gives an average flow of 13,2m3/s.

Water depth: up to 3m in the external side of fast flowing sections.

Water quality: the water was clear (0,98NTU) although there was rain the day before. No source of pollution on the watershed. Conductivity was low (154,7ı S/cm).

Biological environment

Riparian vegetation: Rain forest on the slopes. The vast area clear of vegetation, with sunlight allows a drop zone. Steep gorges are cover with trees and creepy vegetation. Regrowth trees, shrubs and ferns on deposits.

Aquatic vegetation :No aquatic plants. Development of green algae from natural dissolved nutrients have been observed in localized puddles among boulder accumulations.

Fish: rheophilic gobies are dominant with 4 species observed: Stiphodon semoni, Redigobius sp and Stenogobius sp. Kuhlia rupestris was observed in deep waters. Large specimen of other species are likely to be found in pools, due to considerable distance from communities. The isolated pond among boulders showed an important biodiversity, with an eel (30cm) and 2 species of prawns ¯ rarely observed by day - freshwater shrimps, semoni and other gobiids (Glossogibius, Stenogobius ...)

Human activities

The area in uninhabited (no domestic use & associated pollution) and beyond every day reach of Tina river communities .The area is occasionally accessed by the project office to collect hydrology data from the gauging station, and by local people for hunting and fishing. No evidence of logging activities.

Potential impacts of the project on river ecology & resources

The Tina river at station A3 is situated upstream of the future dam construction work areas (option 6E or 6F) and the water quality will remain undisturbed during implementation phase. The end of reservoir is expected to extend at a short distance downstream of the gauging station, but no disturbance on water level and hydrology is expected.

Impact on fish migration: amphihaline fish juveniles will encounter difficulties to pass upstream of the hydropower facilities and colonize the upper watershed, depending on their specific migrating abilities and on the implementation of an efficient fishpass system. Combined with an increased fishing pressure due to an easier access, a significant impoverishment of aquatic live is expected in the rivers upstream of the dam.

Station A3	TRHDP gauging station	05/08/2013

3A & 3B. Tina river downstream of the Voraha- Mbembea confluence (boulders and rapids)

3C. Upstream of gauging station ¯ large pool

3D. The gorges upstream of gauging station

3E. Gauging station ¯ limnimetric scale

3F Gauging station ¯ solar panels

3G. Tina river downstream of gauging station

3H.View of the gorges downstream of A3

New Station	7C Dam site	26/02/2014

Location

Coordinates: S 09º33`32.01 -E 160º03`28.01

River: Tina

Kp: 30 km from the river mouth

Elevation: approx. 230m asl

River section: Middle Tina river

Nearest village: Choro

Weather condition: The weather was fine with few isolated showers during the late afternoons. Cloud cover was 40% with winds blowing SSE direction.

Location:

New Station is located on Tina river about 0.8 kilometer from Choro hamlet.

Access: by car up to the village of Mangakiki, then by walk upstream following the river or by chopper from Henderson Airport.

Physical environment

Valley geomorphology: The new station is upper Choro hamlet. It has a gorge from 160 meter (asl) to about 300 meters on either side of the river. From Njaribisu (gauging station) there is a terrain of 4-5 kilometers contour of high region (300-500 meters), stretching north east towards the Koropa and Senge gorge identified as 6E and 6F dam site options.

River system: No streams confluences with Tina River in this station.

Banks & river bed: The width of the river is approximately 10m. The banks have a 80% slope on each side with bedrock at 45º to the river, 20%pebbles/cobles deposit and10% of boulders.The substrate is of cobbles, pebbles, coarse and fine sands. There is absents of silt and mud at the station

Flow pattern: runs and riffle on a bed of cobbles, with deep water (2-3m) on the external side of meanders. Velocity is estimated 0,5 to 1m/s.

Water quality: the water was clear. Water temperature range estimated to 20-25éC

Biological environment

Riparian vegetation: The forest is defined undisturbed due less people accessing the area. The vegetation is disturbed in between the gorges (about 1-2 meters either sides). Along the 80% slope there potential large Pometiasp, Callophylumsp, that were used as commercial trees also ginger plants, shrubs and ferns..The station is partially covered canopy.

Aquatic vegetation: No aquatic plants. No pollution from anthropogenic activities, however few on the sides due to the influence of the terrain and vascular plants i.e. localized runoffs.

Fish: the observed biodiversity was high (10 species), with observations by day and night. Khulia rupestris and Stiphodon birdsong were dominant. Other gobiids are present (Redigobiusbikolanus, Redigobiussp, Awaousocellarus, Glossogobius sp.) as well as Mesopristisspp, Khulia rupestris. Anguilla marmorata.

Human activities

There were less people accessing the area unless for hunting and fishing (spear fishing). Such activities were done twice maybe in a month, depending on community activity demands for freshwater foods and bush foods. There were no any other usages of the vegetation since then.

Potential impacts of the project on river ecology & resources

The station is the dam site and operations may affect the riverine system. This includes, heavy machineries, labor personals, cutting of trees which will increase sedimentation in rainy times. This will happen during the construction and exploitation stage.

Once the dam will be built, the hydrological conditions in this area will be completely modified (reservoir upstream, artificial outflow downstream). This applied to several kilometers from up and downstream of the dam.

Water quality before at and after the dam will deteriorated in the first months and years of construction and during exploitation stage (organic matter in the reservoir (high nutrients) , deoxygenated water at the bottom of the reservoir, possible release of NH4, As, Hg, CH3ŭ).

Significant impacts are expected on aquatic biodiversity especial the migration fish upstream and downstream for feeding and spawning and resources for subsistence fishing. Though, a new fishery resource should develop in the reservoir.

New Station	7C Dam site	26/02/2014

1. View from top

2. View from Chopper

3. Viewing boulders from upstream

4. Right bank cobbles and pebbles. The mid reach of the 7C.

Station A4	Koropa	01/08/2013

Location

Coordinates: S 9é33.184 - E 160é04.868

River: Tina

Kp: 28.29km from the river mouth

Elevation: approx. 140m asl

River section: Middle Tina river

Nearest village: Koropa

Location:
Station A4 is located on Tina river at the village of Koropa

Access: by car up to the village of Mangakiki, then by walk down to the river

Physical environment

Valley geomorphology: Upstream of Choro, the valley has leaved the long section of deep and steep gorges extending on 5km from the gauging station. The Chorro to Habusi section, oriented in a general N-E direction, forms important meanders with gorge passages identified as potential dam sites (options 6E and 6F), in alternance with open sections with vegetated deposits.

River system: In the vicinity of station A4, the Tina river receives two secondary tributaries (Koropa and Pihu)

Banks & river bed: The width of the river is approximately 15m. The banks have a 50% slope on each side with bedrock, pebbles/cobles deposit and a few boulders.The substrate is of cobbles, pebbles, coarse and fine sands. Locally silt and muddy areas at the confluence of the two tributaries.

Flow pattern: runs and riffle on a bed of cobbles, with deep water (2-3m) on the external side of meanders. Velocity is estimated 0,5 to 1m/s.

Water quality: the water was clear. Water temperature range estimated to 20-28éC

Biological environment

Riparian vegetation: The forest is defined disturbed due to people accessing the area for timber extraction and gardening. The vegetation along the river is dominated with regrowth trees, ginger plants and shrubs. An endemic piper tree was observed in the area. The sampling station had an open canopy cover.

Aquatic vegetation: No aquatic plants. Evidence of pollution with green algae possibly due to timber mills and localized runoff.

Fish: the observed biodiversity was high (10 species), with observations by day and night. Khulia rupestris and Stiphodon birdsong were dominant. Other gobiids are present (Redigobius bikolanus, Redigobius sp, Awaous ocellarus, Glossogobius sp.) as well as Mesopristis spp. Anguilla marmorata, and Gymnothorax sp.

Human activities

Excepted an isolated house at Choro (2km upstream) Koropa is the most upstream inhabited village along the Tina river, with two families (43 members). The village is situated on the right bank

Local people use the river for bathing, fishing, crossing point, water collection and recreational,

Small scale logging using chain saw. The timbers from Koropa were transported using the river to the nearly road at Tina village

Potential impacts of the project on river ecology & resources

Koropa, situated in the immediate vicinity of the dam site (option 6E or 6F), will be heavily affected both during construction and exploitation phases.

Once the dam will be built, the hydrological conditions in this area will be completely modified (reservoir upstream, artificial outflow downstream)

Water quality at the dam foot is likely to decrease both at construction stage (increase of suspended matter due to works on the slopes and in the river ; risk of pollution due to oil spill, cement leaching, wastewaters from workers campů) and during exploitation, especially in the first years (degradation of organic matter in the reservoir, desoxygenated water at the bottom of the reservoir, possible release of NH4 ů).

Significant impacts are expected on aquatic biodiversity and resources for subsistence fishing. Though, a new fishery resource should develop in the reservoir

Station A4	Koropa	01/08/2013

4A. The Tina river at Koropa (station A4)

4C. View of the banks (bedrock/ cobble deposit)

4D. View of the substrate at station A4

4E. View of the river at station A4

4F. Riffle on a bed of cobbles

4G. Riparian gardens near Koropa

4H. House near Koropa

Station A5	Senge	01/08/2013

Location

Coordinates: S 9é32.964 - E 160é04.904 River : Tina Kp: 27.69km from the river mouth Elevation : 133m asl River section : Middle Tina river Nearest village: Senge	Location: Station A5 is located on the Tina river, at the village of Senge Access: by car up to the village of Mangakiki, then by walk down to the river on a very steep slope.

Physical environment

Valley geomorphology: Upstream of Choro, the valley has leaved the long section of deep and steep gorges extending on 5km from the gauging station. The Chorro to Habusi section, oriented to a general N-E direction, forms important meanders with gorge passage identified as potential dam sites (options 6E and 6F)

River system: In the vicinity of station A5, the Tina river receives the Senge, a secondary tributary on the left bank. Senge is also the name of the village.

Banks & river bed: The width of the river is approximately 15m. The side slopes are 40% on the left bank (were the village is located) including boulders and 10% slope on the right bank, The substrate is dominated by large deposits of cobbles and pebbles, with locally coarse sand and vegetal detritus (leaflet and tree branches).

Flow pattern: During the survey, the velocity ranged approx. 0,5 to 2m/s. During floods and wet season, the water overflows towards Senge village which is 2m above.

Water depth : cross sectional depth in front of Senge ranges 0,2 to 3m.

Water quality: the water was clear.

Biological environment

Riparian vegetation: The forest is defined disturbed due to people accessing the area for timber extraction and gardening. The regrowth vegetation on the flat area is of Saccharum sp. The sampling station had an open canopy cover.

Aquatic vegetation :No aquatic plants. Film of brown algae on the rocks.

Fish: the biodiversity was high (about 15 species observed or mentioned by local fishermen) with dominance of Stiphodon semoni. Other species were gobiids (Stiphodon rutilaureus, Sicyopus sp., Lentipes, Awaous ocellarus, Redigobius sp., Glossogobius sp.), Ophielotris sp., Anguilla marmorata, Kuhlia rupestris, Mesopristes cancellatus and prawns (Macrobrachium lar).

Human activities

Senge, situated on the left bank, approx. 500m downstream of Koropa, is occupied by more than 10 peoples (4 houses). A shelter has been installed fo ecotourists. The village use the river for drinking water, bathing, fishing, crossing point and washing.

Logs from timber extraction upstream (Choro/Koropa area) are lying on the flat area. Evidence of small scale logging using chain saw.

Potential impacts of the project on river ecology & resources

Senge, situated in the immediate vicinity of the dam site (option 6E or 6F), will be heavily affected both during construction and exploitation phases.

Once the dam will be built, the hydrological conditions in this area will be completely modified (reservoir upstream, artificial outflow downstream)

Water quality at the dam foot is likely to decrease both at construction stage (increase of suspended matter due to works on the slopes and in the river ; risk of pollution due to oil spill, cement leaching, wastewaters from workers campŭ) and during exploitation, especially in the first years (degradation of organic matter in the reservoir, desoxygenated water at the bottom of the reservoir, possible release of NH4 ŭ).

Significant impacts are expected on aquatic biodiversity and resources for subsistence fishing. Though, a new fishery resource should develop in the reservoir.

Station A5	Senge	01/08/2013

5A. The Tina river downstream of Senge

5B. The Tina river upstream of Senge

5C. Riffle on a bed of cobbles

5D. Fish survey at station A5

5E. Evidence of logging along the path to Senge

5F. Large deposit of pebbles in front of Senge

5G. Option 6 dam site between Senge & Habusi

5H. Idem 5G, downstream view

Station A6	Toni river at Kathihana	30/07/2013

Location

Coordinates: S 9é31.419 - E 160é07.449 River : Toni Kp : 19.81km from the river mouth Elevation : approx 90m asl River section : Lower Tina/Toni Nearest village: Kathihana	Location: Station A6 is located approx. 800m upstream of Tina-Toni confluence and 12km upstream of Ngalimbiu bridge (same place as station D ; Entura, 2010) Access: by car up to Horohutu, then by walk along the river

Physical environment

Valley geomorphology: The Toni river valley, approximately 15km long between Chupu Kama Mounts and the confluence, is located between the Tina valley and the Matepoto watershed where Goldridge mining facilities are implemented.

River system: the Toni river is the major tributary of the Tina river. Both rivers flow parallel and converge to form the Ngalimbiu river.

Banks & river bed: The width of the river at station A6 was not more than 5m. The right bank is 10% whereas the left bank has a 70% slope, used as access point by the village of Kathihana. The confluence is an area of important deposit with a dominance of cobbles/pebbles of diverse geological origin, gravels and coarse sand. At station 6, evidence of vegetal detritus (leaves, branches and logs) from past weeks flood were observed.

Flow pattern: the lower course of Toni river presents pool and riffle with a velocity estimated to 0,1-0,6m/s. High water marks were estimated 2-3m above the river level.

Water depth: ranging 0,2 to 1m across the section.

Water quality: the water was slightly turbid (9,7NTU) due to rain on the last day of survey. Conductivity was significantly higher than in Tina river (243,8ı S/cm).

Biological environment

Riparian vegetation: the sampling station was partially covered with vegetation (riparian forest with shrubs grasses and ferns).

Aquatic vegetation :No aquatic plants. Algal development observed locally among cobbles at the confluence (probably associated with domestic uses).

Fish: about 10 species were observed underwater (Stiphodon semoni, other sicyaniid gobies, pipe fish Microphis lepsis, Kuhlia rupestris, Mesopristes cancellatus) or in fisherman catches (mullet Liza vaigensis + 2 rock-sucker gobies: Hypostomus plecostomus & Glossogobius sp.).

Human activities

The village of Kathihana is located on the left bank of the Tina/Toni confluence

People form Kathihana use the river for bathing, washing, fishing, crossing point, water collection (observation of small pits dug into the gravel bank) and recreation. A fisherman, using spear and goggles, was met on the river.

Though Goldridge mining perimeter officially encompasses a part of the upper Toni watershed, there is no mining activities in this area.

Floating boards observed on the bank are an evidence of logging activity on the watershed. Presence of pig-rearing in the area.

Potential impacts of the project on river ecology & resources

This main tributary will not be affected by the project (no direct impact of the hydroelectric facilities, either on water quality or hydrology).

The Toni river will remain free of obstacle from the upper reach to the mouth and might represent a refuge for amphihaline species colonizing the upper watershed.

Station A6	Toni River at Kathihana	30/07/2013

6A. Toni river upstream of station A6

6B. The banks near station A6

6C. Riparian gardens near Kathihana

6D. Floating boards from logging activity

6E. Erosion cliff on the right bank

6F. Detail of the vegetation on the cliff

6G. Algal development at the confluence

6H. Drinking water pit dug in the gravels

Station A7	Horohutu	30/07/2013

Location

Coordinates: S 9é30.546 - E 160é07.160 River: Ngalimbiu Kp: 16.12km from the river mouth Elevation: 35m asl River section : Upper Ngalimbiu Nearest village: Horohutu & Vuramali	Location: Station A7 is located in front of the village of Horohutu, approximately 1km downstream of the Tina-Toni confluence and 10km upstream of Ngalimbiu bridge Access: by car

Physical environment

Valley geomorphology: Downstream of Senge, the Tina valley, oriented to the N-E direction, enlarges progressively until reaching the coastal plain at Ngalimbiu. The large meander at the Toni/Tina confluence (Valekotcha-Horohutu section) is filled with material deposit (cobbles and gravels).

River system: the Ngalimbiu resulting from the junction of Tina river and Toni river, has a length of about 19km from the confluence to the sea.

Banks & river bed: The river is approximately 100m in width.The banks with a 10% slope on each side are made of cobbles, pebbles, coarse and fine sand, with locally muck mud and detritus from nearby gardens. Extended cobble deposit on the right bank. Substrate in the river bed is dominated by cobbles, lying on gravels and coarse sand. The width has small billabong areas which defined unstable movement of the waterway. Since 2010, it has shift twice as mentioned by local communities.

Flow pattern: pool and riffle areas on a bed of cobbles. The velocity is estimated to 0,5-1m/s. High water mark observed at 1,5m above the river level.

Water depth: ranging 0,3 to 1m across the section.

Water quality: the water was clear during the field work. Conductivity was 173ı S/cm. The water was slightly turbid (6,87NTU). In late afternoon, following a heavy rain, the river level raised for more than 20cm, and a stripe of very turbid water, 3m in width was visible along the shore.

Biological environment

Riparian vegetation: Gardens and vegetation (grass and trees) on the banks. No canopy cover on the river.

Aquatic vegetation :No aquatic plants. The film of algae on the cobbles was the evidence of nutrients input from domestic or natural origin.

Fish: the diversity of fish was poor compared to the previous stations. Stiphodon semoni was dominant and S. rutilaureus was present. Evidence of high fishing pressure.

Human activities

The two villages at station A7 are Horohutu on the left bank and Vuramali on the right bank People use the river for bathing, fishing, crossing point, water collection and recreation.

Farming activities increasing along the upper Ngalimbiu river (pig rearing and gardening).

Potential impacts of the project on river ecology & resources

Horohutu being located approximately 10km downstream from the dam site (option 6E or 6F), impacts will be less important than in Senge/Habusi area, located close to construction area, immediately at the dam foot. The distance from the dam site will contribute to mitigate water quality degradation to a certain extent, with auto-purification / oxygenation of outflow waters from the dam and waste waters from the worker camp, plus dilution with Toni river discharge.

Though, the risk of significant TSS increase, oil spills and fecal contamination is likely to occur during construction, with possible impacts on aquatic biodiversity, subsistence fisheries and domestic uses of the river.

The artificial flow pattern (daily variations, flush outflow) might have incidence on human activities and security if no mitigation measure ins implemented.

Station A7	Horohutu	30/07/2013

7A. Ngalimbiu river upstream of Horohutu

7B. Ngalimbiu river downstream of Horohutu

7C. View of the right bank in front of Horohutu

7D. View of the left bank ¯ vehicle access

7E. Houses along the bank at Horohutu

7F. Domestic use of the river

Station A8	Ngalimbiu bridge	02/08/2013

Location

Coordinates: S 9é27.439 - E 160é08.747

River: Ngalimbiu

Kp: 7.76km from the river mouth

Elevation: 33m asl

River section: Lower Ngalimbiu

Nearest village: Ngalimbiu

Location:

Station A8 is located at Ngalimbiu bridge, crossing point of the main road, approx. 20km West of Honiara

Access: main road

Physical environment

Valley geomorphology: The river flows and forms meanders across the lowland plain. The general N/N-E direction turns to a North direction after the bridge.

River system: no visible tributary in the area - the river channel is probably connected to the alluvial aquifer and to a network of agricultural drainage ditches (drainage of plantations)

Banks & river bed: The width of the river is approximately 15m. The side slope were 20% on the left bank and 30% on the left bank. The observed granulometry is far smaller than on the upper reaches of the river. Substrate is dominated by sands and gravels, accumulating on the right bank (very few cobbles). Presence of trunks downstream of the bridge.

Flow pattern: running waters & riffle. Velocity is estimated to 0,7m/s. Near the bridge, pools of stagnant water separated from the main channel were visible, due to piles and accumulation of wood detritus.

Water depth: ranging 0,1 to 1,5m across the section. High water marks were observed 2m above the river level.

Water quality: the water was slightly turbid during the field work (5,1NTU) due the `spiral effect_ (development of primary productivity in the lower reaches of river from degradation of organic matter further upstream) and/or to the number of human settlements downstream of the Tina Toni confluence. Conductivity (186ı S/cm) was not very different than those at the gauging station.

Biological environment

Riparian vegetation: Dominant riparian vegetation are the paper mulberry tree and Saccharum sp (grass) with fern also. The sampling station had no canopy cover. Aquatic vegetation: No aquatic plants.

Fish: 5 observed species: 3 Gobidae (Stiphodon semoni, S. birdsong and Awaous sp.), Eleotris sp. and Opheleotris sp. Tadpoles in the pool (probably cane toad). Tilapias and eels were mentioned as present by local people.

Human activities

The Ngalimbiu bridge, crossing point of the Ngalimbiu river by the main road, was destroyed by the cyclone Namu. A new bridge was built in 1986 and rehabilitated in the late 90˘s by Ross mining.

The area is accessible for most people of Honiara and Guadalcanal and used for washing of trucks and clothes, bathing, recreation, etc.

Important accumulation of logs and tree branches upstream of the bridge piles.

The village, located upstream of the bridge, is rather important with several houses along the banks. Approx. 20 m from the left bank is the Ngalimbiu Guadalcanal sub-station.

Potential impacts of the project on river ecology & resources

Ngalimbiu bridge being located approximately 25km downstream from the dam site (option 6E or 6F), impacts of the dam will be less important than immediately at the dam foot, due to auto-purification and dilution by discharge of Toni river and small tributaries.

Though, the risk of significant TSS increase, oil spills and fecal contamination increase during construction remains, with possible impacts on aquatic biodiversity, subsistence fisheries and domestic uses of the river.

The artificial flow pattern (daily variations, flush outflow ů) might have significant incidence on human activities that should be further assessed, e.g. change in lateral erosion with consequences for houses built on the banks.

Station A8	Ngalimbiu bridge	02/08/2013

8A. Ngalimbiu river upstream of the bridge

8B. Sand deposit & lateral erosion

8C. Sand deposit on right bank ¯ old pile

8D. Accumulation of wood at the bridge pile

8E. Ngalimbiu bridge, viewed from upstream

8F. Detail of the vegetation on the left bank

8G. Ngalimbiu river downstream of the bridge

8H. Ngalimbiu river, further downstream

Station A9	Saele	06/08/2013

Location

Coordinates: S 9é25.351 - E 160é09.242

River: Ngalimbiu

Kp : 2.62km from the river mouth

Elevation: 11m asl

River section : Lower Ngalimbiu

Nearest village: Saele

Location:

Station A9 is located at the village of Saele, 5km downstream of the Ngalimbiu bridge and 2,6km upstream from the mouth.

The station was chosen to characterize the saline intrusion into Tina River.

Access: by car to the village

Physical environment

Valley geomorphology: In Saele area, the river flows to the North, straight across the lowland plain.

River system: no visible tributary in the area ¯ probable connection with the alluvial aquifer.

Banks & river bed: The width of the river is approximately 50m. The slope is 40% on both banks. Substrate is dominated with sand, silt and muck mud, with presence of wooden detritus. Sans deposit along the banks far upstream of the station.

Flow pattern: velocity is uniform across the section and estimated to 0,7m/s.

Water depth: 1,5m uniformly across the section. High water marks were observed 2m above the river level.

Water quality: the water was slightly turbid during the field work (9,6NTU), due to the `spiral effect_ (development of primary productivity in the lower reaches of river from degradation of organic matter further upstream), and/or to Palm oil plantation and agriculture drainage waters, or wastewaters from riparian human settlements. Conductivity (215ı S/cm) was not significantly higher than on the upper reach stations, showing no saline intrusion at 2.6km from the mouth.

Biological environment

Riparian vegetation: The natural vegetation in the plain has been cleared for plantation, agriculture and gardening. Riparian vegetation is dominated with paper mulberry trees, Saccharum sp. (grass), para-grass, banana plants and sago palms (used for housing construction).

Aquatic vegetation :No aquatic plants.

Fish: no direct observation because of turbidity

Human activities

Saele is a small village of about ten houses, on the right bank, with gardening activities. It is located in the most important plain of Guadalcanal and SI, devoted to palm oil plantations, intensive agriculture and gardening (taro, yam, cassava, bananas, sweet potatoes ŭ).

The river is used for washing, bathing, recreation and fishing.

Potential impacts of the project on river ecology & resources

Saele being located very far from the project area, the incidence of the dam on a section of river already impacted by human activities are likely to be low or insignificant due to the distance, auto-purification processes, sedimentation, etc..

Station A9	Saele	06/08/2013

9A. The left bank at Saele

9B. The Ngalimubiu riv. downstream of Saele

9C. The Ngalimbiu river, upstream of Saele

9D. View of the vegetation on the bank

9E. Coconut plantation in the coastal plain,

9F. Coastal plain landscape near Saele

9G. Crops in the coastal plain

9H. The village of Komporo, near the Mouth

Station A10	Ngalimbiu mouth area	02/08/201

Location

Coordinates: A10a : S 9é24.543 - E 160é08.881
A10b : S 9é24.242 - E 160é09.387

River: Ngalimbiu

Kp: 0

Elevation: 0m asl

River section: Lower Ngalimbiu

Nearest village: Komporo

Location:
The East and West mouths are located approx. 1km and 1,5km West of the village of Komporo

Access: car access to Komporo + walk along the shore

Physical environment

River system: It was confirmed by local people that the river course to the sea has changed several times since the cyclone Namu. The new mouth (station A10a) now considered as the main mouth, was formed mid last year in a lateral position of the delta, about 500m West of the old mouth, as a result of high flood of the river and obstruction of the main channel by logs. The old mouth (station A10b), occupying a central position, is still in activity, though the outflow is much smaller.

Banks & river bed: Substrate is dominated with sand. Presence of logs and wooden detritus are observed along the sea and mouth shore.

Flow pattern: outflow velocity at the main river mouth was estimated 1,5m/s at the contact between the river and the sea.

Water quality: the level of turbidity at the mouth was rather high (12 to 13NTU) compared to other stations upstream in the river. Conductivity was measured at different places of the main mouth (on the Western bank, in the middle of the pass, upstream and downstream) in order to approach spatial distribution of salinity. Conductivity was in a range of 191 to 319ı S/cm, showing a very limited salt intrusion in the river mouth. No longitudinal gradient of brackish water was observed: the river seems to discharge directly into the sea (no brackish water estuary).

Biological environment

Riparian vegetation: The back-swamp vegetation in the vicinity of the mouth is dominated by Pandanus, coconut trees, pines, marsh plants and Saccharum sp, that can tolerate wind. Presence of rushes growing on on sand deposit around the main mouth is an evidence of freshwater conditions in superficial groundwater.

Fish: a diversity of fish species was observed in the fishermen captures, with two categories: marine forms entering into the mouth (mullet, trevally, Jacks, Caranx, Apogon, Mesopristis, Lichiaŭ ,) and shoals of sicydiine goby larvae (probably Stiphodon sp. or Sicyopterus sp.) captured in large amount, using mosquito nets.

Other animals : traces of a marine crocodile were sighted on the sand around the back-swamps. The specimen was supposed to be approximately 2m long. Crocodiles are frequent in the swamps, though large specimen (up to 7m) are becoming rare because of over-hunting. Concentration of tadpoles (probably cane toad) were observed along the bank of the main mouth, another evidence of freshwater conditions in the river mouth.

Human activities

The mouth area is a very bountiful fishing spot along the shore, due to the concentration of adult and juvenile fish of different species entering into the lower river.

About 30 fishermen from Komporo and other coastal villages are working at day time and night time, either for subsistence and commercial fishing, using canoe, gill nets, and mosquito seine nets. According to interviewed fisherman, they can make a single day market of SBD 1,500. Goby larvae are very appreciated and cost SDB 5 per cup. The area is also used for recreation and communication/crossing of the river.

Potential impacts of the project on river ecology & resources

The mouth being located very far from the dam site, impacts of the project should be low or insignificant with a possible effect on water quality mitigated with the distance (auto-purification process, sedimentation, etc..) but likely to impact aquatic ecology and induce possible changes in hydro-sedimentary dynamic (a monitoring might be required).

Station A10	Ngalimbiu mouth	02/08/2013

10A. View of the mouth area with backswamp vegetation and sand deposit

10C. Coconut trees and back-swamp vegetation

10D. Ngalimbiu river upstream of the mouth

10E. Fishermen preparing for seine fishing

10F. Herbaceous vegetation on the banks

10G. Views of the old mouth (station 10B). The discharge is limited to a narrow channel

The following table is a compilation of freshwater & brackish water fish species recorded in the SI, in Guadalcanal and in the Ngalimbiu/Tina river system from the different existing sources since 1974, both scientific reports and EIS baseline reports.

The phylogenetic sequence of families follows Eschmeyer 1990. Subfamilies, genera and species are arranged alphabetically within each family.

Legend: X : recorded in Tina/Ngalimbiu river system ; X: recorded in Guadalcanal ; x: observed in other Solomon islands ; ( ): reported present by local people but not seen.

Note : species name from the same family/genus might be synonymous due to changes in the taxonomy and/or wrong determination.

	Source	Gray, 1974	Polhemus et al, 2008		Golder Asso 2009.		Jenkins & Boseto,	Entura, 2011	BRLi, RS Hevalao current	
	Sampled area	Guadalcana	SI	SI	Ngalim-biu	Matepono	Tete-pare	Tina.	Tina	Tina
	Year	1974	Nov 2004 March 2005	July Aug 2005	1998 to 2006	1998 to 2006	Sept 2006	Sept 2010	July 2013	July 201
Family	Species									
Megalopidae	Megalops cyprinoides	X					X			
Anguillidae	Anguilla marmorata	X	x	X	X	x	X		X	X
	Anguilla megastoma				X	x	X			
	Anguilla reinhardti					x				
Muraenidae	Gymnothorax polyuranodon	X	x		X	x	X	(X)	(X)	X
	Muraenichthys macropterus	X							X	X
Chaniidae	Chanos chanos	X					X			
Apoginidae	Apogon hyalosoma	X					X		X	X
	Apogon lateralis						X			X
	Apogon sp.			X				(X)		X
Hemiramphidae	Zenarchopterus dispar		x							X
	Zenarchopterus sp.						X			X
	Rhyncorhamphus georgi	X								
	Hemirhamphus commersoni	X								
Syngnathidae	Microphis (Oosthetus) manadensis	X			X	x				X
	Microphis (Oosthetus) brachyurus	X	x					(X)		
	Hippicthys (Bombonia) spicifer	X								
	Hippicthys (Bombonia) djarong	X								
	Microphis leiaspis		X		X	x			X	X
	Microphis(Doryichtys) retzi	X	x		X	x			X	X
	Microphis mento				X					
	Microphis spinachoides				X	x				
	Doryicthtys brevidorsalis	X								
	Microphis sp			X			X			
Ambassidae	Ambassis buruensis				X	x				
	Ambassis gymnocephalus	X				x				
	Ambassis interruptus	X	x				X		X	X
	Ambassis macracanthus	X				x				
	Ambassis miops		x	X		x	X		X	X
	Ambassis urotaenia					x				
Terrapontidae	Mesopristes argenteus	X	x	X			X		X	X

	Source	Gray, 1974	Polhemus et al, 2008		Golder Asso 2009.		Jenkins & Boseto,	Entura, 2011	BRLi, RS Hevalao current	
	Sampled area	Guadalcana	SI	SI	Ngalim-biu	Matepono	Tete-pare	Tina.	Tina	Tina
	Year	1974	Nov 2004 March 2005	July Aug 2005	1998 to 2006	1998 to 2006	Sept 2006	Sept 2010	July 2013	July 201
	Mesopristes cancellatus		x	X	X	x	X		X	X
	Terapon jarbua	X		X			X			X
	Amphitherapon caudavittatus	X								
Kuhliidae	Kuhlia marginata	X	x	X	X	x	X	(X)	X	X
	Kuhlia rupestris		X	X	X		X	X	X	X
Carangidae	Caranx papuensis		X				X	(X)		
	Caranx sexfasciatus			X		x			X	X
	Caranx ignobilis	X								
	Caranx sp.								(X)	(X)
	Carangoides malabaricus								X	X
	Decapterus cf macarellus						X			
	Scomberoides sp.						X		X	X
Lutjanidae	Lutjanus argentimaculatus	X	X	X		x	X			X
	Lutjanis monostigma	X								
	Lutjanus fuscescens		X	X				(X)	X	X
	Lutjanus fulvus						X			
	Lutjanus vitta								X	X
Gerreidae	Gerres sp.								X	X
Polynemidae	Polydactylus sp.						X		X	
Monodactylidae	Monodactylus argenteus	X					X			
Mugilidae	Crenimugil heterochellius		x		X	x				
	Crenimugil crenilabrus						X			
	Liza tade				X	x				X
	Liza vaigiensis						X	X		X
	Vagamugil buchanini				X	x				
Cichlidae	Oreochromis mossambicus									
Poecillidae	Poecilia reticulata					x				
	Gambusia holbrooki					x	X			(X)
Toxotidae	Toxotes jaculatrix	X	X		X					
Cichlidae	Oreochromis mossambicus				X	x				X
Serranidae	Epinephelus polystigma						X			
Scorpaenidae	Tetraroge sp.						X			
Rhyacichthyidae	Rhyacichthys aspro		(X)	X	X	x	X		X	X
Eleotridae	Belobranchus belobranchus		X		X	x	X		X	X
	Butis amboinensis		X			x			X	X
	Butis butis	X		X			X			
	Eleotris fusca	X	X	X	X	x	X		X	X
	Eleotris melanosoma						X			
	Hypseleotris guentheri	X			X	x	X			
	Hypseleotris sp		X	X						
	Ophieleleotris (Giurus) hoedti		X	X			X	X	X	

	Source	Gray, 1974	Polhemus et al, 2008		Golder Asso 2009.		Jenkins & Boseto,	Entura, 2011	BRLi, RS Hevalao current	
	Sampled area	Guadalcana	SI	SI	Ngalim-biu	Matepono	Tete-pare	Tina.	Tina	Tina
	Year	1974	Nov 2004 March 2005	July Aug 2005	1998 to 2006	1998 to 2006	Sept 2006	Sept 2010	July 2013	July 201
	Ophieleotris (Giurus) margaritacea						X		(X)	X
	Ophieleotris (Ophiocara) aporos	X			X	x				(X)
	Ophiocera porocephala						X			X
	Oxyeleotris gyrinoides				X	x				X
Gobiidae	Glossogobius celebius				X	x			X	
/Gobinae	Glossogobius sp. 1		X	X			X		(X)	X
	Glossogobius sp 2		X							(X)
Gobiidae	Awaous grammepomus					x				X
/Gobinellidae	Awaous guamensis			X					X	
	Awaous melanocephalus				X	x				X
	Awaous ocellaris				X	x	X		X	
	Awaous sp		X	X				X		X
	Redigobius chrysosoma					x	X			
	Redigobius bikolanus		X				X	(X)	X	
	Redigobius leptochilus		X					(X)		
	Redigobius tambujon								X	(X)
	Redigobius sp			X					X	
	Schismatogobius marmoratus[1]		X						X	
	Schismatogobius ampluviculus[2]								X	
	Schismatogobius sp.						X		X	X
	Schismatogobius roxasi[3]								X	
	Schizogobius bruynis				X	x				
	Stenogobius hoesei		X						X	
	Stenogobius cf beauforti				X	x				
	Stenogobius sp.			X						X
	Bathygobius andrei[4]								X	
Gobiidae	Lentipes multiradiatus		X	X					X	X
/Sicydiinae	Lentipes sp.		X					X	X	X
	Sicyopterus cf hageni				X	x				
	Sicyopterus lagocephalus		X	X			X	X	X	X
	Sicyopterus longifilis		X		X	x	X		X	X
	Sicyopterus ouwensi				X	x				X
	Sicyopterus sp		X	X			X			
	Sicyopus mystax		X					X	X	

[1] This identification is questionable, based on known range and current understanding of Schismatogobius biogeography. Records are pending further identification.

[2] Ibid.

[3] Ibid.

[4] Ibid.

	Source	Gray, 1974	Polhemus et al, 2008		Golder Asso 2009.		Jenkins & Boseto,	Entura, 2011	BRLi, RS Hevalao current	
	Sampled area	Guadalcana	SI	SI	Ngalim-biu	Matepono	Tete-pare	Tina.	Tina	Tina
	Year	1974	Nov 2004 March 2005	July Aug 2005	1998 to 2006	1998 to 2006	Sept 2006	Sept 2010	July 2013	July 201
	Sicyopus zosterophorum		X	X		x			X	X
	Sicyopus discordipinnis		X					X	(X)	X
	Sicyopus sp.		X						X	(X)
	Stiphodon atratus		X					X	X	X
	Stiphodon autopurpureus[5]								X	X
	Stiphodon birdsong		X					X	X	X
	Stiphodon multisquamis[6]								X	
	Stiphodon ornatus[7]								X	X
	Stiphodon rutilaureus		X	X			X	X	X	X
	Stiphodon semoni		X	X	X	x		X	X	X
	Stiphodon sp				X	x	X			X
Scatophagidae	Scatophagus argus	X		X		x	X			
Siganidae	Siganus vermiculatus	X							(X)	
Tetraodonidae	Arothron immaculatus	X								
	Arothron reticularis	X								
	Chelonodon potoca	X								
Anthenaridae	Anthenarius notophtlamus	X								
	Number of species	36	43	29	32	45	60	20	55	59

[5] Ibid.
[6] Ibid.
[7] Ibid.

Plate 11 Fish survey methodology

11A. Direct visual observations & camera

11B. Aquatic ecology team during survey

11C.Direct observation in Upper Tina river

11D. Spear used for subsistence fishing in the Tina river

11E. Fishermen spear capture in the river

11F Sicyadiinae larvae fishing at the mouth

Photo L. Trebaol

11G. Gill net fishing at Ngalimbiu mouth

Photo G Pahin

11H. Determination of captured specie

Photo L.Trebaol

Plate 12 Gobiidae / Sicydiinae (Savutu / Vosu in local language)

12A. Different species of sicydiins Photo RS Hevalao

12B. Stiphodon semoni (male) Photo RS Hevalao

12C. Stiphodon rutilaureus (male) Photo RS Hevalao

12D. Sicydinnae spawn Photo RS Hevalao

12E. Sicyopterus sp. Polhemus et al

12F Sicyopus mystax Polhemus et al, 2008

12G. Lentipes sp. Polhemus et al, 2008

12H Lentipes solomonensis Photo RS Hevalao

Plate 13 Sicydiinae juveniles & other Gobiidae

13A. Gobiidae/Sicyadiinae larvae captured at Ngalimbiu mouth Photo L. Trebaol

13B. Shoal of Sicydiinae juveniles moving upstream along Ngalimbiu river Photo L. Trebaol

13C. Awaous guamensis Photo RS Hevalao

13D. Awaous sp. Polhemus et al, 2008

13E. Photo RS Hevalao

13F Photo RS Hevalao

13G. Belobranchus belobranchus

13H. Eleotris fusca

Plate 14 Non-gobioids fish - inland river

14A. Anguilla marmorata (Giant Eel) fishbase

14B. Gymnothorax polyuranodon (Moray eel)
www .australianmuseum.net.au

14C. Microphis sp.(Pipefish) Photo RS Hevalao

14D. Liza vaigiensis (Mullet) calphotos.berkeley.edu

14E. Mesopristes argentus (juvenile)

14F Mesopristes cancellatus (juvenile)

14G. Kuhlia marginata (Jungle perch) fishbase

14H. Ambassis interruptus

Plate 15 Non-gobioid species ¯ Mouth Area

15A. Gerres sp.

15B. Apogon sp.

15C. Polydactylus sp.

15D. Flatfish

15E. Chub Mackerels

15F. Flatfish

15G.

15H. Muraenichthys macropterus (Worm Eel)

MINUTES OF 1ST MEETING HELD AT THE MINISTRY OF AGRICULTURE AND LIVESTOCK WITH PERMANENT SECRETARY, MR. FRANK WICKHAM

Date: 1st August 2013
Time: 8.30 am
Venue: Permanent Secretary's Office
Min. of Agriculture & Livestock
Mud Alley

Present:
Mr. Frank Wickham - Permanent Secretary/MAL
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Lawrence Foana'ota - Social and Cultural Expert

Mr. Gilles Pahin

- ¿ Thanked the PS for availing himself to meet with us
- ¿ Explained the purpose of our visit and meeting
- ¿ Informed the PS of his position as the team leader from BRLi, a company in France, Fred Patison, the Coordinator of the local experts and Lawrence Foana'ota is the Social and Cultural Expert in the team
- ¿ Pointed out that the ESIA team consists of six local (6) and four (4) outside experts totaling to ten (10)
- ¿ Asked if any information is available regarding future plans for agricultural activities in the area earmarked for the Tina Hydropower Development Project
- ¿ Enquired re-compiling any information on the agricultural activities

PS-Mr. Frank Wickham's Response

1. Large Scale Farming in Food Production:

- ¿ Lee Kwok Kuen is involved with large scale farming in food production
- ¿ Sweet potato or kumara farming is one of the main crops the Company is producing
- ¿ Plans are underway for the farming of other crops and food stuff

2. Guadalcanal Plains Palm Oil Limited Plans:

- ¿ As far as other agricultural activities are concerned, Guadalcanal Plains Palm Oil Limited plans to extend eastward
- ¿ Suggest Mr. Gilles and team should meet with Officials from GPPOL in order to know more about their operations and any expansion plans in the future

3. Adjacent Land To Tina River Area:

- ¿ SI Government is interested in purchasing land owned by RIPEL
- ¿ So far no concrete agreement has been reached as yet on the issue of government purchasing the land

- ¿ Present challenges included the fact that Government owns cocoa farms and cattle in the area but people are serving themselves with them

4. Gold Ridge Situation:

- ¿ Three main groups have been formed to take care of the concerns of the communities
- ¿ Dam tailing group
- ¿ Mid-stream group
- ¿ Down-stream group

5. Some Suggestions and Issues of Concern for the Tina Hydropower Development Area:

- ¿ If communities are planning to engage in farming, they would need some form of irrigation system to be built such as a small dam
- ¿ One major effect the dam would have during the construction period and probably two years after its completion is that the quality of the water might be low
- ¿ It is important that some form of monitoring system should be considered
- ¿ The concern is that people might start to ask compensation when this happens just like the Gold Ridge Mining where people have been demanding compensation payments for the Metabona River. This could also happen for the Tina River when the dam is constructed
- ¿ There should be baseline assessment of the down stream area of the Ngalibiu River carried out first before the dam is constructed to avoid such problem of demanding compensation arising in the future

6. Some Points for Consideration:

- ¿ Benefit and Profit sharing between the communities, government and landowner
- ¿ Commissioner of Lands should release some part of the RIPEL land for recreation activities and sporting facilities
- ¿ PS indicated that he will be leaving the government soon

7. Meeting closed at 9am

MINUTES OF 2ND MEETING HELD AT THE MINISTRY OF ENVIRONMENT & CONSERVATION WITH STAFF

Date: 1st August 2013
Time: 11.15 am
Venue: Environment & Conservation Office
Old Public Service Training Center Building at Vavae Ridge

Present:
Ms. Rosemary Ata - Environment Safeguarding and Monitoring Officer
Ms. Rose Papaua - Conservation Officer
Mr. Edward Danitofea - Rep from the Government on the ESIA Team
Mr. Melvin Zama - Environment Officer
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Lawrence Foana˘ota - Social and Cultural Expert

1. Introduction:

¿ Fred S Patison thanked the Officers and introduced Mr. Gilles stating that he is the overall leader for the ESIA or Environmental and Social Impact Assessment Team as well as the Project Manager
¿ He is the Regulatory Expert and the Coordinator of the National Experts and
¿ Lawrence is the Social and Cultural Heritage Expert.
¿ The ESIA team consists of 10 members, 4 foreigners and 6 nationals

2. After that the officers from the Ministry introduced themselves.

3. Then Mr. Gilles Pahin explained the purpose of the meeting which was mainly to

¿ get officers˘ views and any concerns they may have on the Environment before the Tina Hydropower Development Project starts
¿ find out if they have any information available on any Conserved areas within the propose hydro site
¿ let them know that general survey for the baseline report will be carried out
¿ inform them that major works will be mainly in the downstream area from any protected sites upstream above the main reservoir
¿ inform them that four foreign experts are in the country for two weeks
¿ that the members of the ESIA team have already visited the proposed area of the Project
¿ while he and the two nationals accompanying him for the meetings with other government agencies and stakeholders, Mr. Eric Deneut who is the Assistant Team Leader is already with those national experts looking at the fish, wild life and other environmental issues within the proposed hydro project site

4. The Officers then spoke on some issues they wanted the ESIA team members to consider and take note of as follows:

- ¿ In December this year (2013) experts from USA will carry out wildlife study of the Popomanisiu in the upstream area
- ¿ It was also important to have some protected areas downstream
- ¿ It was suggested that may be one protected area should be in the downstream for gravel extraction
- ¿ There needs to be social impact assessment carried out in the downstream areas to include some baseline study
- ¿ Ministry staff will not involve in any social impact assessment but will participate in the environment impact assessment under government˘s cost.
- ¿ Water quality should be tested during the construction period
- ¿ Review should be covered by the Tina Hydropower Development Project Office
- ¿ The Ministry is in the process of reviewing the Environment Act
- ¿ Noise pollution will have temporary impact on the flora and fauna in the hydro project area
- ¿ Baseline study indicated people claim that Guadalcanal Plains Palm Oil Limited (GPPOL) caused hardship on water downstream

5. It was confirmed to the officers that

- ¿ Socioeconomic impact will also be taken into consideration and
- ¿ Health issues too will be looked into by the Social Impact Assessment team

6. The meeting closed at about 12 noon.

MINUTES OF 3RD MEETING HELD AT THE NATIONAL STATISTIC DIVISION

Date: 1st August 2013

Introduction:

- Presentation of BRLi ¯ Gilles P., Fred P. and Lawrence F.
- Gilles P. introduced the BRLi team and the important of getting accurate data for the Tina Hydro national project. In particular data on population and other social data of community within the Tina hydro site.
- The statistician expressed the fact that the data is available and will be provided to them as requested. He further noted that social issues will be of particular importance for the project.
- The statistics office agreed to provide all the information for the Tina Hydro project area. This will be collected by Mr Lawrence Fonoaota, the national social and cultural expert.

MINUITS OF 4TH MEETING HELD AT THE STATISTIC DIVISION, MINISTRY OF FINANCE & TREASURY WITH JOSEPH NAESOL, GOVERNMENT STATISTICIAN

Date: 1st August 2013

Time: 2 pm

Venue: Statistic Office
Old Government Printers Building
Central Honiara

Present:
Mr. Joseph Naesol - Government Statistician/Ministry of Finance & Treasury
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Lawrence Foana˘ota - Social and Cultural Heritage Expert

The meeting was held in the Conference room at about 2.15 pm.

1. As usual, Mr. Gilles Pahin introduced the members of his team before he explained the purpose of the meeting as follows:-

¿ Find out if any recent census documents on the population for the Tina area are available
¿ Seek advise from this particular Government Division regarding any issues that may be useful to know about before carrying out the Environment and Social Impact Assessment work
¿ Since Mr. Joseph Naesol is from the Tina area he should know if there are any specific cultural or social issues that the ESIA team should watch out for or consider in order to avoid any misunderstandings that might affect the progress of the Hydro Project

2. In response to the points raised above Mr. Naesol provided the following:-

¿ The last census was carried out in 2009
¿ The national census is carried out after every ten (10) years
¿ So far only the census data is available
¿ The complete census report is still not completed
¿ Migration is basically internal
¿ GPS map showing the village locations within the area will be provided
¿ Lawrence Foana˘ota will pick up the documents from Joseph on Monday 5th in the afternoon
¿ The documents he will provide will include tables with associated data of population of some of the villages within the catchment of the Tina River
¿ Any reports should be independent
¿ Important to hear directly from communities regarding their views and concerns

3. The Social Impact Assessment will be carried out by Mr. Gerard Fitzgerald, a Social Key Expert from New Zealand with the assistance of

¿ Kellington Simeon and
¿ Lawrence Foana˜ota

4. There being no other matters the meeting closed at about 3.45 pm

MINUTES OF 5TH MEETING HELD AT THE DEPARTMENT OF ENERGY, MINISTRY OF ENERGY, MINES AND RURAL ELECTRIFICATION WITH MR. GABRIEL AIMAE

Date: 5th August 2013

Time: 10 am

Venue: Department of Energy Meeting Room
Lingakiki
Central Honiara

Present:
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Gabriel Aimae - Representative Energy Division
Mr. Lawrence Foana˘ota - Social & Cultural Heritage Expert

1. The original arrangement made on Thursday 31st July when Lawrence Foana˘ota went around meeting various government officials and stakeholders informing them of the planned meetings was supposed to be with the Director of Energy Mr. John Korihona.

2. Mr. Gabriel Aimae was met instead of the Director.

3. Mr. Gilles Pahin explained the purpose of the meeting with a brief introduction

4. Mr. Gabriel Aimae informed the team of the following:-

¿ Government˘s main focus at this time is to provide power to communities and schools in the country by using solar
¿ Currently the Government is looking into developing geothermal power from Savo Island
¿ Ground work had already started with
(a) visits to the island and
(b) initial negotiations with the local population
¿ Government˘s present need is for Environment Specialists to assist in the Project
¿ Government through the Energy Division are working closely with Kenta Co. in the USA
¿ Compiling a document on a National Energy Policy in collaboration with South Pacific Community (SPC), United Nations Development Program (UNDP) and World Bank (WB)
¿ The Plan is once completed, it will form the National Energy Policy
¿ Government˘s view regarding power/benefit sharing from the Tina Hydropower Development Project is that whiles it is still not yet developed; the communities around the Tina area will be provided with Solar Panels for lighting
¿ The Energy Division does not have enough staff but when the Social Impact Assessment work starts in three weeks time, a staff will be made available

5. The briefing by Mr. Gabriel Aimae was noted by the three members of the ESIA team

6. Mr. Gilles Pahin informed Mr. Aimae of the following:

¿ Field survey has already started by the Environmental Expert team
¿ The main focus at this time is on the flora and fauna
¿ Most of the survey work is conducted specifically within the area expected to have much of the impact from the proposed Tina Hydropower Development Project when it is constructed

7. There being no other business, the meeting closed at 10.55 am

MINUTES OF 6TH MEETING HELD AT WATER RESOURCE DIVISION, MINISTRY OF MINES, ENERGY AND RURAL ELECTRIFICATION WITH THE DIRECTOR MR. ISAAC LEKELALU

Date: 5th August 2013

Time: 11 am

Venue: Water Resource Division Office
Min. of MERE, Lingakiki

Present:
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Isaac Lekelalu - Director Water Resource Division/MMERE
Mr. Lawrence Foana˘ota - Social and Cultural Expert

1. Mr. Gilles Pahin started the meeting with following remarks:

¿ Thanked the Director for availing himself to meet the team members
¿ Briefed him of the purpose of the visit and meeting
¿ Informed him that work had already started by the Environment Expert team
¿ Field survey focuses mainly on the flora and fauna as well as collected water sample for testing from the Tina River
¿ A brief visit to the downstream communities revealed that people do not use the Tina River instead they use rain water collected into tanks

2. The following points were put forward to the Director for consideration:

¿ Request the Director to inform the ESIA team of what plans are in place by the government as far as water resource management is concerned when work starts on the Tina Hydropower Development Project
¿ There are plans to provide water supply so the Water Division need to assist in identifying possible sources
¿ Water tanks need to be provided and wells dug to help communities get clean water during construction and possibly a two year period after the completion of the dam when vegetation might start falling into the reservoir affecting the quality of the water
¿ The Water Division is need to recommend to the Social Impact Assessment team the best sites for placing water tanks, wells and possibly identifying tributaries that the people could use

3. The Director, Mr. Isaac Lekelalu responses as follows:

¿ He is the Government˘s representative on the Tina Hydropower Development Project Committee and so he can look into these issues
¿ The problem in the area as far as the use of water tanks is concerned is the low rainfall

- ¿ During the first six months of the year, the rainfall in the area is limited and so using tanks for storing water will not ease the problem of water shortage
- ¿ But during the second half of the year there is always very heavy rainfall, constructing and use of water storage dams might be a possibility
- ¿ The problem with using dams that do not have covering over them to store water is that the quality of the water might not be good
- ¿ He mentioned the fact that the rainfall in the area is measured by using a rain-gauge they have installed at the Rate Community High School within the Tina area
- ¿ He also suggested the other option is to develop facilities to extract ground water or use water tanks to capture rainwater during the rainy season in the area for the communities
- ¿ He also raised the point that once the dam is completed conditions needed to be in place on the use of the water from it. This could be discussed with the people to get their views
- ¿ Use of water purifiers should be looked into and communities should be encouraged to take care of such facilities and equipments once they are installed.
- ¿ He expressed the concern that it is a well known fact in many places throughout the country where the majority always reluctant to contribute to the maintenance of water supplies once they are installed
- ¿ The Water Division also has other Water Policies that are currently being developed with outside assistance
- ¿ One other Policy that will be developed soon with the help of an expert from the Australian National University (ANU) in Canberra, Australia and is funded by the European Union is a Sanitation Policy
- ¿ Apart from these policies, a number of legal instruments or laws are also being drafted
- ¿ One such law is the `Water Resource Legislation_ which is currently in draft form
- ¿ The Water Resource Unit/Division˘s main operation is on Hydrological Assessment and Development in the country

4. There being no other matters to discuss the meeting closed at 12 pm

MINUTES OF 7TH MEETING HELD AT THE SOLOMON ISLANDS NATIONAL MUSEUM, MINISTRY OF CULTURE AND TOURISM WITH MR. TONY HEORAKE,
DIRECTOR OF MUSEUM & MR. JOHN TAHINAO, DIRECTOR OF CULTURE

Date: 5th August 2013

Time: 2 pm
Venue: Director˘s Office
National Museum Division Building
Coronation Garden
Central Honiara
Present:
Mr. Gilles Pahin - Team Leader
Mr. Tony Heorake - Director of Museum
Mr. John Tahinao - Director of Culture
Mr. Lawrence Foana˘ota - Social and Cultural Heritage Expert

1. Since not much research work was carried out or written materials available for this specific area of Guadalcanal Province, the meeting was very brief

2. Mr. Gilles Pahin briefed the two Directors about the Tina Hydropower Development Project and he wanted to find out the best way to carry out the cultural heritage work in the area that will be affected

3. During his briefing he used his laptop computer to show the following to both Directors:

¿ A map of the area to be covered by the project and the villages within the project site
¿ He also pointed out the location of the reservoir which will be near the Senge Village in the upstream of the Tina river
¿ He also pointed out that 5 weeks will be spent in discussing the project with the people
¿ Studies by the various national and overseas experts will continue until March 2014
¿ The main requirements which the Directors are requested to look into were (i) whether any documents on cultural heritage sites in the area and (ii) any written documents which may be worth looking at are available or not

4. The former Director of Museum, Lawrence Foana˘ota, who is a member of the ESIA team responsible specifically for the Social and Cultural Heritage Impact Assessment, pointed out during the brief discussions the following:

¿ This is a new area so much of the data on the Social and Cultural Heritage will be collected from the people in the communities during the initial field survey
¿ The only written information available so far is on `The fresh and brackish water fishes of Guadalcanal _, by Noel Gray published in one of the volumes of the Solomon Islands National Museum Association Journals in 1974:45

- ¿ There may be documents or reports that may have been produced on the surrounding areas regarding other development projects which would involve literature research in the libraries or other institutions
- ¿ Since this is going to require more work, with limited time given to carryout the baseline field survey it will not be possible

5. The meeting which lasted only for about half an hour ended at 2.30 pm

MINUTES OF 8TH MEETING HELD AT THE GUADALCANAL PLAINS PALM OIL LIMITED WITH MR. ANDREW KERR, SUSTAINABILITY MANAGER, MS. REGINA GATU, COMMUNITY RELATIONS OFFICER & MR. ERNES KOLLY, SUSTAINABILITY OFFICER

Date: 6th August 2013

Time: 8.45 am

Venue: GPPOL Conference Room
Tetere Complex
Northeast Guadalcanal

Present:
Mr. Andrew Kerr - Sustainability Manager
Ms. Regina Gatu - Community Relations Officer
Mr. Ernest Kolly - Sustainability Officer
Mr. Gilles Pahin - Team Leader
Mr. Fred S Patison - Regulatory Expert & Coordinator of National Experts
Mr. Lawrence Foana˘ota - Social and Cultural Heritage Expert

1. Since it was a long way to drive from Honiara to the Guadalcanal Plains Palm Oil Limited Complex for the meeting, the team has to left the Mendana Hotel around 7.30 am. The trip took about one hour and fifteen minutes

2. The three member team used Mr. Fred Patison˘s vehicle while the Environment Impact Assessment team members used the hired vehicle from Budget.

3. Mr. Andrew Kerr met the team and went straight for the meeting into the Conference Room

4. After a brief introduction and Mr. Gilles informed Mr. Kerr of the purpose of the visit and meeting the Sustainability Manager went straight into his presentation

5. During his talk he cover a lot of areas which highlighted the processes they apply right from the beginning when they first established the company until now including the following:

¿ They started with zero dollar
¿ The land is being leased for a period of 99 years
¿ Local Contractors were hired to do all construction jobs
¿ Negotiation was done first with Contractors before they purchase any trucks
¿ The Company decided to employ local laborers to prevent social problems
¿ Whenever any problems arise, they use the custom to sort them out
¿ Encouraged the five main tribes including small holders to be members of the Land Association
¿ So far the Land Association has a total of about 1,000 members
¿ When deploying contractors 40% should be local

- ¿ Currently GPPOL has1,600 plus workers and only 14 are expatriates
- ¿ The company employ people in the area to run the Security service
- ¿ They have three Memorandum of Understanding or MOU in place with SI Government, Guadalcanal Province and the Land Association
- ¿ They pay diffidence to Local Land Association and not to individuals
- ¿ Pay royalties
- ¿ Pay land rentals
- ¿ The company provides 4,500 houses for its workers
- ¿ Provide own power and medical free for their employees
- ¿ The company generates its own power

6. Apart from providing the above information Mr. Kerr also made some suggestions for consideration by the Tina Hydropower Development Project as follows:

- ¿ When deploying Contractors make sure 40% should be local
- ¿ Make sure expatriate employees are limited in number
- ¿ Laborers should be of people from the local area
- ¿ Use the communities to involve in the construction
- ¿ GPPOL needs to involve with the Tina Hydropower Development Project
- ¿ Watch out for new tribes coming up as the project develops because they have already experienced this social development when the company started operating
- ¿ Recommend to the Tina people to form their own Land Association and avoid using middlemen to involve in the project on their behalf
- ¿ Warned to watch out for Chief Benedict Garamane and Sam who lives downstream of the Tina River
- ¿ The area earmarked for possible expansion of the oil palm plantation is at Malatoha, apart from that there is no plans for expansion westward

7. When the issue about compensation came up he brought in two of his staff who are directly involve with this area in the communities

- ¿ The staff who is directly responsible for handling of any issues relating to compensation or other community matters is Ms. Regina Gatu who deals directly with the community leaders and chiefs on behalf of the company
- ¿ One of the main issues that she sometimes deal with in consultation with the chiefs and community leaders is compensation
- ¿ Any incidents between any members of the local communities and the company such as compensation payments or security problems are dealt with by the members of the local staff who are directly responsible for these areas.

8. The former Director of the SI National Museum, Mr. Lawrence Foana˘ota provided the following information to those present:

- ¿ He had done some research work on the abusing of compensation payment in contemporary Solomon Islands society
- ¿ What he found was that people use this custom or cultural practice mainly to demand money from other people
- ¿ When someone pays or gives compensation, it is mainly to mend broken relationships, bring people together and to show that the perpetrator is sorry for the wrong he or she has done to the victim
- ¿ Today some people use this custom or cultural practice as an excuse to get what they want and instead of solving the problem, they create more hardship. It is one way of getting easy money from vulnerable victims
- ¿ He suggested paying or giving compensation should be made using the appropriate and acceptable custom and traditional materials instead of cash

9. This was the last issue that was raised and discussed before the meeting closed at about

   10.15 am

MEETING WITH THE BAHOMEA TRIBAL CHIEFS ¯ TINA HYDRO PROJECT SITE

Compiled by Zimri Launi

Project Office:
Eric Gorapava
Brally Tavalia
Julian Maka'a
Daniel Una
ESIA Team:
Eric Deneut
Fred Patison Siho

The meeting was to inform the leaders about a Baseline Study on the Flora and Fauna of Tina River by BRLi.

Brally thanked and welcomed all present and introduced his team then asked Eric Deneut to do his presentation, assisted by his local counterpart Fred Siho.

The presentation basically touched on why the study was necessary in terms of understanding direct and indirect effects on communities who depended on the river. It wants to establish the relations of the people with the river and also investigate social issues and people must say what they want, what they don't want etc. about the project.

Social Assessments will address what livelihoods there are of the people in the Tina River. The Social Assessment group will also provide a baseline report after its work.

They said the study is to assess what sorts of impacts the hydro will have on the environment and their livelihoods so that mitigation measures can be addressed before, during and after construction.

They stressed that BRLi is an independent group that is neutral and is carrying out the work in line with World Bank Safeguard Policies and IFC Performance Standards.

A Mitigation Workshop is earmarked for November this year. After the workshop, mitigation plans will be in place on how to address potential impacts.

They stressed the report will be a big one which will cover all the information gathered from the communities.

Eric and Jefferson assured the leaders that the government has embraced their work and recognized it so they should feel good about their effort. The work they'd carried out is not for the government or the Project Office. It is their business and they have done well.

Comments from leaders were varied.

Zimri stressed that in case BRLi encounters any disturbances during their work, they shouldn't panic as these are considered normal in the community. Such disturbances shouldn't be seen as from the communities but more as personal ones and shouldn't be taken to represent the community.

One tribal chief wants the involvement of the older people in the ESIA and SIA and someone suggested that in focus group discussions during the studies, chiefs should have one by themselves.

One question asked whether or not BRLi had involved in similar studies anywhere in the world to which Eric said he'd worked in Africa, Asia and the Caribbean so he has a vast experience. Fred also gave examples of his work with mining companies in Choiseul and Isabel Provinces.

Eric also clarified the social assessments will concentrate on communities in the proposed dam area down to the confluence of the Toni River.

Pastor Kedimiel asked whether or not BRLi would support them during in a Development Agreement but the response was no, but the information gathered in the studies would be of help.

Oscar Billy Pego said he saw the BLIC group as a model that should have been used in the early stages of the project, saying going through other bodies as was the case, created a lot of personal interests. He said land on Guadalcanal is the number on livelihood of the people and so they should talk about it, not anybody else. So the BLIC make up is the right make up. He said the HOC is merely responsible for harmony and peace in the communities, not land issues. Tribes own land not chiefs. He also wanted a copy of the ESIA report to be available for communities of Bahomea before the Mitigation Workshop.

Daniel Una said he saw the model as the best and the disturbances are internal. They are something they can sort out. As long as the government appreciates the process about the land id, that's it because the disturbances are minor and can be sorted.

Zimri added that the inclusion of three former LOC members is a good move. The fact that misinformation is going around the communities is because the BLIC group is yet to go around communities to clarify things. He said if this happened, there would be wide support among all communities.

Dohlan Gisi suggested that if all tribal chiefs were part of the BLIC process, it would strengthen the body and become a positive move for Bahomea in the long run. Right now, he said, only a few of them who attended sessions of the process and understood what it is and how good it is have already signed. But other tribal chiefs should become party to the process ¯ very important for the future of Bahomea.

Chief Mahlon Maeni suggested that those disturbing the process have lost their power base and hence their actions. He said they are their sons but don't know what's going to happen ¯ they only know how to harvest but not how to plant, he said.

Community awareness will be held in Bahomea on Wednesday and Thursday next week, Antioch, Marava, Tina and Horohotu, funded by the Project Office. Those included for this are PO and some senior members of the BLIC process.

Paramount Chief Peter Rocky thanked everyone for the positive messages conveyed by those who presented. He said the disturbances created a few worries for the Bahomea people but the messages of today's discussions were heartening. Tribal chiefs and the communities of Bahomea aren't interested in media stories. It's normal in life that every positive thing will always have negative ones. But Bahomea people are not interested in the disturbances ¯ it is their heart that the project materializes for their future. He stressed all the people of Bahomea like the project. He suggested that those disturbing were worried about power but that is not the interest of the communities of Bahomea. When they have power, there's a place they gain something. But he said such things can be sorted. He said they were very happy about the messages about the environment studies today. He was happy that the messages have encouraged them because the findings would give them ammunition for a future agreement about the project. He thanked the government for its recognition of their work; they took up the task because they valued the traditions handed down by their ancestors. They believe in peace and harmony. He said when they presented their work to the World Bank reps recently; they were greatly encouraged by their comments. He apologised about the venue but said venue quality is not important, it's what's discussed and gained is more important. He also thanked the Project Office for organising the meeting.

The Paramount chief also acknowledged the comments already made by others but the issues being raised currently by some opponents are internal and they can sort them out.

WEEK 1-DAY 1: Monday 2nd September 2013

SIA Team Visit to-

I. Marava ¯ the main center where the meeting was held

II. Targeted Communities were: Marava, Vatupaua; Ngongoti; and Rate Community High School

III. Attendance:
(a) Twenty males & twelve females
(b) Total 32

IV. Program:
(a) Opening Prayer- Zimri Laoni
(b) Welcome by- Zimri Laoni
(c) He also explained to those representatives from the other communities who attended the purpose of the meeting and told them to give the right information concerning the proposed Tina Hydro Project when they are asked questions.

V. Introduction of each of the Team Members by Gerard Fitzgerald the SIA Team Leader.

VI. Presentations:
(a) Marava: The presentations began by providing information about Marava Village which was first established in 1962. Before that families used to live in settlement up in the mountains.
(b) Families moved to Marava and other nearby villages because of easy access to work in Honiara town, transportation and health facilities.
(c) They moved during the time of the Colonial Government˘s administration. Marava and the other places were chosen because the areas are good for gardening and also it is safer than in the mountains where landslides sometimes occur.
(d) There are 28 households in Marava. The biggest family has 8 children while the smallest family consists of 3 children. The total number of families is 168.
(e) Vatupaua: 3 households with five families consisting of 50 members.
(f) Ngongoti: 1 household consisting of 20 family members.

VII. Language: The main language spoken by people of the area is called `Teha_

VIII. Family Ties: All the family members belong to the two main moieties known as Garave or Manukama and Manukiki. The people of Tina area belong to sub-tribe of the Malango tribe known as Bahomea in Central Guadalcanal. They originally moved from their bush settlements in the early 1960s. There are about 21 sub-tribes or vuvuga in the Tina area. According to the culture of the people, members of Garave sub-tribes are not allowed to marry each other. It also applies to members of

Manukiki sub-tribes. But if any members of Garave sub-tribes want to marry any members of Manukikisub-tribes or verse-versa it is allowed. When it comes to any members of the two main tribes wanting to marry, there is no problem,

IX. Community Groups/Organizations: In these communities, there are women, youth and chief˜s groups. These groups form a Central Board that has committees responsible for the following areas-
   (a) Education & Training
   (b) Women, Youth & Children
   (c) Culture & Tourism
   (d) Health & Sanitation
   (e) Project Development
   (f) Religion

X. The Main Churches are:
   (a) South Sea Evangelical Church or SSEC
   (b) Seventh Day Adventist or SDA
   (c) Bible Way Church or BWC
   (d) Roman Catholic Church or RCC and recently
   (e) Assembly of God or AOG

XI. Church Groups/Organizations are:
   (a) Roman Catholic Women˜s Group
   (b) Sports Group-Soccer, Volleyball & Futsal
   (c) Youth Singing Band and
   (d) Church Outreach groups

XII. Livelihood: People in the communities earn a living by:
   (a) Marketing at the Honiara Central Market;
   (b) Going sometimes to the Market at Gold Ridge to sell betel nut;
   (c) Working at Gold Ridge Mining Company;
   (d) Farming for marketing and family use;
   (e) Milling timber for sale and own use;
   (f) Selling firewood bundles;
   (g) Harvesting cocoa including coconuts and selling them to local buyers;
   (h) Plans are underway for raising cattle;
   (i) Operating small canteens; and
   (j) Receiving royalties from Gold Ridge Mining Company

XIII. Women˜s Roles:
   (a) Weaving baskets;
   (b) Sewing calico and children˜s school uniforms;
   (c) Baking cakes & bans;
   (d) Planting vegetables like slippery cabbage, tomato, beans and egg plants;
   (e) Cultivating root crops such as potato or kumara, cassava;
   (f) Looking after the children;
   (g) Taking the children when they are sick to the clinic or school;
   (h) Cooking for the family using fire;
   (i) Fetching drinking and cooking water from the main Tina River;

(j) Collecting firewood for cooking;
(k) Feeding the pigs and other domestic animals;
(l) Going to the markets in Honiara and Gold Ridge to sell or buy goods for the family;
(m) Washing the clothes & dishes; and
(n) Cleaning in and around the home

XIV. Health Issues: The most common diseases are-
(a) Malaria caused by parasites transmitted from person to person by mosquitoes;
(b) Pneumonia affects the lungs and is caused by very bad cold from diving in the river at night or working in the rain;
(c) Diarrhea affects both young and old people and is caused by germs carried by flies, rats and cockroaches contaminating water for drinking or food.
(d) Measles often affects young children;
(e) Influencer or flu is also a common sickness affects both old and young; and
(f) Stress affecting women due to pressure from overworking, husband˘s un-control behavior when they get drunk and youth people involving in drugs.

XV. Health Concerns:
(a) 8 cases of malaria have been recorded in these communities early this year (2013);
(b) Long distances to the Clinics is a major health concern to the people;
(c) Rove, Mataniko and Kukum Clinics are all located in Honiara;
(d) Lack of transportation when there is an emergency is great concern to families;
(e) Worry about youths taking drugs can cause hypertension or high blood pressure;
(f) Unhealthy habits like no proper toilets but mainly pit latrines;
(g) Heavy alcohol drinking causing accidents;
(h) Suffering from high blood pressure and diabetic;
(i) Husbands involving in extra marital affairs with other women causing stress;
(j) Women over working themselves without husbands helping;
(k) No. 9 Central Referral Hospital is often overcrowded;
(l) Fear of witchcraft known as Vele which has symptoms like malaria; and
(m) Currently buses only operate four trips per day and each trip costs $20.00 a person.

XVI. Communities˘ Needs:
(a) A health clinic near the communities is urgently needed;
(b) Frequent transportation between Honiara and the communities;
(c) Going to town only once a week and too expensive;
(d) Canteens operating in these communities to sell small basic goods are limited;
(e) Police Posts are at Henderson and Tetere so need for one at a nearby community;
(f) Reliable lighting is needed because solar is only good during sunny days;
(g) The need to establish a few more Primary Schools to carter for youths in the area;
(h) More young people need to attend school up to secondary and even to tertiary levels;
(i) There is a need to setup an internet caf¶|at Rate Community High School; and

(j) Rate Community High School computer is not reliable so need a reliable computer.

XVII. Education:

(a) The only Primary and Community High School in the area is at Rate;
(b) Two Early Childhood Education or ECE schools at Marava and Ngongoti;
(c) Rate School is both Primary and Community High School;
(d) At the Secondary level, students undertake their studies from Forms 1 to 3 only;
(e) Parents see educating their children as important and a priority;
(f) Currently only 1 student studying at the University of the South Pacific in Suva, Fiji;
(g) 1 student is studying at the USP Honiara Center.

XVIII. Sports Facilities and Activities:

(a) 1 playing field for local sports at Rate Community High School;
(b) Main sports are soccer, volleyball and futsal;
(c) Sometimes organize 7 aside soccer knockout competition; and
(d) Play grounds for children at Marava and Ngongoti.

XIX. Gardening Techniques:

(a) Different gardening areas for different crops;
(b) Before planting the crops, they burn the grasslands;
(c) Rotation of crops plant cassava first followed by the planting of bananas;
(d) Each household is responsible for making their own garden;
(e) They always plant a mixture of crops in one garden in some instances;
(f) Return to the same gardening area after 2 to 3 years;
(g) Gardens are either 1 km or a few meters away from residential houses; and
(h) Garden sizes may be 20m x 30m depending on individuals.

XX. Varieties of Crops and Wild Plants:

(a) Cassava, potato or kumara, yam, taro;
(b) Banana, mango, Malaya apples, pineapple, pawpaw, breadfruit, coconut, nali nuts, oranges, lemon, pomelo, mandarin, betel nut and cut nut;
(c) Melon, cucumber, egg plants, tomatoes;
(d) Slippery cabbage and beans;
(e) Right now Cassava, banana and tomatoes are being harvested;
(f) Wild yam is called Uvikambe;
(g) Wild taro is known as Kai chui; and
(h) Picho is a kind of local ice-cream.

XXI. During Disasters:

(a) Seek government aid like in 1986 when Cyclone Namu struck;
(b) Seek help from Guadalcanal Disaster Management Committee in 2010˘s flooding; and
(c) People eat swamp taro or kakake and banana during times of disasters.

XXII. Hunting and Fishing:

1. Are carried out at their old settlement sites at Malukula and Tulotrea;
2. Always go in 2 or 3 groups of 8 to 10 men;

3. Accompanied by women because of fear of witchcraft known as vele;
4. Usually spend between three to four days in the mountains while hunting and fishing;
5. Women accompanied the men to cook and help carry the catch back home; and
6. Used guns to hunt for animals, mammals and birds and spears to fish for the following but now they only use spears:

(a) Pigs;
(b) Opossums;
(c) Fly foxes;
(d) Pigeons or kurukuru;
(e) Eels or tapurara;
(f) Fish known as helu;
(g) Valu;
(h) Kola; and
(i) Tilapia found only in Betisasanga stream

1. Diving and fishing done without hunting;
2. Choro and upstream of the river fish mainly for eel and scrimp;
3. From Antioch to Senge, Marava people usually spent the weekends fishing for small fish and eel using spear guns;
4. Area upstream of the river, fishing is usually done for important occasion only;
5. Hunting for wild pigs is also carried out only when they are organizing a big feast or fund-raising events.

XXIII. Building Materials:

(a) Timber used for flooring, rafters, studs and knockings, cross beams and beams;
(b) Loya cane is used for tying, sewing sago leaves together and weaving;
(c) Bamboo use for building, cooking and as light when it is dry;
(d) Palm- bark for walling, planks for sewing sago leaves along;
(e) All these materials are collected from the bushes upstream of the river;
(f) Both men and women help to collect the building materials; and
(g) Only the men build and carry out maintenance of buildings.

XXIV. Land Boundaries:

1. From Vuramali to Birao, the land belongs to another tribe.
2. From Birao to Senge the land belongs to the tribes in the Malango area or Bahomea people which include Marava communities.
3. Land boundaries sometimes are not clearly demarcated.
4. In some cases streams, special trees and plants or natural objects like big stone boulders are sometimes used as boundary markers.

XXV. Cultural and Religious Sites:

1. In these three communities, no archaeological or historical sites exist.
2. About 13 cemeteries are within the area.
3. Six of these cemeteries may be in the way of the road to the Dam Site
4. Seven are in areas still in question

XXVI. Concerns Regarding the Impacts of the Hydro Project:

(a) The Hydro Project will affect the people˘s fishing activities along the Tina River.
(b) They want free access to continue to their fishing and hunting grounds.
(c) The quantity of gravel might be less than at present once the dam is constructed,
(d) Tina, Vuramali and Antioch are the places where they normally get their gravel.
(e) Recreational areas on the river banks will be affected, especially in the Vuramali area where the children and their parents use for picnicking.
(f) The environment will no longer be safe for the women and children.
(g) Quality of water will be affected especially during the construction of the dam.
(h) Water will no longer be safe for drinking, cooking or washing.
(i) Marava get water from a Stream which they run the water through a pipe for about 1 emeter and collect it into containers.
(j) They use this stream when the Tina River floods.
(k) Cemeteries may have to be relocated if they are in the way of the road.
(l) Downstream water quality will no longer be the same.
(m) Fish stock and their habitat will be greatly reduced.
(n) Disturbance to social lifestyle by outsiders.
(o) Disturbance during construction with heavy machineries going up and down the road.
(p) Abuse and inappropriate behavior by outsiders like at Gold Ridge will happen.
(q) Traffic and safety are of great concern to families.
(r) Peaceful lifestyle currently enjoy by everyone will no longer be the same.
(s) Disturbance and damage of important sites and gardens.
(t) Problems of relocation will greatly affect people˘s lives.
(u) Fear of increasing social problems once money started following into the communities

XXVIII. Electricity: Current Situation-

(a) Families use solar for lighting but only when the sun is bright during the day.
(b) Generators for lighting, charging mobile phones & screening videos
(c) They need fuel for the generators which is currently very expensive

XXIX: Expected Benefits from the Hydropower Project-

(a) If have power they would use refrigerators for preserving food
(b) Operate workshops & joinery shops using electrical tools
(c) If work on the project and earn money would build permanent houses
(d) Start income generating businesses
(e) Operate transportation services using cars for taxis and buses
(f) Set up canteens
(g) Own and Sell fuel
(h) Women want to generate income by operating businesses, catering and home-stay
(i) Men and women want to involve in contracts, road construction and driving heavy machineries
(j) Provide accommodation for visitors
(k) Employment opportunities for local skillful workers

(l) Training on the jobs offered by the Hydro Project for locals
(m) Government to grantee loans from banks for capital needed to start a business
(n) Establish good partnership between the communities, government and stakeholders
(o) Want a government that has concerns for the people (lesson learnt from Gold Ridge)
(p) Mainly looking forward for improvement of their standard of living
(q) Easy access to power, better services and equal opportunities in the employment sector
(r) Long term benefit will depend on the landowners and trustees.
(s) Looking forward to involving in contract work with the Hydro Project.

XXIX. Some Final Issues Worth Taking Into Serious Consideration:

1) Marava Community is located on registered land owned by the Government through the Commissioner of Lands in the Ministry of Lands and Housing.
2) As far as the communities at Marava, Ngongoti and Vatupaua are concerned, the main destructions that may affect some of their grave sites and probably parts of their gardening areas would be from the construction of the road to the main dam and the power station sites.
3) In such cases, some forms of compensation payments need to be negotiated with the owners to assist them move the graves and gardens to new sites. Some houses may have to be relocated especially in Ngongoti. These issues will become clearer when the surveyors and engineers decide on the plans for the roads and the power-lines.
4) For the time being the general feeling is that everyone within these three communities supported plans for the Tina Hydropower Development Project.

WEEK 1-DATE 2: Tuesday 3rd September 2013

SIA Team Visit to-

I. Vuramali-The main Center for the meeting

II. Targeted Communities were-Vuramali, Horohotu (1 & 2) Katihana and Haimane

III. Attendance: 44 persons

IV. Program-

(a) The program started with a prayer and a welcome
(b) Vuramali was not possible to get to because it meant crossing the river
(c) It was decided to hold the meeting at Haimane.
(d) The Paramount Chief of Vuramali, David Tabea was present
(e) Zimri Laoni gave the introductory remarks in the local language
(f) He also encouraged those present to talk openly and share their views about the Hydro Project
(g) Gerard Fitzgerald, the SIA Team Leader introduced himself and explained that he is an independent researcher.
(h) He then explained the main purpose of the visit is to-

All the villages along the Tina River

Talk about the areas the Hydro Project might affect in people˜s lives
Find out the views of the people regarding this Project

(i) All the information was translated by Kellington Simeon, the Assistant Sociologist

V. Discussions: Chief Alfred Ilala expressed his views as follows-

(a) Up until now major projects like the Gold Ridge Mining, Guadalcanal Plains Plantation Oil Limited and Logging operating in the country are implemented in Central Guadalcanal and yet they still have not benefited.
(b) So he questioned `if the Tina Hydro Project is built would they receive any benefits_?
(c) He expressed these issues basically because this is another new huge undertaking which has not been done anywhere else before in the country.

Penuel Pore, a Church Elder (SSEC) and Chief also spoke about the need to-

(a) Build and relocate them
(b) Have their lives built up and improved

Zimri told those present that the SIA team is not an awareness group
Sarah Estela (a lady) then asked what will happen to the information the team collects.
Gerard Fitzgerald responded as follows-

(a) First all the data is collected
(b) Second the data is put together or compiled into a report
(c) Third the report is then presented to the Government and the Project Developer
(d) Fourth depending on the data provided, they then decide whether to go ahead with the Project or not

VI. Movement of People:

The next lot of information collected was about the movement of people from one place to another. According to the data they provided they used to live in the following places before moving to where they are today:

(a) Belana
(b) Railoto
(c) Chipukiki

VII. The Reasons for Moving:

People Move because of the need for-

(a) Easy access to employment
(b) Better living standards
(c) Better and easy access to services like health, transport, market, schools and Church
(d) Natural disasters like flooding, cyclone, landslides, etc.

VIII. Years of Settlement:

(a) Horohotu(2) -c1960
(b) Horohotu (1) -1970
(c) Haimane -1970
(d) Vuramali -c1990
(e) Katihana -No information available

IX. Attendance at the Meeting:

Not everyone turned up for the meeting

(a) Horohotu(1) - Nil
(b) Horohotu(2) - 2

(c) Haimane -12
(d) Vuramali -10
(e) Katihana -Nil

X. Community Church Groups:
(a) Haemane-Baptist Church Women˜s and Youth Groups
(b) Vuramali-South Sea Evangelical Church Women˜s Fellowship and Youth Groups
(c) Horohotu-Seventh Day Adventist Church Women and Youth Groups

XI. Livelihood:

In Haemane 11 men and 4 women involve in paid employment in the following:
(a) Gold Ridge Mining Co.
(b) Ministry of Finance & Treasury-SIG
(c) Ministry of Fisheries-SIG
(d) Solomon Islands Ports Authority
(e) Teaching Services
(f) Royalties from Gold Ridge Mining

Formal Employment:
(a) Vuramali 6 men and women
(b) Horohotu 5 men and 1 woman
(c) Katihana no information

Other activities which they also involve with for their livelihood are-
(a) Milling timber
(b) Gardening/Marketing
(c) Fishing/Hunting
(d) Cutting Copra/Selling Cocoa
(e) Operating Canteen
(f) Sewing School uniforms
(g) Weaving baskets for sale

The kinds of crop, fruit and veges which they sell in the markets are;
(a) Slippery cabbage
(b) Paw paw
(c) Cassava
(d) Kumara/Potato
(e) Ferns-Kasume

No one in either Haemane or the other communities involved in any tourism projects but some of them are signatories to the Gold Ridge Mining Company and Paramount Chief David Tabea is one of them.

XII. Fishing and Hunting:

Both men and women go diving and hunting up to Pachuki and all the way up the riverand in the bush following bush road, and the valley looking for
(a) Ura & eel in the river; and
(b) Pigs in the bush

XIII. Historical & Sacred Sites:
(a) Tulahi is an ancestral sacrificial site
(b) Namuloha is a sacred pool

(c) Aho is a stream with a half Eel living in it and since everything else in it is all half no one is allowed to eat anything in it
(d) Pela is also a tabu site
(e) Naukotiti is a historical place of worship with a stone and a sacred tree known as vaovao still standing in it today. It is located in the area between Senge and Choro
(f) Vuho which literally means to catch in a net is a sacred site at Vuramali

XII. Currently People Use the Water from the River for:
(a) Cooking
(b) Washing
(c) Drinking
(d) Swimming
(e) Watering cabbages, egg plants, beans and other vegetables
(f) Boiling and making tea
(g) Transportation

XIII. Main Concerns if the Dam is built:
(a) Their hunting grounds will be affected because the pigs resting place will be under water
(b) Fishing will be affected, especially diving because the best spots will become so deep that no one will be able to dive
(c) Quality of the water will no longer be the same
(d) It will no longer be safe for the children to play freely in the river
(e) Drinking the water directly from the river will become a health problem
(f) Fear of the dam breaking and destroying everything in its path including lives of people

XIV. Health Issues and Concerns:

Currently the most common diseases or sicknesses that often affect people in these communitiesand their concernsare-
(a) Malaria
(b) Pneumonia
(c) Influenza
(d) Diarrhea
(e) Measles
(f) Clinics very far
(g) Lack of transport in emergence cases

XV. The first things people buy when they have money:
(a) Rice- because easy to cook
(b) Soap
(c) School fees
(d) Generator for lighting, video show (3-4 hrs a day)

XVI. Benefit they see if Hydro is Constructed:
(a) Provide lighting
(b) Refrigerator for preserving food/cold water
(c) Good communication
(d) Clinics

(e) Permanent School/Church buildings with lights for night programs
(f) Employment opportunities for women
(g) Electric sewing machines
(h) Men will be employed
(i) Operate small income generating businesses

XVII. People's general feeling toward the Tina Hydro Project:
(a) Generally those present at the meeting seemed to appreciate the discussions
(b) They were happy to express their feelings freely but still not sure since hydro development of this magnitude is a new undertaking by the SIG in this country
(c) Since this huge development project will be on their land, fairness in the benefit sharingmust be taken seriously and they need to fully participate as equal partners
(d) They do not want the situations they already experienced with Gold Ridge Mining Company and Guadalcanal Plains Palm Oil Limited repeated
(e) Therefore, SIG, the financier of the Project and all stakeholders must take on board seriously the people's concerns.

WEEK 1-DAY 3: Wednesday 4th September 2013

SIA Team visit to-

I. Tina: The main center for the Meeting

II. Targeted Communities: Tina, Valebebe, Valebarik, Valemaota&Tahurasa

III. In attendance: 38

IV. Program:
(a) Met on arrival by the founding father of Tina Community, Chief Gabriel Gi.
(b) Meeting was held at the Church Community Hall
(c) Welcomed by the Village Chief Asher Wini
(d) Opening Prayer by Jeremiah
(e) Opening remarks by Zimri Laoni who was one of the three Field Guides
(f) Kellington Simeon and Gerard Fitzgerald explained the purpose of the visit and told those who attended that the SIA team consists of independent Scientists and not from the SI Government or the Tina Hydropower Development Project Office.
(g) The SIA team's visit is paid for by the World Bank

V. History of the Communities/Villages:
(a) Tina started by Chief Gabriel Gi, his wife and father in the 1950s after WWII
(b) Before that they were living in Belana and Vurutolu
(c) He converted to Christianity through the teaching of a Missionary from North Malaita by the name of Gideon Fangalea who used to accompany him as a young man to get things from the American Soldiers and carry them back to mountain settlements.
(d) Gabriel Gi's wife attended Afio Girls Bible School in South Malaita before they got married

(e) Current population is between 400 to 500
(f) Main religion is South Sea Evangelical Church
(g) From Tina the others move to settle in the other communities such as
(h) Valebarik started in 1980
(i) Valebebe started in 1998
(j) Tahurasa started in 1999
(k) Valemaota started in 2006

VI. Main Reasons for moving from the mountains and later spreading to establish other communities include:
(a) Escaping from the Moro Movement in the 1950s when it was very strong
(b) Need easy access to medical services
(c) Close to Honiara for other services such as market, shops and main Church Head Office
(d) Employment opportunities
(e) Natural disaster such as the Cyclone Namu in 1986

VII. Church and Social Groups:
Since all the family members now living in the other communities started from Tinawhich is predominantly SSEC, they all have the same social groupings such as:
(a) Women˘s Fellowship Groups
(b) Men˘s Fellowship Groups
(c) Youth Groups
(d) Sunday School Groups
(e) Soccer Teams
(f) Volleyball Teams
(g) Netball Teams

VIII. Livelihood:
(a) Women˘s activities involve gardening
(b) Marketing vegetables and other crops like potato, cassava, taro etc at the Honiara Market
(c) Sewing cloths for themselves and extras for sale
(d) Every Friday go to Honiara main Market
(e) Sell flowers
(f) Feed and sell pigs
(g) 12 workers employed at Gold Ridge
(h) 1 work for GPPOL
(i) 3 School Teachers
(j) 1 work in the THP Office
(k) 1 Public Servant
(l) 2 work as Police Officers at Tetere Police Post -(Chief Gabriel Gi˘s son and grandson)
(m) Milling timber for sale or personal use
(n) Dive for fish to sell or family consumption
(o) Hunt for pig for sale or to eat
(p) Logging in the area

IX. Women˘s Current Lifestyle in the Communities:

(a) Free to walk wherever they wish without fear
(b) Free to fee and raise their pigs and children
(c) Free to fee their dogs
(d) Free to breath fresh air
(e) Free to fish using fishhooks or their bare hands to catch the fish
(f) Free to walk along along the river banks
(g) Free to go to their gardens alone

X. Community Projects:

In Tina Community, the South Sea Evangelical Church had introduced in August 2012village projects that involved:

(a) Sanitation ¯ which individual families are taught how to make proper sealed toilets
(b) Environment Cleaning ¯ cutting down the grass, digging proper drainage systems, general village cleaning around residential dwellings and proper disposal of rubbish
(c) Piggery ¯ the Church provided a boar and female pig
(d) Aims - to prevent unhealthy habits such as using the bushes and streams as toilets
(e) - toreproduce piglets for distributing to individual families to feed.
(f) Unfortunately, both pigs are so huge that they are unable to reproduce.
(g) Two persons from Tina community attended a training courseon how to properly manage pig farming at the Taiwan TechnicalFarm in Honiara

XI. Sacred/Tabu Sites:

(a) Vatulina is a sacrificial site from before
(b) Namuloha is a fish spurning big pool at Korobawhich is regarded as sacred
(c) The Pool is regarded sacred so that while the fish is spurning they are protected and preserved and later they can spread to other parts of the Tina River

XII. Health Issues:Main diseases/sicknesses

(a) Malaria (cases drastically reduced)
(b) Diarrhea (reduced)
(c) Hookworm (also reduced)
(d) Pneumonia (cases are increasing)
(e) Stress amongst women (slightly increasing)
(f) Still birth or other related difficulties in child delivery is not a problem

XIII. Main Health Concerns:

No health clinics close by so they have to travel to Honiara especially to

(a) Rove clinic
(b) Mataniko clinic
(c) Kukum clinic
(d) No. 9 Central Hospital
(e) Heavy alcohol consumption
(f) Youths involving in drug use
(g) Transportation is sometimes difficult in emergency cases

XIV. Problems with the construction of the dam for the Tina Hydro Project:

(a) Polluting the water
(b) No fishing
(c) No diving

(d) No clean drinking water
(e) No clean water for swimming
(f) No clean water for washing cloths and dishes
(g) Fear for the children
(h) Fear of the dam breaking during earthquakes and cyclones
(i) Fear of landslides causing the water to overflow from the dam
(j) Diseases like diarrhea might increase

XV. Men and Women˘s Concerns:
(a) Employment should involve locals who already have skills
(b) Nor respect for the custom/culture by those from outside
(c) Camp sites should have proper waste disposal in place
(d) Contracts should consider the locals first not like Gold Ridge Mining Company
(e) Dumping of raw sewerage straight into the water without treating like Gold Ridge Mining Company not acceptable
(f) Disrespect for young girls and even married women
(g) Security
(h) Women do not want the type of treatment Gold Ridge Mining Company has done to the local women in the Gold Ridge area
(i) Women want the Project to provide the opportunity for them to do catering, laundry and even driving some of the light vehicles
(j) They want the first chance for employment for unskilled work to be given to their men-folks

XVI. Long Term Concerns:
(a) Landslide into the lake/dam
(b) Trees for timber along the river bank in the dam area will not be possible to cut
(c) Will they continue to use the lake/dam for fishing
(d) Diving will no longer be possible
(e) Using the river as a means of transportation will be greatly affected

XVII. Benefits from the Hydro Project:
(a) Provide lighting for the communities
(b) People will be able to use refrigerators to store food/cold water
(c) Build mini hospital
(d) Improve the road and other infrastructures
(e) Provide good water supply system
(f) Use the Dam as part of tourism attraction
(g) Provide employment
(h) Building permanent houses
(i) Set up scholarships for local students
(j) Invest any money they earn from the project
(k) Involve in joint investment schemes
(l) Involve in eco-tourism development projects
(m) Operate canteens
(n) Set up furniture making workshops

XVIII. Some Mitigation Measures:

(a) Provision of water tanks
(b) Build water supply to provide water from other sources
(c) Possible use of lake/dam for transportation
(d) Sailing
(e) Fishing
(f) Other recreational activities

XIX. Final decision on the Benefits and Effects:
(a) 90% of those present supported the Project
(b) 10% undecided
(c) More information is still needed on the effects

XX. Concluding remarks:
When people do not benefit from any project on their land they cause social disturbance

XXI. Lunch was kindly provided:
Consisting of boiled bananas which was greatly appreciated

WEEK 1-DAY 4: Thursday 5th September 2013

SIA Team visit to-

I. Valesala: The main center for the Meeting

II. Targeted communities: Antioch, Valesala and Komeo

III. Total Attend Meeting: 41

IV. In attendance:
(a) Paramount Chief of Antioch Community, Eron Nose;
(b) Tribal Chief of Komeo Community, Mark Enoch;
(c) Tribal Chief of Valemaota, Enoch Maki who did not attend meeting at Tina;
(d) Ishmael Wesi, Elder of the Church and Village of Antioch;
(e) 38 Men and Women as well as children

V. Program:
(a) Opening pray by Elder Ishmael Wesi;
(b) Brief introduction of team members including local guides and field assistants by local Anthropologist;
(c) Chief remarked saying they did not receive any prior information about the SIA team˘s visit;
(d) SIA team leader, Gerard Fitzgerald expressed his regret about the information not reaching them in time before the team arrived even though it was sent earlier;
(e) Kellington Simeon explained the purpose of the visit by the SIA team; and
(f) Zimre Laoni further explained in language the purpose of the visit in response to a question from the former SSEC Pastor Osca Billy

VI. History of people migration from place to place:

(a) First wave of migration to these villages started around 1960s;
(b) First settlement at Kolohaji;
(c) From Kolohaji people move to Talamu and Torotolu;
(d) From Talamu to Vatunadi;
(e) From Vatunadi to Valelokea;
(f) From Valelokea to Valekocha;
(g) From Valekocha to Valelokea or Antioch and Valesala in the 1970s; and
(h) These movements also included members of the Moro or Gaena Alu Movement

VII. Reasons for moving from one place to another place:
(a) Easy access to Honiara town;
(b) Easy access to clinics;
(c) Easy access to schools;
(d) Easy access to other services like transportation, shops etc.;
(e) Also natural disaster like Cyclone Namu in 1986 caused people to move; and
(f) People move along their relationship ties, land boundaries and landownership

VIII. Livelihood:
(a) Full time employment
(b) 3 Teacher (Government)
(c) 2 GPPOL
(d) 4 Earth Movers Logging Company
(e) 1 Gold Ridge Mining Company
(f) 1 Pastor

IX. Other sources of income:
(a) Milling timber
(b) Fire wood
(c) Flowers
(d) Handicraft
(e) Garden products
(f) Fishing
(g) Hunting
(h) Gardening
(i) Marketing
(j) Day labor (earn between $50 and $100 or provide food)
(k) Contracted jobs
(l) Megapod or wild turkey eggs
(m) Chicken/Duck/Pigs
(n) Betel nut fruits
(o) Local building materials-sage palm leaves, vines, etc
(p) Local tobacco (lekona or savusavu)
(q) Nali Nut and Coconut (young and dry fruits)

X. Common Health Diseases/Sicknesses and Concerns:
(a) Malaria both adults and children
(b) Pneumonia
(c) Diarrhea both adults and children

(d) Measles mostly with children
(e) Influencer/common flu both adults and children
(f) Yellow fever rare
(g) Sugar or Diabetic common amongst adults
(h) High blood pressure adults only
(i) Main clinics far away at Rove, No. 9 for emergency cases only
(j) Namanu health aid center lacks fulltime medical staff and medicine
(k) Stress affects women because of drunken husbands and extra marital affairs
(l) Difficult child birth can cause death
(m) Accidents
(n) Children drowning in the river
(o) Body shaking, cold, fever-people associate this new kind of feeling in the body with the use of chemicals in the mining activities at Gold Ridge Mining sites

XI. Main Church and Groups:
(a) South Sea Evangelical Church
(b) Women˘s Fellowship Group
(c) Men˘s Fellowship Group
(d) Youth Group
(e) Music Group
(f) Sunday School Group

XII. Moro or Gaena Alu Movement:
(a) Preservation of Culture and Inheritance
(b) Moro˘s vision was to preserve the culture
(c) Preserve the Environment- (Hairau)
(d) Preserve the Land- (Pari)
(e) Preserve custom money, way of doing things and lifestyle of People- (Tinoni)
(f) Live simple life- (Poua or Poor)
(g) Look after the Ground/Land- (Momoru)
(h) Life of today (rich becomes richer and poor becomes poorer)- (Vulua or Head)

XIII. Current Situation:
(a) Use Kerosene for light
(b) Generator
(c) Solar Panels

XIV. Future Plans if Hydro Project is completed:
(a) Lighting
(b) Refrigerator
(c) Video
(d) Electric sewing machine
(e) Improve and upgrade Church Musical Instruments
(f) School computers

XV. Household:

If women have extra income they would
(a) Start income generating businesses
(b) Improve housing from thatched to iron

(c) Pay school fees

XVI. If men have extra income they would
(a) Purchase truck for marking timber
(b) Purchase truck and put on hire or rental
(c) Involve in Tourism/Home-stay
(d) Spend it on housing
(e) Purchase tools (chain saw)
(f) Build Community health
(g) Build Community hall

XVII. Final Remarks:

One of the women expressed her concerns regarding
(a) Road block to drinking water (Gold Ridge)
(b) Road block to gardening area (Gold Ridge)
(c) Continue the dialog after 1 year
(d) People in the affected areas to have maximize benefit and minimize the effects
(e) Communities should involve with the management of the project
(f) Any agreements should consider inclusion of any clause that will take into account reviewing the agreement.

WEEK 1-DAY 5: Friday 6th September 2013

SIA Team Program

I. Household Survey Review

II. Venue: Hyundai Office

III. Time: 8 am ˜ 5 pm

IV. Attended by: All SIA Team members

V. Discussions led by Gerard Fitzgerald, SIA team leader, assisted by Kellington Simeon, Lawrence Foana˘ota, Anthropologist and Sharon Para, Local Assistant Guide and Interpreter

VI. Went through the four days˘ field work results and fill in any gaps with the help of the other local guides such as Zimri Laoni and Rex Ata

VII. Planned the field work program for the rest of Week 2.

WEEK 2-DAY 6: Monday 9thSeptember 2013

SIA Team Visit to-

I. Senge ¯ the main center where the meeting was held

II. Targeted Communities were: Senge, Koeroba and Choro

III. Present:
(a) Chief Joe Maneisu of Senge, & Son Clement Tovia
(b) Chief Hudson Micah of Koeroba, wife and Son-inlaw
(c) Chief of Choro did not attend
(d) Rest of those present were of those who went with the team
(e) SIA team-GF, KS, SP & LF

IV. Program:
(a) Brief welcome by Clement Tovia
(b) He also explained to those representatives from the other communities who attended the purpose of the meeting and told them to give the right information concerning the proposed Tina Hydro Project when they are asked questions.

VI. Introduction of each of the Team Members by Gerard Fitzgerald the SIA Team Leader.

VII. Presentations:
(a) Senge: was settled before World War 2.
(b) After the War some families decided tomove to communities like Marava, Vuramali, Managikiki and Koeroba
(c) Joe Maneisu and family remain until today.
(d) In 1986 Senge was destroyed by Cyclone Namu.
(e) People moved to Marava and after the cyclone return back to Senge again.

VIII. Reasons for moving:
(a) Natural disasters like cyclone Namu of 1986
(b) Easy access to job opportunities in Honiara
(c) Easy access to transportation
(d) Quicker to get to Health clinics

IX. First information about the Hydro Project:
(a) The people˘s first time to hear about the HP was in 2007;
(b) The person who first told them about the Project was Texas from Guadalcanal;
(c) He visited Koeroba and Senge;
(d) Life after the dam is built, is still unknown;
(e) Life now is all they know; and
(f) Little they know about the project at this time is that it will change their way of life and affect their use of the river

X. Main Livelihood Activities:
(a) Gardening;
(b) Hunting with dog & spear;
(c) Fishing;
(d) Diving;
(e) Marketing of ferns/tomatoes/egg plants;

(f) Milling timber for sale and own use (small scale);
(g) Development of Eco-Tourism (from 2009 till early 2013 already had 29 guests);
(h) Charging for accommodation (from beginning of 2013 already had 17 guests who paid a total of $17,000.00);
(i) Marketing of the Eco-tourism lodge at Senge overseas has already been made; and
(j) Foraging in the forest

XI. Other Village/Community Activities:
(a) Hunting and fishing may take villagers away from their homes for a week;
(b) Daily hunting and fishing take place between Senge and Terobisi;
(c) They may also hunt or fish along the Beahea or Bicho Rivers;
(d) Namutamadira Pool people believed in the past a family drowned inside after a landslide and still live in it. After Cyclone Namu people started fishing inside;
(e) Used fishing lines (in Senge they have about 6 fishing lines);
(f) Use goggles for diving (only 1 left):
(g) Hunt for pigs with dogs and spear;
(h) Opossums; and
(i) Large lizard known as Hunu

XII. Women's Roles:
(a) Weaving baskets;
(b) Planting vegetables like slippery cabbage, tomato, beans and egg plants;
(c) Cultivating root crops such as potato or kumara, cassava;
(d) Taking care of the household chores;
(e) Cooking for the family using fire;
(f) Fetching drinking and cooking water from the main Tina River;
(g) Collecting firewood for cooking;
(h) Feeding the pigs and other domestic animals;
(i) Washing the clothes & dishes; and
(j) Cleaning in and around the home

XIII. Varieties of Crops, Plants, Animals & Materials for family use and for Sale:
(a) Cassava, potato or kumara, yam, taro and banana;
(b) Betel nut;
(c) Ferns or Kasume planted;
(d) Slippery cabbage and beans;
(e) Wild yam is called Uvikambe;
(f) Wild taro is known as Kai Chui leaves;
(g) Swam taro or Kakake;
(h) Fish & Pigs;
(i) Loya cane; and
(j) Picho is a kind of local ice-cream.

XIV. How much they earn per month:
(a) In the past they used to earn between $250 to $500 per month;
(b) Now they may earn between $500 to $1,000 per month by selling betel nut; and
(c) Providing accommodation for tourists

XV. The main Church & Organization at Senge, Koerob & Choro:
(a) Roman Catholic;
(b) Moro or Gaena Alau Movement; and
(c) Seventh Day Adventist (1 person at Senge).

XVI. Main Diseases:
(a) Malaria (not a major problem);
(b) Pneumonia (caused by very bad cold);
(c) Influencer or common cold
(d) Hernia (caused by hard work); and
(e) Generally people in these communities are healthy

XVII. Health Concerns:
(a) Long distances to the Clinics like Rove, Mataniko and No. 9 Hospital;
(b) Namanu and Good Samaritan Clinic (near Nguvia) unable to deal with serious cases;
(c) Lack of transportation; and
(d) Being far away from any good roads and health facilities

XVIII. Communities˘ Needs:
(a) A health clinic;
(b) Good access roads;
(c) Need to setup an internet caf¶; and
(d) Proper accommodation facilities for tourists

XIX. Education:
(a) The only Primary and Community High School in the area is at Rate;
(b) The children from Koeroba have to reside at Antioch to go to school and only return home during school holidays;
(c) Main worry is for food because they do have any land for gardening at Antioch; and
(d) So far only 1 person at Senge attended High School and is currently operating an Eco-Tourism lodge

XX. During Disasters or the Tina River floods:
(a) Seek government aid like in 1986 when Cyclone Namu struck;
(b) Seek help from Guadalcanal Disaster Management Committee in 2010˘s flooding;
(c) People eat swamp taro or kakake and banana during times of disasters; and
(d) People use Senge & Nembo streams to fetch water for drinking and cooking

XXI. Cultural Sites:

The following sites were used by the founding fathers who settled the land between Senge and Choro:
(a) Tulahi opposite Koeroba Settlement;
(b) Aho is a sacred Pool;
(c) Namoloha is a sacred Pool;
(d) Choga
(e) Vatukotiti is a sacred Stone;
(f) Bela located on Tulahi hill;

(g) Tovu;
(h) Babaru Luvia is a cave used in the past for sleeping; and
(i) Kabi

XXII. Their Sacred Totems:
(a) Helu (Big fish) represented by 2 stones;
(b) Eel ¯ Mouvo;
(c) Prawn used for sacrifice;
(d) Hahate-poisonous snakes (2 types)
- ¿ One red in color is a totem;
- ¿ 2nd is called Hurusuli - dark-blue in color is poisonous but very rare and lives in the river; and

(e) Vatumosa is a Pig represented by a stone totem.

XXIII. Forest & Logging:
(a) Logging happened at the top of the mountains in 2011;
(b) Recent logging activities in the area was by Earth Movers;
(c) Problem of logging causing streams to get dirty and undrinkable;
(d) Arguments usually occur between family members regarding benefit sharing;
(e) Causes a bit of soil erosion;
(f) Tapu sites were marked with red paint;
(g) Koeroba main reasons for milling timber are for sale and house building;

XXIV. Benefit of Electricity if the Dam is built:
(a) Currently use solar (sun only heats up the panels from 11 am to 2 pm;
(b) Kerosene (now facing out);
(c) Sustainable lighting;
(d) Able to screen video/movies;
(e) Refrigerator for the Eco-Tourism Lodge;
(f) Set up internet caf¶
(g) Relocation of the communities;
(h) Improvement of standard of living;
(i) Have proper water supply;
(j) Have protected area;
(k) Provide employment
(l) Contribute to the Development of Eco-Tourism Activities and Attractions;
(m) Provide Sports Facilities for communities;
(n) Provide scholarships and training;
(o) Provide close health facilities like clinics and even a mini-hospital;
(p) Improve the level of education in specialized skills;
(q) Tourists might be interested to come and see the lake; and
(r) It will make it easier for people to travel upstream by canoe or boat

XXV. Other Benefits if get extra Money:
(a) Buy an Out Board Motor & Canoe to use in the lake;
(b) Buy a truck;
(c) Establish a Fuel Station;
(d) Buy a laptop computer for entering data concerning tourists; and

(e) Set up a Tire Repair Workshop

XXVI. People˘s Concerns if the Dam is built:

(a) The use of plants for medicine will be affected;
(b) The use of plants for food may no longer available;
(c) Plants use to feed dogs in order to know where pigs live will be destroyed;
(d) Access to medicinal plants use for fishing, hunting and women will be limited;
(e) Leaves of plants use for separating married couples will be hard to find;
(f) Number of tourists visiting the place might be less;
(g) Some species of fish might migrate while those like living deep waters might stay;
(h) Calvelum trees and creepers need to be removed because they are poisonous and might kill the aquatic life in the dam;
(i) Logging trees must be compensated;
(j) If paid for the trees, the Project would have the right of ownership;
(k) Property lose;
(l) Lose of river access;
(m) Water contamination;
(n) Access for normal use will be affected;
(o) Pollution of the air, noise, and water;
(p) Tribal conflict over land and royalty sharing;
(q) Two graves at Koeroba will be under water;
(r) Gardening areas for potato, cassava, yam, taro, banana, betel nut, coconut and all kinds of fruit trees will be flooded;
(s) Aho stream on Tulahi land owned by Charana sub-tribe of Manukiki will be under water in the dam;
(t) Change of culture which might lead to women wearing shorts & driving trucks;
(u) Broken families;
(v) Ethnic differences and misunderstanding between locals and international employees might cause frictions; and
(w) Introduction of new diseases

XXX. Chief Hudson Micah of Koeroba˘s Movements:

(a) Chief Hudson Micah was born at Valehaitora within Manukiki land;
(b) From Valehaitora he moved to Muritovavi;
(c) From Muritovavi he moved to Hailake (on Garavu land);
(d) From Hailake he moved to Tavura (Manukiki land);
(e) From Tavura he moved to Vatumosa;
(f) From Vatumosa he moved to Turutolu;
(g) From Turutolu he moved to Valehaona;
(h) From Valehaona he moved to Valebokoboko;
(i) From Valebokoboko he moved to Malatoha;
(j) From Malatoha he moved to Tavura;
(k) From Tavura he moved to Hanilake;
(l) From Hanilake he moved to Marava (where he married in 1975);
(m) In that year he started Vuramali;

(n) From Vuramali he moved to Komeo (which was damaged by Cyclone Namu in 1986);
(o) From Komeo he moved back to Marava;
(p) From Marava he moved to Vuramali;
(q) From Vuramali he moved to Tina;
(r) From Tina he moved back to Vuramali;
(s) From Vuramali he moved to Valesala;
(t) In 1993 he moved from Valesala to Koeroba. and
(u) Established a hamlet on his land at Koeroba

XXXI. Main Reasons for Moving from Place to Place are:

(a) He was not accepted by Church leaders who disagree with the Moro Movement;
(b) He was not allowed to promote any activities associated with the Movement;
(c) Disrespecting the Movement˘s believes and teachings which he practices;
(d) Not allowing him to make money on land owned by other people;
(e) Disturbing his plans to build custom houses by taking him to court;
(f) His interaction with other community members was restricted; and
(g) His desire to return to his ancestral land where everything is free

XXXII. Some Information on the Moro or Gaena Alu Movement:

(a) Name Gaena Alu was given to the Moro Movement after it was registered under its Constitution.
(b) The Movement˘s main base is at Koeroba where Chief Hudson Micah is the main holder of everything related to the Movement.
(c) He has two boxes containing the things that he keeps in three compartments in each box.
(d) The purpose for keeping them in boxes is for security and safety reasons.
(e) Also when the dam is built and the place is flooded, they are easy to move to another safe location.
(f) By keeping them safe, he would use them to attract tourists.
(g) He is interested in developing eco-tourism facilities in his own place.
(h) He is not sure at this stage if the Hydro Project or Government would assist him finance his proposed plans.
(i) Items kept in the boxes are shell money rings use for life saving.

XXXIII. Some Issues Worth Noting:

1) Reiloto is the original place of settlement by the founding ancestors of the present families of Senge and Koeroba hamlets.
2) Descendants of the Charana sub-tribe continue to move around in the surrounding areas of land in search of good gardening, hunting and fishing spots along the Tina River.
3) Even though they move around, they still continue to think about their relationship and ownership of their land. Therefore, they continue to live until today in the hamlets at Senge and Koeroba.
4) The families in these hamlets continue to depend on what grows and lives in these areas of land along the river for their survival.

5) It was in 2007 that he first heard about the Hydro Project from one Government Officer who visited them.
6) From that time he started replanting his betel nut trees at Namopila away from the dam site.
7) He wants to relocate at Vukuraunaba further up in the hills from Koeroba.
8) To mitigate he needs to relocate his Custom House where he keeps the heirloom.
9) In each box he divided into three rooms.
10) Room 1: items relate to environment;
11) Room 2: items relate to good health; and
12) Room 3: items that make gardens produce high yields
13) These items represent similar ones held at the Movement˘s headquarters in Makaruka, on the Weather Coast of Guadalcanal Province

WEEK 2-DAY 7: TUESDAY 10TH SEPTEMBER 2013

SIA Team visit to-

I. Pachuki ¯ main venue of the Meeting

II. Targeted Communities: Pachuki, Habusi and Veralokea

III. Habusi Settlement: A brief stopover was at Habusi where the power station will be located on the way to Pachuki. Only one person met the team at the settlement.

IV. Program:
(a) Introduction of the SIA Team members by Lawrence Foana˘ota-National Anthropologist/Health and Cultural Heritage Expert
(b) Explaining the purpose of the visit by Gerard Fitzgerald-International Sociologist
(c) Questions and discussions about social aspects of the communities led by Kellington Simeon-National Assistant Sociologist assisted by Sharon Para, Zimri Laoni and Rex Ata, the local guides and interpreters

V. Attendance:
(a) Avai Gilbert, Chief of Pachuki Village
(b) Risiki Rongo, Chief of Habuchi Village
(c) Including men, women and youths from both communities
(d) SIA team- GF, KS, SR & LF

VI. History of the two Settlements:
1. Pachuki
¿ Started after Cyclone Namu in 1986
¿ Before that members were in Torotolu
¿ In 1966 they left Torotolu for Valekocha
¿ From Valekocha they moved to Valesala
¿ From Valesala they moved to Pachuki