AUSTRALIAN WATER RESEARCH FACILITY

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Situation Analysis Report

SOLOMON ISLANDS

Abbreviations

ADB	Asian Development Bank
AHC	Australian High Commission
ARDS	Agriculture and Rural Development Strategy
AusAID	Australian Agency for International Development Assistance
AWRF	Australian Water Research Facility
CBO	Community Based Organisation
EU	European Union
FMP II	Forestry Management Project II
HDI	Human Development Index
IWC	International WaterCentre
MoH	Ministry of Health
NCSA	National Capacity Self Assessment Project
NGO	Non-government Organisation
RWSS	Rural Water Supply and Sanitation
SOPAC	South Pacific Applied Geoscience Commission
SPREP	South Pacific Regional Environment Program
TA	Technical Assistance
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
WRD	Water Resources Division, Department of Mines and Energy
WWF	World Wide Fund for Nature

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International WaterCentre 2006

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Introduction and Overview

This situation analysis is a combination of a desk review completed in January 2006, and a follow-up in-country visit undertaken in July 2006. The delay between these two activities was primarily due to the unrest surrounding the May elections.

Purpose of report

The purpose of this document is to outline the current context of water in the Solomon Islands: water is central to all aspects of life and is a cross-cutting issue affecting community, economy, environment and health. The institutions responsible for the management of water are described, as is the governance and regulatory context. This report was developed as a background reference for the development of the research activities of the Australian Water Research Facility. However, it provides a useful overview of the sector for government officers, donor organisations, researchers, and others wishing to better understand the water sector of the Solomon Islands.

Research is by its nature limitless, and there are many unanswered questions relating to water in the Solomon Islands. The Australian Water Research Facility (AWRF) team has described what it sees as pressing needs that it can best address, namely catchment management. Initially an urban/ peri-urban case study is recommended, with the possibility of expanding into rural areas as the project progresses. AWRF is conscious of the need for any research to be practical and useful for the Solomon Islands its development, and this will be a continuing consideration throughout the program's activities

Key issues

Solomon Islands has abundant rainfall and natural water resources in nearly all provinces which could be developed to provide adequate and quality water supply for the entire population. However, the prevailing environment is such that there is low economic growth coupled with rapid population growth. The government is poorly resourced, weak and inefficient in delivery or services including water.

Land and access issues

Many households, especially in rural areas, still do not have access to improved water supply systems and still rely on streams and rivers to obtain water for drinking and household use. Some communities that have had to relocate because of logging activities have ended up living a considerable distance from reliable water sources. As women (and often children) perform household duties such as collecting water this greatly increases their daily workload.

The land tenure system often results in land disputes associated with water supply in the provinces and often disruption to installation of water supply systems, damage and vandalism of water supply infrastructure. Landowners, especially in Honiara, often cause disruption to water supply at source due to dissatisfaction over lack of up-to-date payment of water leases by the Government.

Quantity and quality

While there is generally an abundance of water in most of the archipelago, water supply has been disrupted in certain areas, which affects both the quantity and quality of the water available. As the region is prone to flooding, this needs to be taken into account when considering water use and availability.

Most coastal villages and those on atoll islands ground water from wells are saline. This problem is becoming common and poses a risk to the villagers who rely on the water from the wells for their household use.

Indiscriminate land clearing through subsistence food production, for plantation and commercial logging is resulting in drying up and sedimentation of river and streams systems. Even if water supply systems are built, high sedimentation in river systems clogs the pipes making the water unsuitable for drinking and household use.

The Environmental Health Division only carries out water quality analysis to facilitate rural water supply *installation,* but does not carry out any analyses during time of use. There is risk of water being contaminated as most reservoir tanks at source are open and not fenced. Some catchment areas are being disturbed through land clearing and logging causing high sedimentation in the river system. Villagers sometimes complain about dirty drinking water from their water supply systems.

High rainfall in some areas like Guadalcanal weathercoast often affects crop growth and thus food supply tends to be disrupted in the wettest months. This is particularly marked in years where the rainfall is especially high, as happened in 2004.

Lack of resources and infrastructure

The poor resourcing of the Water Resources office is a barrier to successful water resource research and development. The Division has limited technically qualified staff to provide professional service in planning and development of a reliable and good quality water system in the country, which over the years has never been a government priority.

No maintenance or servicing of existing water supply systems and ground water wells has ever been carried out by either the communities concerned or responsible authorities and as a result most water supply systems require repair and rehabilitation.

One of the main issues of concern to current institutional arrangements in the country is fragmentation of policies and plans which resulted in little co-operation among organisations responsible for water resources thereby not adequately addressing water resources which sometimes could lead to conflicting mandates and objectives at the national level. With assistance from donor organizations, the Government of

Solomon Islands has implemented a program to address water governance in the country.

The previous lack of appropriate legislation, approved water policies, guidelines and regulations formed a significant barrier to the planning and development of proper water supply facilities in the country. Despite the new governance program, resources continue to be inadequate, impeding provision for supply and regulation.

The Solomon Islands Water Authority (SIWA) struggles to survive and fights daily to keep water supply to town residents going. There is an ongoing problem with inadequate water supply in towns (Honiara and Auki) due to increasing water demand on old and deteriorating water infrastructure. There have been incidences of water contamination in the past that made the water unsafe for human use in Honiara and other urban centres.

Current situation for water and sanitation

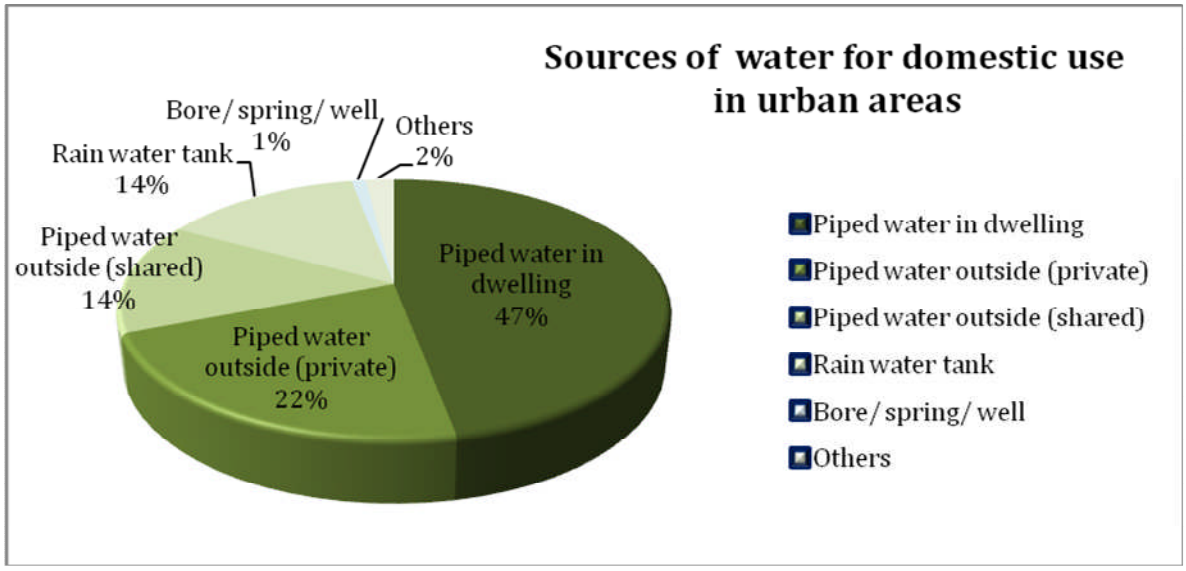
In Solomon Islands water resources are required for: (1) Drinking and household use; (2) Power generation; (3) Agricultural use; (4) Mining operations; and (5) Industrial use. Some surveys have been done to indentify access to resources and requirements for water and sanitation. The data on urban areas is more comprehensive; however some information exists on water provision in rural areas.

Drinking and household use

Water for drinking and household use is a priority as it affects the greatest number of people on a daily basis. Many rural villages obtain water for drinking and household use directly from the natural source. Those who do not have access to streams and rivers use either ground water from wells or springs, or collect water from rain catchment tanks. Over the last two decades, with donor support, Government and some NGOs have provided piped water supply to many communities including those in urban centres from the abundance of rivers and streams on the islands. There is now an increasing use of piped water supply.

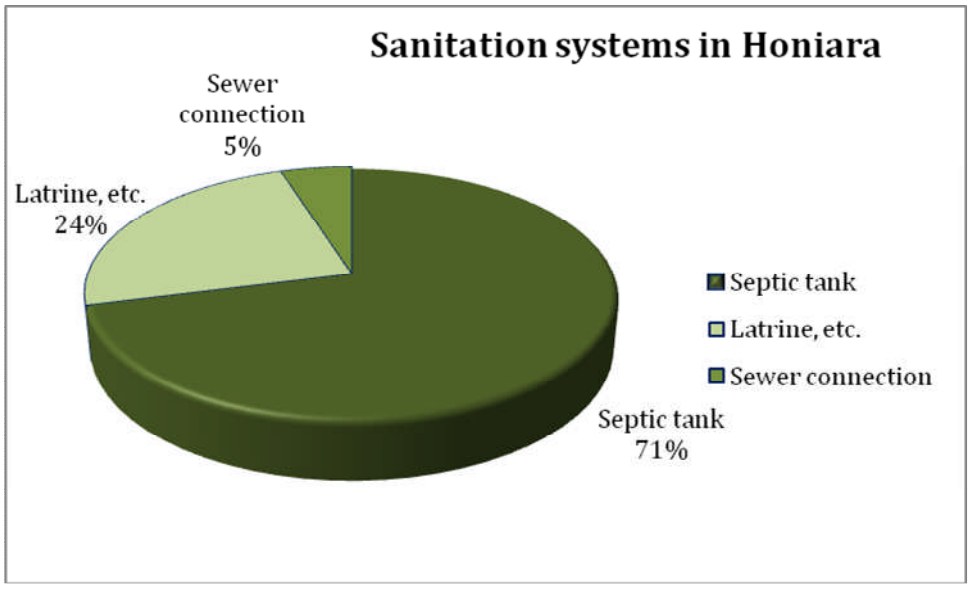
A survey of urban households suggested that there are four main types of water supply: piped water, rain tank, bore water and natural sources such as river and streams. Less than half of households have piped water inside, although most households do have some access to piped water either shared or private, or alternatively have a rainwater tank. A small percentage relies on groundwater via a bore or well, or must collect water direct from the source.

Figure 1.1 Sources of drinking water in Solomon Islands Urban Areas (JICA 2006)



The survey found very few households were connected to the sewer, with the majority using septic tanks and nearly a quarter still using latrines. See figure 1.2 below

Figure 2. Discharge system in Honiara (JICA)



The Village Resources Survey of 1996/97 along with the Solomon Islands National Census conducted in 1999, documented the status of water use and sanitation in the provinces and summarised in the Provincial Development Profile Reports (2001) as follows:

Table 1: Access to improved water and sanitation in the provinces

Province	Access to sanitation facilities (%age)	Access to improved water supply (%age)
Malaita	15-25	65-75
Western	15-25	64-75
Makira/Ulawa		58
Isabel	16	84
Temotu	8.3	73
Guadalcanal	25	

- Not all data was available as percentages in these broad categories, therefore details of other facilities (or lack thereof) is given below:

- On Guadalcanal, water and sanitation services are generally inadequate. As of 1997, there were 464 installed water supply systems in the Province. The rest of the residents use streams or rivers for swimming, bathing, washing and drinking. The 1999 census recorded 7,827 households were using "other toilets" for waste disposal. (UNDP 2001)

- Makira/Ulawa province has compared well with other larger provinces like Malaita in terms of water supply facilities. However, sanitation is still a major problem. Most villages use the bush or sea for convenience causing environmental pollution. (UNDP 2001)

- In Choiseul Province, the Rural Water Supply and Sanitation Project reported that new water systems were installed in 2001 in Tabarato, Sisiki, Ghoe, Voza, Sipokana, and Sirovangga. The project is assisting the maintenance of the water system in Pimadara, Koloe, Voruvoru, Vudutaru, Qalovai, and Lukuvaru. The project also reported that sanitation projects have been set up in Wagina, Vavudu, Kiriqela, and Kerepaqara.

- In Central Province, about 151 villages had water supply systems constructed while 19 others relied on natural sources, (eg, streams). Of the villages with installed systems, 59 were simple gravity, eight had wells with pumps, 25 had wells without pumps and there were 135 with rain catchment supply (RCS) tanks. Many of these were in need of repair. Between 1998 to 2001, a total of 37 water supply systems and 135 sanitation facilities were constructed in the province under the AusAID funded Rural Water Supply and Sanitation Programme of the Ministry of Health and Medical Services. A 10 % cash contribution came from the benefiting community. The shift in practices is an ongoing process; some people in the provinces still use beaches, bush, and mangroves despite the increased availability of sanitation facilities. (UNDP 2001)

- In Rennel and Belona Province, people rely on rainwater tanks as their main source of water as there are no major rivers or other water systems in the province. The Government has provided most of the water tanks in the villages. The people around lake Tenggano use the lake for washing purposes. In Wards East and West Tenggano and Lughu there are about 54 water tanks and 17

wells. There are 217 toilets on Rennell, thus a ratio of 1 toilet for every 9 persons. Bellona on the other hand has only 5 toilet facilities and the ratio is 1 toilet for every 252 persons. (UNDP 2001)

The information for each province includes their provincial capitals except Guadalcanal where it excludes Honiara. Most of the water supply systems, water tanks and sanitation facilities were constructed under RWSS programme within the Ministry of Health and Medical Services and funded by AusAID. Some were built by NGOs, communities and private companies. Despite progress being made, inadequate water supply and sanitation facilities are still a problem in many villages in the province.

One of the major problems affecting the development of water supply systems and sanitation in the province is that provision of improved water supply systems is expensive on a per capita basis. The social acceptance rate in terms of sanitation facilities is still low. Lack of maintenance caused damage to most of the installed systems need repair or rehabilitation. In some areas people deliberately vandalized and damage the systems because of land disputes.

Those who depend on piped water from rivers and streams (or obtain water directly from the source) are affected by the turbidity of water during the rainy season. As this is the majority of households this poses a significant problem. Similarly, the expansion of logging and land clearing for cultivation has contaminated natural sources and affects an increasing proportion of the population.

Power generation

There is substantial potential for hydropower from water resources on at least seven islands but until recently little effort had been made to evaluate the resource. The JICA-funded *Master Plan Study for Power Development in Solomon Islands* was carried out in 1999-2000 and identified nearly 330 mega watts (MW) of hydroelectric potential on seven islands. The first hydro scheme to be developed in the Solomons was a micro hydro (Pelton turbine) plant installed in 1976 serving a church mission and health centre at Atoilfi on Malaita. The turbine has a rated capacity of 75 kW and generates about 32 kW.

Solomon Islands Electricity Authority (SIEA), a quasi-government organisation developed and implemented two hydro schemes in 1986 and 1996 respectively. The first was installed on the Malu'u River on Malaita. It has a rated turbine capacity of about 32 kW, a maximum load of about 15 kW. It supplied power to a health centre, retail stores and several residential houses. It was funded by New Zealand Aid but was closed for some time due to local land disputes. The Government and SIEA made attempts in 2007 to re-open the hydro scheme pending a High Court decision between landowners. The second was constructed in Buala on Santa Isabel in 1996. It has a 185 kW turbine capacity which supplies some 150 kW to a hospital, a school, some retail stores, a fish storage unit and number of residential houses. It was part of a German (GTZ)-funded and Forum Secretariat managed project. Three hydro schemes with a total capacity of approx. 0.5 MW are reportedly currently under

consideration at Huro river on Makira, Sorave river on Choiseul and Rori river on Malaita.

An Australian organisation, APACE (Appropriate Technology for the Community and Environment) has been involved in developing micro-hydro systems in the Solomon Islands for over twenty years. APACE has recently established the Village First Electrification Programme (VFEP) under a local incorporated NGO called the Solomon Islands Village Electrification Council (SIVEC) to coordinate micro-hydropower development in the country. The first village-based micro-hydro system (10 kW) was installed in Iriri settlement on Kolombangara Island in Western Province in 1983. The hydro systems installed with APACE support (all in Western Province or Malaita) are summarised in Table 1.1

Table 2: APACE-Supported Hydro Development in the Solomon Islands

Location	Year Installed	Turbine capacity	Generation	Funded by	Comments
Iriri settlement (Kolombangara)	1983	10 kW	3-4 kW	UNIDO	Currently (April 2004) being upgraded and extended. Power remains off until upgrade is completed
Vavanga (Kolombangara)	1994	12 kVA	4-5 kW	AusAID + Austr. Citizens	Currently (April 2004) being upgraded and extended. Generation will double.
Ghatere (Kolombangara)	"1997"	12 kW		AusAID + Austr. Citizens	Not properly installed. Wiring damaged in *tsunami*. Completion awaits local fund raising
Manawai Harbour (Malaita)	1997	50 kW	15-25 kW	ROC	Various economic and rural development spin-offs
Bulelavata (New Georgia)	1999	29 kW	14 kW	AusAID	Only 4 days of downtime during first 4 year. Power supply extended to Beulah PSS
Raeao (Malaita)	2002	25 kW	14 kW	ROC	
Nariaoa (Malaita)	Feb. 2004	25 kW		ROC	Not completed

Source: Note: ROC is Republic of China (Taiwan)

Agricultural use

In agriculture production, water is required for irrigation. Most of Solomon Islands, however, is classified as wet due to high rainfall. While the rainfall requirements and tolerance of extremes vary from crop to crop, a working figure for the southwest Pacific is that a mean annual rainfall of 1800–2500 mm is optimal for agricultural production (Bourke et al. 2005), which means annual rainfall of over 4000 mm is somewhat higher than optimal for crop growth and there is no requirement for irrigation. The recent introduction of paddy rice cultivation by Chinese Agriculture

Technical Mission (CATM) of the Republic of China (ROC) would require water for irrigation.

Recent governments have identified land for Oil Palm plantation development as part of their policy on rural developments. In addition to the current Guadalcanal Plains Palm Oil Ltd there are plans for plantation development in the Aluta Basin and Waisisi in Malaita Province. East Choiseul Province has been identified for potential oil palm plantation development. Wangunu oil palm plantation was developed in the late 80's however until now there was no production.

In addition to agricultural developments, forest plantation has also been promoted by recent governments in anticipation of low revenue from logging industry in the near future due to the unsustainable rate of logging in the country.

Evidence has shown substantial hydrological impacts of land clearance on streams and rivers. The rivers and streams on the Guadalcanal Plains are severely affected by the oil palm plantation development. It is anticipated similar hydrological impacts will be experienced by streams and rivers in the proposed oil palm plantation development. It is also likely there will be hydrological impacts associated with forest plantation development as there will be changes in the vegetation of the land cover. In all these situations the most probable hydrological impacts will be reduced stream and river flows with streams drying out and increased sediment load in the river water which will severely affect the capacity of the water to sustain the aquatic habitat which the local community previously enjoyed.

Mining operations

Mining operations, such as Gold Ridge Mine on Guadalcanal, were suspended during the tensions, but are now operational again. Prospecting is occurring throughout the country, with associated demands for water for processing. Relationships between mining companies and customary landowners require complex negotiations, not only for use and access to land, but also to water resources. The questions of adequate compensation for use of the resources, as well as any negative downstream impacts are concerns often requiring government intervention. In March 2007 the local radio (SIBC) reported dead cocoa crops and other vegetation along the Matepona River (close proximity to river mouth). This prompted Department of Mines and Energy (DME) to arrange a reconnaissance survey to the areas affected. It was reported by the villagers that the problem was first noticed in the year 2000. The initial problem was observed on cocoa trees whose leaves turned yellow and gradually died. While a number trees were found dead along the Matepona River others were still alive and well. During high flows the surrounding plains adjacent to the river were flooded as a result of overflows from the river bank. The river bank was reported to be shallower due to deposition of sediments transported by the river. It was alleged that the major source of sediment was from the mine site upstream. The Gold Ridge Mining Company was asked by the government to clear the river blockage.

Industrial use

Although demands on water for industrial use other than mining are still relatively small, there is considerable potential for future growth. At the moment a few companies in Honiara that have significant water requirements include; Solomon Brewers Ltd which require water for beer production, Solomon Islands Fish Processing Ltd use water for its cannery, Guadalcanal Plains Palm Oil Ltd uses water in its factory whilst Total Water Services, Szetu Enterprises and Blue Water purify municipal water for sale. The quality of water is an important factor, particularly when the water contains dissolved salts, which affects equipment in the industrial process.

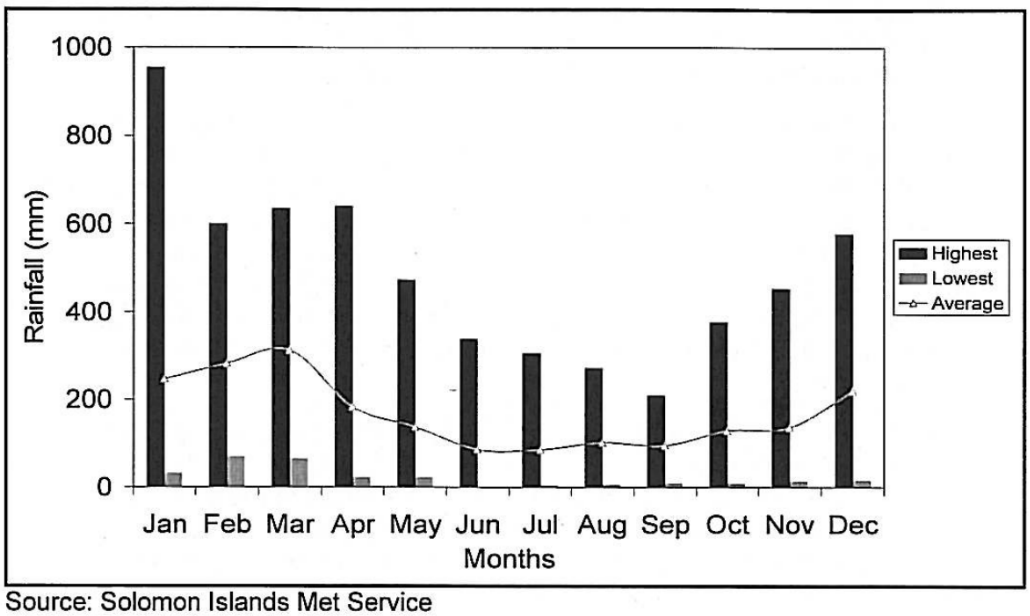
Country Context

Biophysical context

Solomon Islands has about 996 islands , totalling 28,450 square kilometres (km^2), of which land accounts for 27,540 km^2, dispersed over 800,000 km^2 of sea. Approximately 350 islands are inhabited including the six main islands of Guadalcanal (the largest, where the capital Honiara is located), Malaita, Makira, Isabel, Choiseul and New Georgia. The group lies on a longitude between 155° 30' and 170° 30' east and a latitude between 5° 10' and 12° 45' south, to the northeast of Australia. The Exclusive Economic Zone extends to 200 nautical miles with an area of 1.34 million km^2. The islands are forest covered and surrounded by a narrow fringe of coral reefs and numerous lagoons.

The climate is tropical monsoon, with few extremes of temperature and weather. Daytime temperatures fluctuate between 25 to 32ºC falling by about 3 to 5ºC at night. The rainy season occurs between November to March and two short dry seasons are from April to June and September to October during the year. With the exception of the area from northern Guadalcanal to the Florida group (Gela), and possibly parts of Isabel, Solomon Islands which can be classified as ‘continuously wet’.

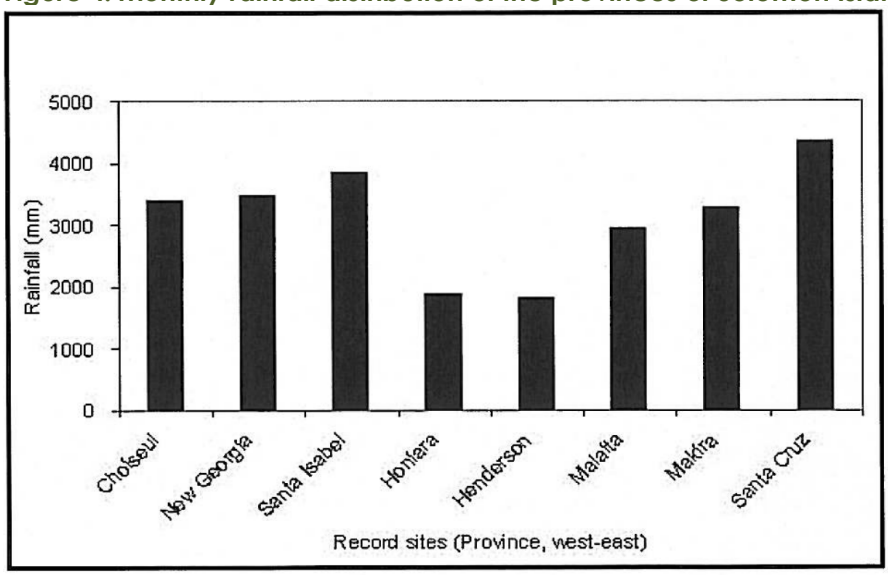
Figure 3: Average monthly rainfall for Honiara (1955-2000) representative of Solomon Islands



Source: Solomon Islands Met Service

Most areas have mean annual rainfall of 3000–5000 mm, with variations depending on latitude, topography and the orientation of islands to prevailing winds. The interiors of the islands experience higher rainfall, associated with hills and mountains, with mean annual rainfall rising as high as an estimated 8000 mm in the mountains of Guadalcanal and Makira (Bourke *et al.* 2006). The highest rainfall recorded in Solomon Islands is an annual average of 8,304 mm at 430 m above sea level at Koloula on Guadalcanal (Hansell and Wall 1970). Daily rainfall of over 250mm is not unusual. Fifteen daily totals of more than 200mm have been recorded in the past 25 years by the Solomon Islands Meteorological Services. The heaviest recorded prolonged rainy spell which lasted for 18 consecutive days was recorded at the Koloula river catchments on Guadalcanal Island with an average of 209mm per day (Aldrick 1993).

Figure 4: Monthly rainfall distribution of the provinces of Solomon Islands



Land and sea resources are held under customary tenure and their use and access are controlled under traditional systems as well as modern regulatory mechanisms. It is widely accepted that smallholder agriculture is, for most of the population, the dominant source of household livelihoods. Over the past decade, pressures on the country's natural resources have increased, with a wider range of biological resources being exploited more intensively or affected indirectly by both subsistence and commercial activities, across a greater number of locations. Commercial logging, fishing, mining and agriculture developments have all contributed to the pressure. At the same time concerns about the environment and over-use of natural resources have increased, and there have been calls for sustainable types of development that conserve renewable resources and are socially and culturally appropriate and beneficial. For a more detailed analysis on the biophysical context of the Solomon Islands see Annex H.

Social context

By end of 2005, the population of the Solomon Islands was estimated about 457,000 and growing at an annual rate of 2.8%. In 1999 national census, it was 409,042 (94.2% Melanesian, 4.0% Polynesian, 1.4% Micronesian, 0.4% European and 0.1% Chinese). About 84% of the population (65,000 households) lived in rural villages and 14% were considered urban. The average household size was 6.3 persons, and by aggregating the population density figures, there was an average of 13 people per km^2. However, population density varies greatly between provinces as shown in the table below.

Table 3: Distribution of rural population by province in 1999DENSIYRSONS

Province	Population	Percentage rural population	Av. population density
Malaita	122,620	34	29
Western	62,739	17	11
Guadalcanal	60, 275	17	11
Makira–Ulawa	31, 006	9	10
Central	21,577	6	35
Isabel	20,421	6	5
Choiseul	20,008	6	6
Temotu	18,912	5	22
Rennell–Bellona	2,377	1	4
Honiara	49,107	0	0
Total	**409,042**	**100**	**15**

Source: SIG (2002a) and author's calculations of population density cited in Bourke et al. 2006, p.5

Urban and rural population by island are shown in Table 1.4. Around 77% of the 1999 urban population live in Honiara.

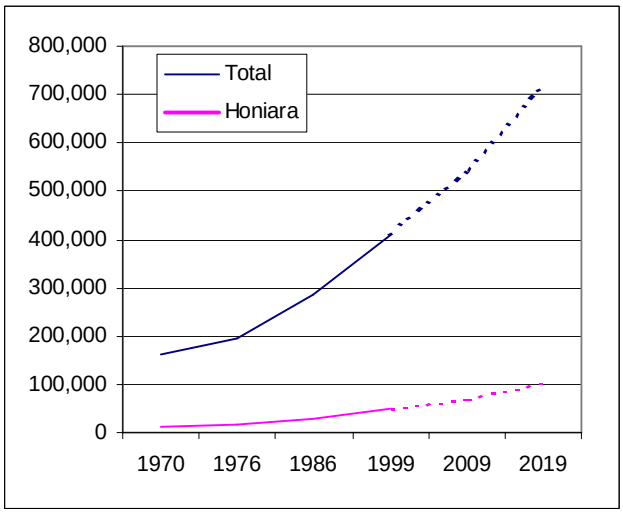
Table 4: Population of Solomon Islands in 1999

Island or group	Total	Urban	Rural
Choiseul	20,008	440	19,568
Western	62,739	6,442	56,277
Isabel	20,421	451	19,970
Central	21,577	1,333	20,244
Rennell-Belona	2,377	0	2,377
Rest of Guadalcanal *	60,275	3,013	57,262
Honiara	49,107	49,107	0
Malaita	122,620	1,606	21,2014
Makira	31,006	979	30,027
Temotu	18,912	361	18,551
Total	*409,042*	*63,732*	*345,310*

Note: * Excluding city of Honiara
Source: 1999 Census of Population & Housing (2001)

The urban population (Figure 1.1 & Table 1.3) grew even more rapidly with an AAGR of 2.8%. The Department of National Planning (DNP), assuming that these AAGRs will continue, estimates a national population of 716,000 by 2019 with Honiara reaching 105,000; more than double that of 1999. From 1970-1986, Honiara grew by 6.0% annually, with the recent decline in AAGR reflecting to some extent the temporary movement of people out of Honiara in 1999 due to the ethnic tension in 1998 to 2003. With the end of hostilities, Honiara's growth could again increase more rapidly than the projection suggests. The total population increase and the urban increase (particularly in Honiara), could affect future water use options and the patterns of water use.

Figure 5: Population 1970-1999 & Projections to 2014



Source: Data from Ministry of National Planning (Jan. 2004)

Note that the intervals shown between years are not constant.

The population is young with around 42% between 0 –14 years old. In 1999 there were 65,000 households with an average of six people per household. National population density has increased over 2.5 times since 1970, with a four-fold increase in Honiara. With the majority of the population living in rural areas, access to clean water, health services, transportation, education, employment and income generation opportunities are very limited. An estimated 20% of children are malnourished and about 70% of adults are illiterate. The human poverty index for Solomon Islands is assessed at 49.1 placing it among the poorest in the Pacific.

Political context

The former 'British Solomon Islands Protectorate' gained independence from Britain on 7 July 1978 and became the Independent State of Solomon Islands. At independence, Solomon Islands joined the Commonwealth with Queen Elizabeth II as its Head of State, represented by a Governor General. The unicameral National Parliament comprises fifty members, elected for a four-year term under a "first past the post" voting system. The Prime Minister is elected by a simple majority of Members of Parliament. Party structures in Solomon Islands are fluid. In addition to the national government, there are nine provincial assemblies, each led by a premier.

Although ethnic tensions have ebbed and flowed for many years, they escalated on Guadalcanal Island in December 1998. Many Guadalcanal people resented the influence of settlers from other islands and their occupation of land. The settlers, mostly from Malaita, were drawn to Honiara and its surrounds by economic opportunities. Violent clashes involving rival militant groups destabilised the Solomon Islands government and undermined national institutions and coherence. This situation persisted for more than four years. While various peace agreements were

made during this period, peace itself remained elusive. With the breakdown of law and order, government operations were paralysed and significant amounts of public infrastructure were destroyed.

In 2003 Solomon Islands Government, through Prime Minister Sir Allan Kemakeza, requested assistance from the Australian Government. After consultations between the governments in the Pacific region, the Pacific Islands Forum unanimously endorsed a package of strengthened assistance to Solomon Islands through a Regional Assistance Mission to the Solomon Islands (RAMSI) under the framework of the 2000 Biketawa Declaration. The RAMSI has greatly improved the situation from a state of recurring violent conflict to one of stabilisation and recovery. With the restoration of law and order, RAMSI is increasingly focussing on the reconstruction of the Solomon Islands government and economy. However, the root causes of the tensions largely remain. This was demonstrated in the tensions and destruction following the elections of May 2006. Provincial reconstruction has yet to be fully mobilised and economic and employment opportunities, particularly for youth, remain extremely limited.

Following the restoration of law and order in the Solomon Islands in 2003, and again after the election in May 2006, the SIG with the support of RAMSI is focusing on addressing the longer term, root causes of conflict and rebuilding the Solomon Islands economy. Efforts to address root causes include:

- Reconciliation between communities through collaborative efforts of the Department of Reconciliation and Peace, RAMSI, National Peace Council and communities.
- SIG has established peace committees on both Guadalcanal and Malaita to consult with local communities. Committee reports have been submitted to the Minister of the Department of Reconciliation and Peace.
- RAMSI has assisted the anti-corruption institutes like the Ombudsman, Leadership Code Commission, and Auditor General's office.
- SIG and RAMSI have established the anti-corruption team and are now investigating a number of cases following reports of corruption in the Auditor General's reports.
- SIG in its Policy Framework will establish an independent commission to look into the causes of the tension.
- SIG has announced it will establish a lands commission to look into land issues on Guadalcanal
- SIG is strongly focussed on rebuilding the Solomon Islands economy through stabilising government finances, developing an agriculture and rural development strategy and supporting oil palm and Gold Ridge mining activities.

In December 2007, Dr Derek Sikua was elected Prime Minister on a platform emphasizing assistance to rural populations in the Solomon Islands. The Sikua Government of Coalition for National Unity and Rural Advancement (CNURA) Policy focused on eight Key Priority Areas. The CNURA government recognises the

importance of rural development as the basis for economic advancement in Solomon Islands. Thus the CNURA government will focus on rural development as its priority objectives for the next two years; 2008-2010

Economic context

The economy of the Solomon Islands comprises:

(1) a mixed subsistence sector on which the majority of the population is dependent, and

(2) a small monetised sector dominated by large-scale commercial enterprises.

The mixed subsistence sector includes household food production for self-consumption and surpluses for sale to local and urban markets as well as household production of cash crops for the export market. The monetised sector comprises commercial enterprises and primary production including export of logs, fish, copra and cocoa. The conflict from 1999 to 2003, which occurred as a result of ethnic tensions, had a significant impact on the country's economy. Agriculturally derived foreign exchange earnings from copra, cocoa, palm oil and kernel fell from 1998 pre-conflict levels of SBD$167 million to SBD$61 million in 2003 (CBSI, 2004).

The Solomon Island dollar (SBD$) has weakened steadily for well over a decade (Figure 1.2). Recent trends in Gross Domestic Product (GDP) in real terms, including traditional non-monetised output, are summarised in Figure 1.3. Between 1996 and 2002, GDP in real (constant dollar) terms declined by 24%, or over 35% per capita. Table 1.4 shows economic growth by sector.

Figure 6: Exchange Rate: SI$ to US$1.00

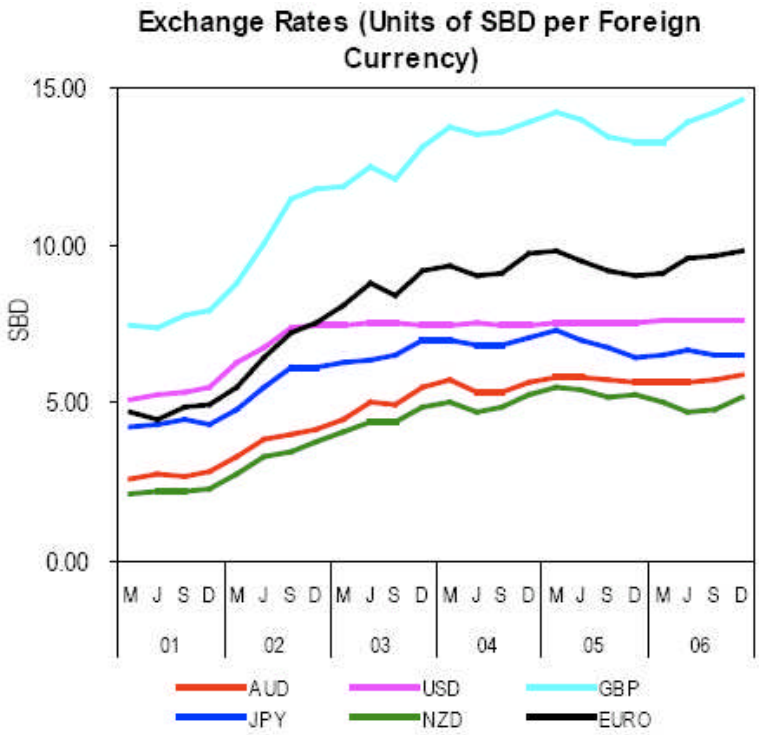
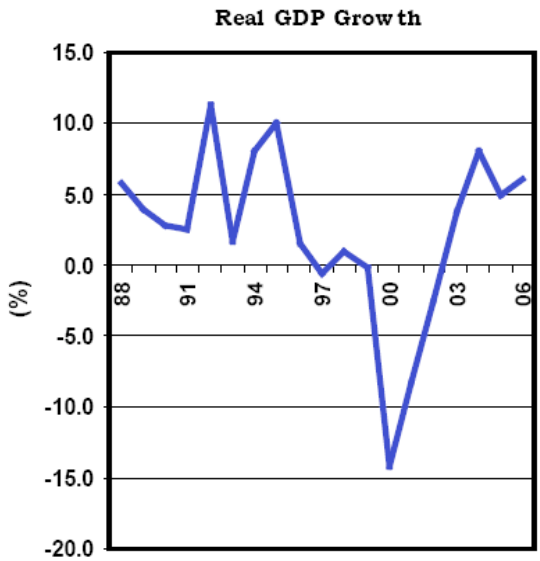


Figure 7: Change in Real GDP (1997-2003)



Source: Economic Overview (CBSI; 2004)

Real economic output in 2006 outpaced the population growth rate (2.8%) of Solomon Islands to drive nominal income upward to US$708 per capita from US$641 per capita in 2005. However, the current per capita income remains lower than the

pre-tension levels of US$783 per capita in 1999, underlying the importance of sustaining higher economic growth into the future (CBSI 2006).

The country's weak economic fundamentals includes: a precarious level of foreign reserves, very high debt, relatively high inflation, excessive government deficit, and a weakened financial system.

Table 5: Real Gross Domestic Product, 2003-2006 (CBSI annual report 2006)

Estimated Real GDP
(Index 1985=100)

Industry	2003	2004	2005	2006
Agriculture	102.7	106.2	118.1	120.8
Forestry	188.3	263.6	288.3	306.5
Fishing	104.4	115.5	104.4	130.6
Mining & Exploration	-3.2	-3.3	-3.3	-3.3
Manufacturing	134.3	135.8	137.1	141.0
Electricity & Water	211.8	213.2	250.6	255.0
Construction	35.9	45.6	52.9	70.6
Retail & Wholesale Trade	136.6	140.9	143.3	143.3
Transport & Communication	139.2	143.9	146.7	187.6
Finance	223.5	229.4	231.7	236.0
Other Services	119.1	126.4	135.4	144.2
Index of Monetary GDP Prod.	127.6	139.8	147.5	158.4
Annual % movement	7.7	9.5	5.6	7.4
Index of Primary Prod. (Min)	21.2	141.7	151.2	162.4
Annual % movement	33.7	16.9	6.7	7.4
Non-Monetary : Food	160.5	165.0	169.6	174.3
Non-Monetary : Constr.	155.6	160.0	164.4	169.0
Non-Monetary : GDP Index	160.0	164.6	169.2	173.9
Index of Total GDP Prod.	133.9	144.6	151.8	161.1
Annual % movement (Real)	6.5	8.0	5.0	6.1

Source: Central Bank of Solomon Islands

In 2003 the Government with support of donors developed a National Economic Recovery, Reform and Development Plan (NERRPD 2003-2006), which identifies and focuses on five key strategic areas:

Normalising the law and order and security situation;

Strengthening democracy, human rights and good governance;

Restoring fiscal and financial stability and reforming the public sector;

Revitalising the productive sectors and rebuilding supporting infrastructure; and

Restoring basic social services and fostering social development.

It is too early to assess the extent to which the NERRDP is succeeding but CBSI, which has been an effective and critical economic watchdog for some years, concluded that the outlook for stronger economic growth is good (CBSI 2006). It further reported that the economic recovery that started in late 2002 and enhanced by the presence of RAMSI since 2003 has continued despite the unrest after the elections in May 2006. The real GDP grew at a rate of 5.0% in 2005 and 6.1% in 2006 to a total of $333.9 million (CBSI 2006). The key drivers of the growth were: rise in private sector activities, favourable external conditions, return of confidence in law and order and donor support. The bank stressed that despite the positive growth; the level of economic activity in 2006 was still below pre-tension levels and cautioned that it will take many years to restore GDP to those levels. Also taking into account the population growth rate of 2.8% per annum it will take even longer to grow per capita GDP to the levels enjoyed by Solomon Islands Pacific Island neighbours.

The Bank also pointed out that the economic growth came primarily from increased private sector activity, particularly significant growth in exports and continued donor support. The Government continued to support the revival of the oil palm project, operated by Guadalcanal Plain Palm Oil Limited (GPPOL) in order to try and diversify its economic growth base. Nevertheless the economy is still relying heavily on the current unsustainable logging boom which provided 70% of its export earnings in 2006. It is estimated that logging for export will be depleted within the next ten years. Commercial logging is also causing huge environmental damage which is a threat to water quality.

Regulatory and institutional framework

4.1 Planning and policy regulatory bodies

The National Government is responsible for national planning and policy making in the water resources sector through functions and obligations of various organisations directly involved in the sector. These organisations include:

(1) Water Resources Division in the Department of Mines and Energy;

(2) Solomon Islands Water Authority (SIWA);

(3) Rural Water Supply and Sanitation; and

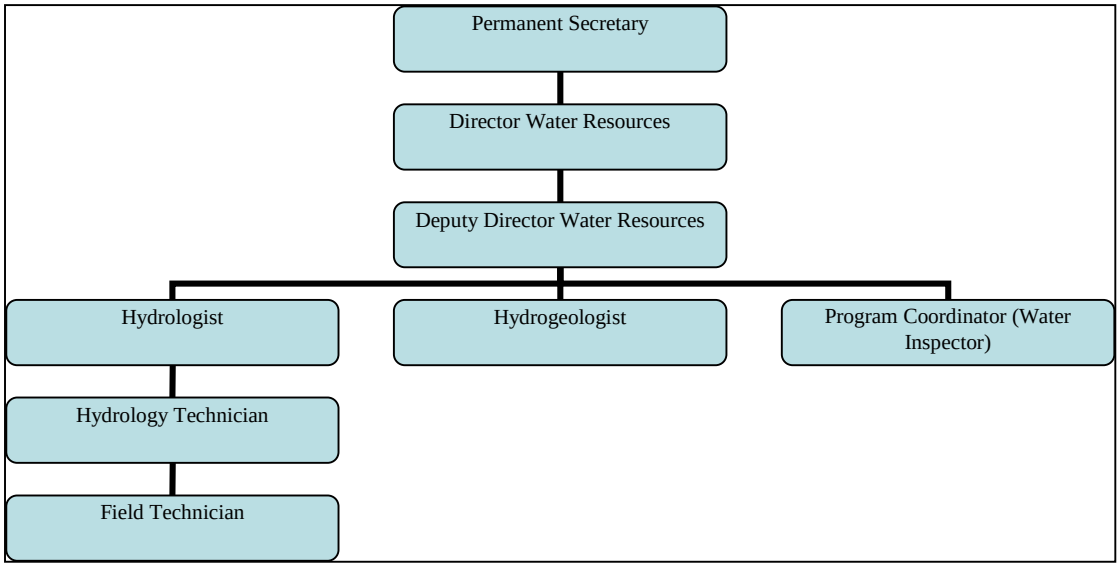
(4) Environmental Health Division.

4.1.1 Water Resources Division

The Water Resources Division carry out the Solomon Islands Government's (SIG) policy, planning and formulate legislation with regard to water resources sector in the country. The SIWA is responsible for providing safe water supply and waste water services to the urban centres while the RWSS is charged with the provision of providing safe water supply and sanitation to rural population and Environmental Health Division, to ensure water supply for human consumption is free of contamination and pollution.

The Water Resources Division is headed by a Director who is responsible to the Permanent Secretary, a political appointee, who in turn is responsible to the Minister. Divisional staff report to the Director. For the Division, as for government offices in general, it has been extremely difficult to function effectively in recent years, although there has been some improvement since the arrival of RAMSI. Access to transport, funds for travel and basic office expenses, telephone service, and basic e-mail communications have been intermittent or non-existent. Electric power supply has been erratic. The Division has very limited financial resources and its actual powers are both unclear and weak.

Figure 8: Structure of the Water Resources Division



4.1.2 Solomon Islands Water Authority (SIWA)

SIWA is a quasi-government body, governed by the act of Parliament. It is required by that statute to have a board of directors, appointed by the minister responsible who is the minister for the Department of Energy and Mines. The board from time to time may determine policies in addition to its statues for SIWAs smooth running where seen fit and appropriate. Although SIWA operates as a business with the goal of making a profit, there is a history of under investment, insufficient resources and under skilled staff. The SIWA's equipment and water supply infrastructure are old and malfunctioning and as a result it has not been able to provide adequate water services to the urban population. The water situation in Honiara is deteriorating and some Honiara suburbs have been without water for some time. Beyond Honiara in other urban centres such as Gizo water services are worse.

Until recently the Solomon Islands had no specific water policy. Realising an urgent need for one, a draft National Water Policy was prepared as one of the pilot projects under the Solomon Islands Water Governance Project funded by the EU. This policy requires introducing international best practice management techniques. To support the Government's policy, the SIWA board has recently agreed to capacity building management contracts with the World Bank. Under the management contract the board will hire a team of experts to work in management positions alongside local managers for up to five years. This allows time to get financial accounts up to date, improve operating techniques including debt collection and expand the network. Most importantly, local managers will be trained in international best practice management techniques. The decision to go ahead with the World Bank agreement has been controversial due to the fact that Japan International Cooperation Association (JICA), who has already worked extensively with SIWA, had already offered to assist in similar areas of capacity building.

4.1.3 Rural Water Supply and Sanitation (RWSS)

The RWSS is located within the Environment Health Division of the Ministry of Health and Medical Services. The RWSS is largely dependent on overseas donor funding for its projects although the administration and management of the office is carried out by the government financial system under the Ministry of Health and Medical Services. Project funding comes primarily from Australia, New Zealand, the EU, Canada, Japan and the Republic of China. Prior to 2000, AusAID funded the RWSS Division.

One of the main issues of concern to current institutional arrangements in the country is fragmentation of policies and plans which have resulted in little co-operation among organisations responsible for water resources. The water governance project funded by the EU has started to address these issues, increasing cooperation across organisations. Nonetheless, conflicting mandates and objectives at the national level exist.

Legislation and policies

The Water Resources Division within the Department of Energy and Mines was established to carry out the Solomon Islands Government's (SIG) policy and planning and formulate legislation with regard to water resources sector in the country.

Table 1.6 summarises existing legislative and policy documents that provide appropriate mandates for various institutions with water related functions.

Table 6: Legislative and policy documents. Source: SOPAC 2007

Mandate	Water Functions	Organisations/institutions/ responsibilities	Formulation
River Waters Act Draft Water Resources Policy	Water resources management	Ministry of Mines and Energy	Act of Parliament Cabinet
Environmental Act National Environmental Management Strategy (NEMS)	Watershed protection Environmental Protection	Ministry of Forests, Environment and Conservation	Act of Parliament Cabinet
SIWA Act Urban water management policy	Urban water and wastewater services	SIWA	Act of Parliament, SIWA Board
Environmental Health Act	Rural water supply and sanitation services	Rural area: Ministry of Health (RWSS)	Act of Parliament
Honiara City Council By Laws	Septic tank collection	Honiara City Council and a private company	Act of Parliament
Public Health Ordinance SIWA Act	Water quality monitoring	Ministry of Health Environmental Health SIWA	Act of Parliament
SIEA Act	Hydro power generation	Ministry of Mines and Energy/SIEA: Others – rural electrification	Act of Parliament
Agriculture Act	Irrigation water	Ministry of Agriculture	Act of Parliament

At the moment there is no framework for integrated water management and conservation. A Water Resources Bill was prepared in 2001 based on recommendations from UN legal adviser on water resources but no progress has been made on it since. The Bill was drafted by the Attorney Generals Chambers after it was discussed and promoted via a steering committee. The legislation will require the Water Resources Division to administer a water right system in the future as part of water resources sector management in the country.

The Water Resources Bill when it becomes an Act will have the following purposes:

- To provide for the integrated management of the water resources of the Solomon Islands.
- To promote the most efficient, fair and beneficial use of natural water.
- To ensure that natural water resources are available for sustainable use for the benefit of all present and future Solomon Islanders.
- To provide for the protection of natural watercourses and water catchments.
- To provide for the control of activities occurring over or beside waterways or watercourses.

Once gazetted, the Act will establish a Water Resources Advisory Board, which, in association with the Minister and the Director of Water Resources, will be responsible for general matters relating to the administration of the Act. The Act also identifies the Ministry responsible for water resources as being responsible for controls for the use and development of water catchments and riverbanks. Such control may be exercised through regulations, orders, and instructions prescribed by the Minister. Logging, mining and extraction of sand and gravel in water catchments, river banks and river beds may be restricted by the Ministry according to the requirements of catchment management and conservation. Such restrictions may only be compensated if they amount to functional dispossession or transfer of ownership.

The Act also addresses pollution of water where "waste" is defined to include any matter that, when added to or mixed with any natural water, will contaminate the water so as to change the physical or chemical condition thereof in such a manner as to:

- Make the water unclean, noxious, or impure; or
- Be detrimental to the health, safety, or welfare of persons using the water; or
- Be poisonous or harmful to animals, birds, or fish around or in the water; or
- Make the quality of such natural water below quality standard acceptable for human consumption in Solomon Islands

At the moment the River Waters Act (1969), the Forest Resources and Timber Utilisation Act (1969) and revised in 1991, the Town and Country Planning Act (1979), Environment Health Act (1980), the Water Supply Act (1981) and the Rural Water Supply Regulations (1987) form the basis of legislation relating to the management of water. Other legislation such as the Environment Act 1998 and proposed Forestry Bill 2004 are also relevant to water resources protection. Specific rivers are protected under the River Waters Act (1969), areas can be declared for protection under the Forestry Bill 2004 and the SIWA Act (1981).

The Town and Country Planning Act (1979) is the principal mechanism for managing development, environmental planning and protection at the national and provincial levels in both urban and rural areas. Although the Act is administered through the Physical Planning Division of the Department of Lands

and Survey following a 1982 amendment, the physical planning functions was transferred to the Honiara City Council and Provincial Assemblies.

"Development" administered by the Act is defined as:

"building, engineering, mining and other operations in, over, or under any land, or the making of any material change in the use of any buildings or other land".

The Environment Health Act (1980) and a Public Health Bill drafted in 1990 included comprehensive provisions for community health, the control of "nuisance" activities, the protection of water supplies and drain and waste disposal.

The Environmental Act of 1998 was only gazetted in September 2003 and its relevant regulations are not yet in place. Under the Act there are formal requirements for environmental impact assessments (EIAs) and on-going review and monitoring of development projects. No EIAs have been conducted since the Act was gazetted but they would be required for such projects as major hydropower development. The other significant Part of the Act concerns the control of pollution and waste.

The *Forests Bill (2004)* is another new piece of legislation seeking to protect natural river systems from Logging impact. It is still awaiting passage through parliament. The Bill provides for the sustainable harvesting and management of the forest resources in Solomon Islands. The objectives of the Bill are:

- To ensure proper management of Solomon Islands forest resources in an efficient, effective and ecologically sustainable manner;
- To promote the development of a sustainable commercial timber industry so as to ensure the maximum benefit to the present and future generations of the people of Solomon Islands, and
- To protect and conserve forest resources, habitats and ecosystems including the maintenance of ecological processes and genetic diversity.

The Bill will make mandatory compliance to the "Code of Practice for Timber Harvesting" produced by the Forestry Division in 1996. The objectives of the Code are to define practices and provide guidelines that:

- Safeguard terrestrial and aquatic environments within the logged area and downstream,
- Protect soil and water resources,
- Protect sites which have cultural, historic or archaeological value,
- Maintain a healthy and productive forest, and
- Promote safe logging operations.

Government programs and priorities

The primary goal in the Water Resources Division policy and planning are:

1. To promote the most efficient and beneficial use of water

2. To promote the maintenance and improvement of the quality of all natural water

The management strategy to achieve these goals is outlined as follows:

Assessment of present resources: Assessment of the present water resources of the Solomon Islands will involve measurement of the quantity and quality of both surface and ground water.

Identification of community needs: The need to identify and schedule community needs in regard to water will cover requirements for rural and urban water supply, recreation and hydropower. In addition to present needs it is necessary to predict future requirements to allow an allocation strategy to be planned.

The current emphasis of the Water Resources Division is on the assessment of the water resources but there is also a need to assess the demands on these resources and develop some legislation, which will ensure a fair and efficient usage of the natural waters. The government priority programmes and objectives were contained in the Government Statement of Policies (1997-2001) and the Medium Term Development Strategy (1999-2001). The following areas were outlined as priority programmes in the water resources sector in the Government Statement of Policies (1997-2001):

- Importance of identifying and developing available water resources for human consumption, agricultural & industrial development and provision of energy production
- Review/amend existing legislation for the proper management and efficient administration of water resources in the country
- Promotion of utilization of hydro power electrification program in the country

Whilst the following were identified as key result areas under the Government's Medium Term Development Strategy (1999-2001):

- To increase water supply in Honiara and other urban centres, to meet household demand and demand for business and industrial use
- Enhance the supply of safe drinking water in the rural areas
- Increase the supply of electricity to meet demand, both in urban and rural areas through development of hydro power electricity projects

To achieve the above key result areas the government has identified actions as part of its medium term development strategy and guideline to implement its development plans. These include:

- Implement program to supply more water, so as to adequately meet demand based on a comprehensive study of the sector

- Implement programs to increase the supply of safe drinking water in rural areas
- Implement hydro power electricity generation projects for the country

These policy actions forms the basis upon which each organisation responsible for water resources implement their programs and plans to achieve government goals and objectives according to the key result areas being identified under water resources sector. The government established SIWA as a statutory organisation and have been mandated to provide essential services such as water supply, wastewater removal to and from urban areas, generally in an efficient, effective and economical way. The Government is committed to further strengthen and expand activities of the Rural Water Supply and Sanitation (RWSS) program under the Ministry of Health and Medical Services. The Energy Division of the Department of Energy and Mines is responsible for energy policy and renewable energy project development and project implementation.

Agencies involved with water management

Three organisations are responsible for water resources in the country at different levels, their goals, objectives, policies and plans are also different. They are:

1. Department of Mines, Energy and Water attempts to assess, administer and manage the nation's water resources,
2. Ministry of Health and Medical Services involved in the provision of providing safe water supply and sanitation to rural population, and
3. Solomon Islands Water Authority involved in the provision of providing safe water supply and wastewater services to urban areas in the country.
4. Department of Environment and Conservation involved in pollution and water quality management

With the support of the Solomon Islands Water Governance Program, these three organisations have formed a Water Sector Steering Committee to coordinate the water sector, particularly legislative and policy review, and establish a monitoring system with targets and indicators (KEW May 2006).

The Central Government aims to provide a comprehensive evaluation of the nation's water resources in relation to potential use and through appropriate legislation and policies to maximize benefit from utilization of the resource and thus set up the Water Resources Division in the department of Energy and Mines.

Water Resources Division

The Water Resources Division is responsible for:

- hydrological investigation including instalment of water flow recording and collection of hydropower development;
- river flow data to determine the technical feasibility of target streams for hydropower development; and
- ground water drilling reports and mapping.

The functions of the technical services unit of the Water Resources Division in relation to hydrogeology and hydrology are:

- To develop and implement water-related legislation to improve management of water resources;
- To enhance the capacity of power generation in Honiara by collecting critical data and information concerning water flow in the Lungga River,
- Increasing electricity supply in rural areas through the collection of river, stream-flow and rainfall data from selected sites throughout the country.
- Hydrological monitoring at Malaita, Makira and Isabel including negotiations with customary landowners for access to water resources.

The government recognizes that safe drinking water and proper sanitation facilities are basic necessitates to better health. Thus, it is committed to further strengthen and expand activities of the Rural Water Supply and Sanitation program under the Ministry of Health and Medical Services.

Environmental Health Division

The Environmental Health Division of the province is responsible for Rural Water Supply and Sanitation (RWSS). AusAID through the Rural Water Supply and Sanitation Programme of the Ministry of Health and Medical Services funded all the materials for the RWSS in the past.

The Solomon Islands Water Authority (SIWA) is responsible for water supply and distribution to all urban and provincial centres, i.e. Honiara, nine provincial centres, and Noro township in the Western Province. SIWA is a quasi-government body, governed by the act of Parliament that gave birth to such an authority. It is required by that statute to have a board of directors, appointed by the minister responsible. At present this is the minister for the Department of Energy and Mines. The board from time to time may determine policies in addition to its statues for its smooth running where seen fit and appropriate. Although it has been commercialised, and operates as a business with the goal of making a profit, there is a history of under investment, insufficient resources and under skilled staff.

There are other organisations that provide information of significant importance in the water resources sector; this information provides physiographic aspects of water resources assessment in the country.

- Lands Survey Division (DL&H): Physiographical data (topography, land use, land cover, river networks, political boundaries in GIS format and ordinary maps (1:50 000))
- Mines & Minerals Division (MNR): Geological maps (Geochemical, catchment areas in reports and maps (1:50 000))
- Energy Division (MNR): Promotion of energy development projects through utilization of renewable energy sources; hydro power and solar energy potential throughout the country
- Meteorological Service Division (MTCA): Meteorological data (rainfall, sunshine hours, min & max temperatures, cloud cover, wind speed & direction) as raw data and reports with records back to 1962
- Environmental Health Division (MHMS): Microbiology and water chemistry analysis

Private sector organisations and NGOs have also engaged in the collection of water resources data for their own purposes. These are the logging companies who carry out reforestation, development of water supplies; mining companies for environmental management and other purposes; agricultural and industrial development for climate and design purposes; church organisations and colleges for training purposes. These organisations do provide water resources data on voluntary basis and through other arrangements.

Other organisations involved in water

Research organisations

There is no research organisation in the country that carries out research on water resources. Organisations responsible for water resources do carry out some research work but on an ad hoc basis and only relevant to their areas of responsibilities. For example, the Water Resources Division only carries out the following regular monitoring and data collection, and not research per se.

The SIWA routinely carry out quality tests on its urban water supply and the Environment Health Division carry out microbiology and water chemistry analysis water quality checks for the RWSS water supply installation. The Geology Division of the Department of Mines & Energy carry out surveys on some catchment areas and Meteorological Service Division of Department of Communication, Aviation and Meteorology collects meteorological information on rainfall, sunshine hours, min & max temperatures, cloud cover, wind speed and direction as raw data, conduct basic analyses and produce reports.

Higher Education Institutions

There are two higher education organisations offering courses in resource related areas. The School of Natural Resources, Solomon Islands College of Higher Education (SICHE) offers certificate courses in agriculture and forestry. It has in the past offered environmental studies courses and hopes to again in the future. It currently has no external assistance and struggles with a lack of resources. In 2006 SICHE was restructured focusing on teaching, business studies and computing, with the School of Natural Resources discontinued.

The University of the South Pacific (USP) has a campus in Honiara from which it offers USP courses, including courses in environmental studies, to over 1,500 students. These are all undergraduate students in their first and second years of study. Third year students must travel to Fiji to complete their final year of study. Resources for higher education in the Solomon Islands are greatly limited. In 2006 there were only three academic staff based in the Solomon Islands campus of USP.

NGOs and community activities

The following section provides an overview of some of the main national and international NGOs operating in the Solomon Islands. A number of NGOs are involved in water in Solomon Islands, working with communities to provide water supply and sanitation facilities.

5.3.1 Solomon Islands Development Trust (SIDT)

The SIDT is a local NGO set up in 1982 and is a regional affiliate of Foundation of the Peoples of the South Pacific International (FSPI). Its main concern has been in the field of development, environment and health education. The organisation has built up a strong grassroots network of community workers and trainers committed to addressing the social, environmental, and economic problems facing the country. It conducts non-formal education outreach programme using a Mobile Team approach and its outreach extends to all 10 provinces in the Solomon Islands working in teams as Village Demonstration Workers (VDWs). The heart of SIDT's work is with the VDWs to strengthen the quality of village living.

An AusAID funded rural water supply and sanitation project was implemented by SIDT in 1999 to 2000 and worked with SIDT's nationwide group of VDW's and theatre groups in the field to SIDT was also involved in a pilot project with Gold Ridge Mining Program (Ross Mining Company, Australia) to tackle the very difficult issues including water that a major commercial mining operation generates. The Gold Ridge Mining Company and SIDT discuss key issues, including community concerns, and devise community-based programs to address these issues.

The following NGO's are also involved in installation of water supply systems provision water tanks to some communities in Solomon Islands:

5.3.2 World Vision International Solomon Islands (WVI) –

a Christian aid organisation that provides technical assistance/training support for project managers and support for a range of community based projects. It is now implementing the largest NGO funded RWSS program with projects on the weathercoast of Guadalcanal and Malaita focussed mostly around catchments that were involved tensions conflict.

5.3.3 The Live and Learn Environmental Education Solomon Islands-

a local NGO which is part of the Live and Learn based in Fiji and Australia is implementing a project called River Care. They are working with local youth groups and schools in developing ways to care for river systems. Another local NGO called Vois Belong Mere Solomon (VBMS) is based in Honiara and provides radio awareness programs on a wide range of issues, including environmental matters and water issues.

5.3.4 Adventist Development and Relief Agency International (ADRA) –

a Seventh Day Adventist NGO involved in provision of water tanks and sanitation facilities.

5.3.5 Rotary Club Solomon Islands –

provide water tanks (rain catchment) and build concrete tanks to collect rain water in several locations in the country.

Private Sector

Some companies operating in the country operate outside urban centres and have set up their own small townships to accommodate their employees. They provide their townships with water supply systems. Some of these companies include:

1. Kolombangara Forest Product Limited (KFPL) currently has 12,000 hectares of forest plantation, out of the 30,000 hectares of land available to them and have about 200 employees with their families,

2. Eagon Plantation Limited (EPL) a foreign owned company that operates forest plantations in New Georgia, Western Province and in Choiseul Province, planted 7,000 hectares in Western Province and 4,000 hectares in Choiseul Province.

3. Guadalcanal Oil Palm Plantation Ltd (GOPPL) took over the former Solomon Islands Plantation Limited (SIPL) 6,000 ha oil palm plantation on the Guadalcanal Plains and currently employees about 1000 workers. The SIPL used to provide a good water supply

system using bore holes (ground water) in the past and GOPPL will rehabilitate the system to provide water to its employees. SIPL's infrastructure was destroyed during the ethnic tension.

4. The Russell Islands Plantation Limited (RIPEL) has in place a water supply system at Yandina but due to an ongoing industrial dispute between the employees and the management, the water supply system has not been maintained and has been vandalized by some employees.

5. The Gold Ridge Mining Company when it was operating in Central Guadalcanal also provided water system to its employees residing at the mine site. It was destroyed during the ethnic tension.

A number of tourist resorts operating in the country provide their own water supply either through pipe water or wells. Some of the resorts include Tavanipupu, Maravagi, Uepi and Sanbis.

The following companies purify municipal water in Honiara and sell it to retail outlets. They include:

1. Zsetu Enterprises Ltd
2. Total Water Services Ltd, Honiara
3. Blue Water Ltd

Donor Programs and priorities

Note: The following information was current at August 2006. It is recognised that donor programs are constantly being updated and new initiatives may have been undertaken since the times of writing

Donor programs and priorities focused on key areas identified in the SIG in the NERRDP 2003-2006. These include:

- Normalising the law and order and security situation;
- Strengthening democracy, human rights and good governance;
- Restoring fiscal and financial stability and reforming the public sector;
- Revitalising the productive sectors and rebuilding supporting infrastructure; and
- Restoring basic social services and fostering social development.

Restoring basic services and fostering social development covers important sectors such as education and health. The government recognizes that safe drinking water and proper sanitation facilities are basic necessitates to better health. Thus with assistance from donors , it is committed to further strengthen and expand activities of the Rural Water Supply and Sanitation program under the Ministry of Health and Medical Services and put in place management systems within SIWA to enhance and strengthen its capacity to meet urban demand for water.

European Union

The EC has commenced work with the Department of National Planning and Aid Co-ordination to improve the Department's planning capacity including the strengthening of links between provincial and national agencies. This is being implemented through the EU Project Management Unit established within the Department. The Department also hosts the EU funded Micro-Project which deliver small scale community assistance focused on rural development and strengthening the smallholder sector. The focus within Micro-Projects has been directly at the community and household level. The Micro-project has assisted a number of communities' construction of clinics, water supply and sanitation and schools.

AusAID

The AusAID funded the Rural Water Supply and Sanitation Project implemented by the Environment Health Division in the Ministry of Health and Medical Services. The project built and installed water supply and sanitation systems throughout the country. The project ended in 2000, just before coup. Since 2000, AusAID has supported Institutional Strengthening Projects to the Departments of Lands, Forestry as well as the Ministry of Health and Medical Services. These projects have a strong national and provincial focus. AusAID has recently increased its emphasis on, and support to rural transport infrastructure. This has occurred through bolstering the capacity of Community Sector Program (CSP) to expand its existing road rehabilitation works and in the development of a new rural infrastructure development activity with NZAID and the ADB.

The CSP builds upon the work undertaken through the Community Peace and Reconstruction Fund (CPRF). The CPRF had funded rural water supply and rainwater tanks at the requests of the communities. CSP was contracted in February 2005 and is in the midst of a transition year from CPRF employed modalities and focus. CPRF and now CSP is primarily designed to engage in direct implementation at the grass roots, community level through their extensive network of Provincial Coordinators. The principal operating mode of CSP is the provision of "community grants" for priority projects identified by communities. Most community requests are for social services such as clinics, water supply systems and schools.

The Australian High Commission's Direct Aid Funding is an ongoing small grants scheme and has assisted a number of communities with water supply systems.

NZAID

NZAID have supported some curriculum development and materials for sanitation in schools (i.e. wash hands after toilet etc) in conjunction with the AusAID rural water supply project and the Curriculum Development Centre of the Ministry of Education and Human Resource Development. The project was

progressing well until the coup in 2000 with about half of the materials produced and distributed to schools.

NZAID continues to be a key donor in the education sector. It is providing integrated assistance to the primary education sector, including infrastructural needs and instructional material development. NZAID is also providing assistance for tertiary training to Solomon Islanders, both in-country and overseas. NZAID have an institutional strengthening activity with the Department of Fisheries and have also made a substantial commitment to the rural transport sector (up to NZ$25m over five years) and have allocated some NZ$10m in support of the rural livelihoods/agriculture sector.

Republic of China

The Republic of China (ROC) or Taiwan funds major infrastructure initiatives like the National Referral Hospital, and also delivers grants through three main sources:

1. An agriculture fund (SBD$300,000 for each of the 50 constituencies per year) mainly for copra and cocoa activities.
2. The Rural Constituency Development Funds (RCDF) where each Member of Parliament (MP) receives SBD$400,000 annually for the support of development activities within their constituency.
3. Micro-Project Fund under the Department of Planning and Aid Coordination (DPAC) with an allocation of SBD$200,000 per constituency annually.

These funds are spent on areas identified by the Member of Parliament (MP) as priority in his constituency. For example, from 2001 to 2005, the member for West New Georgia and Vona Vona constituency expended his RCDF allocation (SBD$400,000) upon the following priority areas (Solomon Star Issue 17th January 2006):

- Water security.
- Agriculture and aquaculture income generating projects.
- Women's development and
- Youth development.
- Discretionary expenditure, i.e. humanitarian aid for critically ill needing medical attention.

For water security, he distributed $300,000 worth of aluminium water tanks for the people of Vona Vona according to need and location.

The ROC Micro-Project criteria are also health and social service delivery such as markets, clinics, sanitation projects and roads. The MP's expenditure for the ROC micro-project funds was SBD$100,000 for aluminium water tanks for Munda to Kindu, SBD$50,000 to upgrade the Munda market and SBD$50,000 to upgrade the Munda to Elelo road.

JICA

Japan has a small grants community mechanism working in provincial areas across Solomon Islands. The Japanese Grassroots Grant Scheme has funded a number of activities in the infrastructure and social sectors, including water supply and sanitation, malaria and immunisation control as well as a volunteer and training capacity building program. Community water supplies are funded with technical back stopping from RWSS.

JICA assists SIWA in provision of equipment and Technical Assistant to upgrade facilities in Honiara. In May 2006 JICA completed a study for the rehabilitation and improvement of SIWA's water supply and sanitation systems. This provides a thorough analysis of the current water supply systems of Honiara and Provincial centres Auki, Tulagi and Noro and a plan for rehabilitation and capacity building over the next twelve years. Further assistance to upgrade the water supply and sanitation systems is planned.

World Bank

The World Bank is working with SIWA to provide technical and management assistance to SIWA under the contract. Under the management contract the Board works with a team of experts in management positions alongside local managers for up to five years. This aims to address financial reporting and accounts, improve operating techniques, increase debt collection and expand the network. Most importantly, local managers will be trained in international best practice management techniques.

Canada Fund

Individual communities make requests directly to Canada Fund for assistance especially in health and education sectors. For example the Fund supported the Arabala Water Supply and Sanitation Project in 1999 to 2000 by provision of SBD$34,843.59 to improve water supply and sanitation facilities available to Arabala, where their inadequate resources have been stretched due to the influx of displaced people back to Malaita as a result of the ethnic tension.

SOPAC/ EU

SOPAC is currently administering an EU funded project with Water Resources Division on Water Governance. This project aims to address:

1. Policies – setting goals for water sector, water use, protection and conservation.
2. Legislative framework – rules to follow to achieve policies and goals (water laws cover ownership of water, permits to use it, transferability of those permits, customary entitlements, regulatory norms for conservation, protection, priorities, and conflict management.)
3. Creating an organisational framework – forms and functions (clear demarcation of responsibilities, co-ordinating mechanisms, jurisdictional gaps or overlaps, match responsibilities with authority and capacities for action).

4. Awareness - developing awareness for decision makers, water managers and professionals, for regulatory bodies and empowerment of civil society.

GEF

In collaboration with SOPAC

SOPAC is also working with the Water Resources Division on an Integrated Water Resources Management Demonstration Project funded by the Global Environment Facility (GEF) and implemented by UNDP and UNEP. This demonstration project will focus on managing the Honiara City Water Supply and to reduce pollution through IWRM approaches. The purpose of the project is to demonstrate management strategies and protection measures for critical watersheds, aquifers and well-fields within Honiara city through proper assessment of potential water resources to determine the extent and location of aquifers, the extent of threats of pollution and the potential resources available for extraction without over-exploitation of the resources. (MME Draft Proposal September 2007)

In collaboration with SPREP

SPREP and GEF have the role of coordinating climate change activities in the Pacific. In the Solomon Islands this work with the Bureau of Meteorology on a National Adaptation Program Actions (NAPA) to develop vulnerability assessments.

6.10 UNDP/UNOPS

UNDP implemented the Solomon Islands Development Administration and Participatory Planning Programme (SIDAPP) from 1997 to 2001 in collaboration with the Department of Provincial Government and Constituency Development. Support was provided under the programme to carry out the participatory planning in nearly all villages in three provinces. This has resulted in production of constituency profiles, projects and action plans. The SIDAPP also supported the establishment of the Rural Development Volunteers Association (RDVA) in partnership with Ministry of Provincial Government and Constituency Development. The RDVA developed and established the People First Network (PFnet) a rural email network that connects some isolated communities in the country by email. The PFnet also developed a website where projects identified in the constituency profiles are promoted for donor funding. A number of water supply projects identified by communities as priorities were funded by donors through this arrangement.

Existing research and monitoring of condition

Water research

There is no specific research organisation in the country that undertakes research on water resources. Some research and monitoring work is carried out by few organisations responsible for water, but this is very limited and specific to their requirements.

Water Resources Division is responsible for hydrological and hydrogeological monitoring of water resources. They have limited data and resources. Their best data set is from Lunga River to the east of Honiara; here they have 10-15 years of weekly measurements. Measurements have not commenced again since the tensions in 2000. Estimates of stream flow are extrapolated to the rest of the nation from this dataset. In reality they respond to requests and measure water flow of targeted streams and ground water drilling reports and mapping for hydropower and mine development. The Division has received training and equipment from NZAID for monitoring rainfall and streamflow but this is not yet installed. When project complete there will be 10 monitoring stations, 8 in the Provinces and 2 in Honiara.

Meteorological Service Division collects meteorological information on rainfall, sunshine hours, min & max temperatures, cloud cover, wind speed and direction as raw data, conduct basic analysis and produce reports.

In terms of water use for drinking and household use, SIWA routinely monitor its water quality through regular sampling and testing and the Environment Health Division (MoH) carry out water quality check for the RWSS water supply installation. There are two water quality testing laboratories: SIWA's laboratories undertake on water testing for E. coli and the MoH laboratories have the capacity for microbiology and water chemistry analysis.

Mapping

The Department of Lands manages a GIS unit which has data on waterways, catchment boundaries, settlements, topography, infrastructure, etc. The section can produce maps on request at cost recovery price.

Risk

Even though organisations like SIWA and Environment Health Division do carry out routine quality test on the water, the risk of contamination and pollution is high. Some of their reservoir tanks are not fenced to keep people or animals out. These pose risk for possible contamination. There have been incidences of water contamination in the past that made the water unsafe for human use in Honiara and other urban centres.

The Environmental Health Division only carries out water quality analysis to facilitate rural water supply installation and not during time of use. There is risk to water being contaminated as most reservoir tanks at source are open and not fenced. Some catchment areas are being disturbed through land clearing and

logging causing high sedimentation in the river system. Villagers sometimes complain about dirty drinking water in their water supply systems. Most coastal villages especially on atoll islands often experienced high salt content in the water from their wells. Water in the wells become saline and this problem is becoming common. This poses a risk to the villagers who rely on the water from the wells for their household use.

Common Issues and the Way Ahead

8.1 Case study catchments addressing key water issues

Coastal villages and those on atoll islands currently experienced water problems. Developing a program on water resources with these villages will address their water problem. Some catchment areas in the provinces have been heavily disturbed through logging and other land use activities that resulted in water problems. Catchment areas on the west and central Guadalcanal and in the Western province are examples of this.

8.2 Community/government and/or donor organisations for IWC to partner with for AWRF

Three organisations are currently responsible for water resources in the country are:

-
- Water Resources Division of DME mandated to assess, administer and manage the nation's water resources.
- Solomon Islands Water Authority involved in the provision of providing safe water supply and wastewater services to urban areas in the country.
- Environmental Health Division of MHMS involved in the provision of providing safe water supply and sanitation to rural population.

The Water Resources Division lacks resources and manpower to carry out any effective programme on water research unless it is strengthen through external support. Currently support from the Government is very low to almost non-existent. The Government's priority is on law and order and economic recovery. Already some NGOs like SIDT, World Vision and ADRA have been addressing water problems through working with some communities. They have existing linkages with communities. The World Bank and Japan are supporting SIWA to provide reliable and good quality water to the urban population while AusAID in the past has supported the RWSS in the Environment Health Division to provide water to the rural population. These are some organisations that IWC can partner with. Under the management contract the board will hire a team of experts to work in management positions alongside local managers for up to five years. This allows time to fix financial accounts, improve operating

techniques, increase debt collection and expand the network. Most importantly, local managers will be trained in international best practice management techniques for the AWRF.

ANNEX A – References

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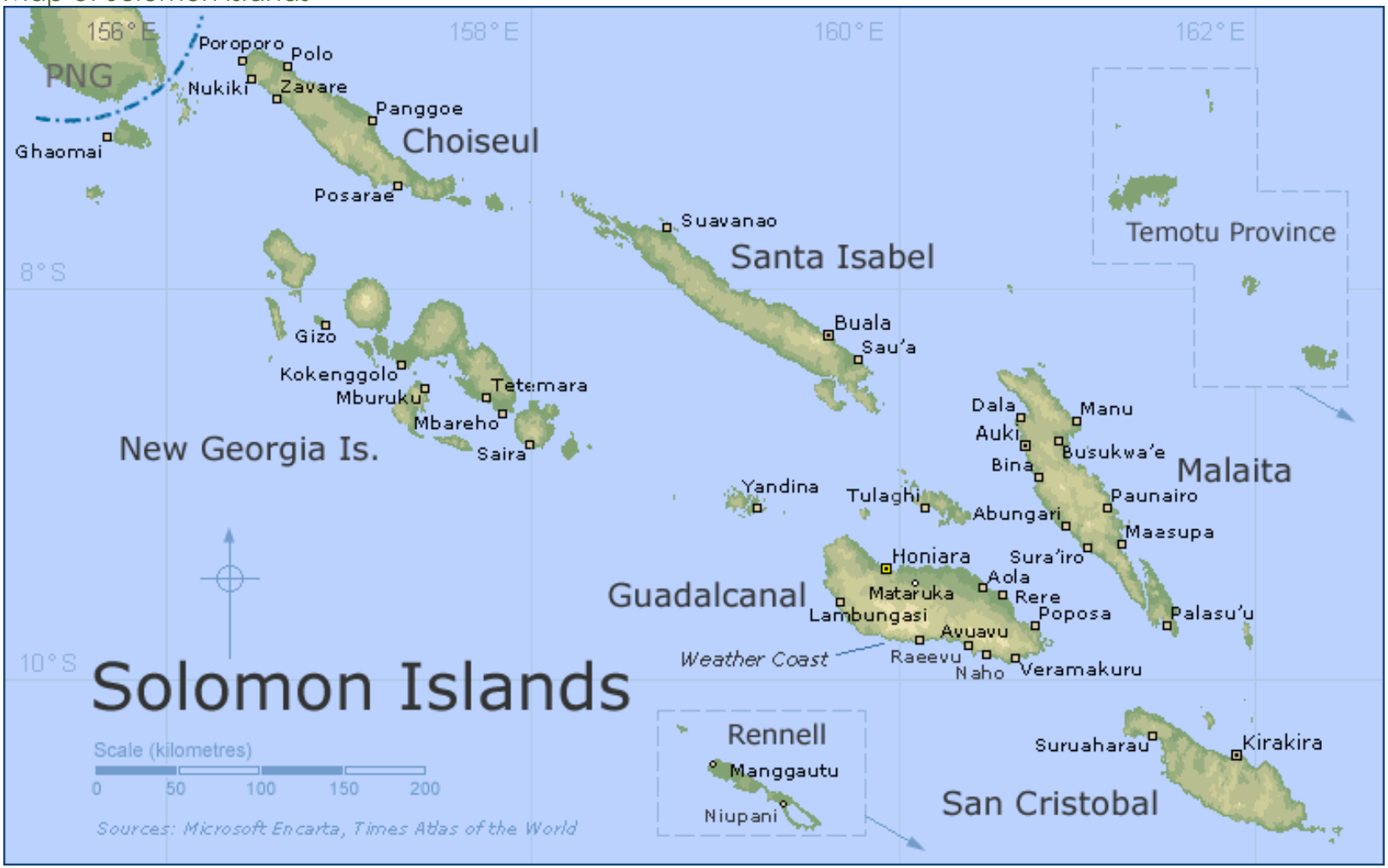
ANNEX B – Persons consulted during in-country validation

Organisation	Persons met
AusAID	Rhona McPhee - Second Secretary AusAID Robertson Natei – Program Officer
AusAID, Australian High Commission	Patrick Cole Australian High Commissioner to Solomon Islands
Water Resources Division, Department of Energy and Mines	Charles Bepapa (Director) Isaac Lekelalu (Deputy Director)
Environmental Health Division and Rural Water Supply and Sanitation, Ministry of Health and Medical Services	Robinson Fugui (Director)
Solomon Islands Water Authority (SIWA)	John Waki (General Manager) Jacob Houtarau (Engineer Environment) Ray Andersen (Divisional Manager Engineering Services) Roger Townsend (Divisional Manager Finance and Sales) Freda Unosi (Senior Sales and Customer Service Officer)
Environment & Conservation Division Conservation National Capacity Self Assessment Project	Joe Horokou (Director) Nester Leguvaka (project coordinator)
Climatology and Meteorological Service Division, Ministry of Transport, Works and Aviation	Mr Chanel Iroi (Director of Meteorology)
Forestry Management Project II, Ministry of Forest, Environment and Conservation Research project preparation	Ross Andrewartha (Team Leader)
NO SHOW - Meeting with Department of National Planning and Aid Coordination	Dudley Mazini – Director of National Planning & Noelyn Biliki
World Vision International Solomon Islands (WVI)	Frank Lui (Water Supply and Sanitation Engineer) & Carlson Shady Taro (Program Officer, Environmental Health)
AusAID	Robertson Natei
WWF Solomon Islands SIDT Building	Stephen Dalipanda (Country Program Manager
New Zealand High Commission	Margie Lowe (First Secretary, NZAID Manager) Allan Daonga (Development Programme

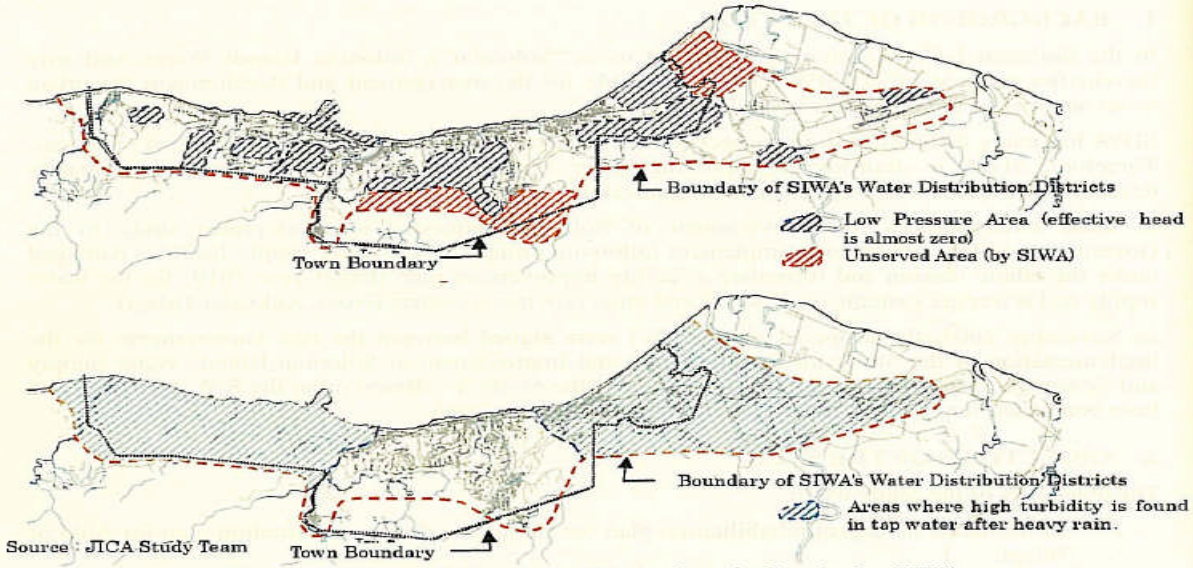
	Coordinator)
School of Natural Resources, Solomon Islands College of Higher Education (SICHE)	Alexander Makini (Head of School)
Office of the Special Coordinator Regional Assistance Mission to the Solomon Islands	Paul Wright Development Program Specialist
Department of Agriculture and Livestock *Transitional Support for Agriculture Project*	Jimi Saelea (Director of Research)
Community Support Programme	Frans Arents (Team Leader)
Szetu Enterprises Ltd	Peter Tam (General Manager)
The University of the South Pacific –	Dr. Glyn Galo (Director)
Water Resources Division, Department of Energy and Mines	Isaac Lekelalu (Deputy Director)
Delegation of the European Union	Ronald Irupitu
Live and Learn Solomon Islands	Jacob Zikuli
Solomon Islands Institutional Strengthening of Land Administration Project	Larry Hunt (Physical Planner and Development Advisor
AusAID – Debrief	Robertson Natei

ANNEX C – Maps

Map of Solomon Islands

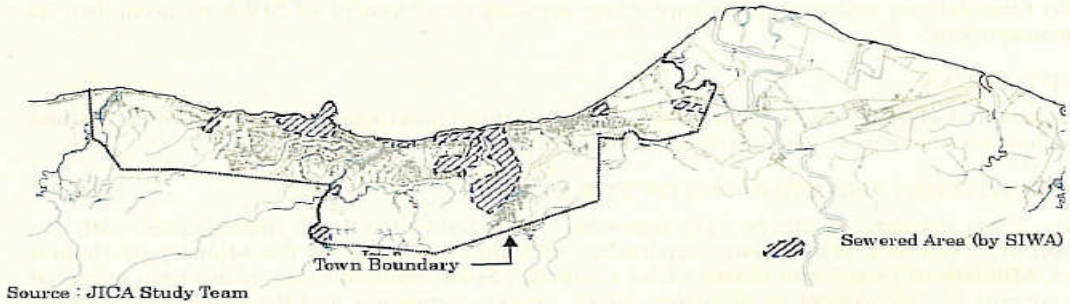


Current Situation of Water Supply and Sewerage Services by SIWA



Source : JICA Study Team

Figure-1 Current Situation of Water Supply Service by SIWA



Source : JICA Study Team

Figure-2 Current Situation of Sewerage Service by SIWA

Annex D: Biophysical information (adapted from SOPAC National Integrated Water Resource Management Diagnostic Report)

Solomon Islands lie in the southwest Pacific Ocean between latitudes 5° to 12° south and longitudes 155° to 170° east and form a northwest to southeast oriented archipelago approximately 860 km in length (Annex C). It consists of about 1000 islands stretched over a distance of more than 1,500 km from Bougainville Islands of Papua New Guinea in the Northwest and Vanuatu in the Southeast. The Solomon Islands encompass more than 800,000 km^2 of sea area with a land area of about 30,000 km^2 (Institute of Hydrology 1993). The islands vary considerably from a small tiny atoll islands to a high mountainous heavily dense rain forested. The major islands are Guadalcanal, Malaita, Choiseul, Santa Isabel, New Georgia and San Cristobal (see map in Annex C). These vary in length from 145 to 190 km and in width from 35 to 50 km. The largest of the islands, Guadalcanal has a land area of 5,120 km^2 (Gutteridge and Whiteman 1978).

Topography

The main islands are rugged and mountainous; the highest named peak Mt Makarakomburu (2447m) is on Guadalcanal. Most islands are of igneous and metamorphic rocks, overlaid with considerable layers of marine sediments. The only extensively coastal plains are on the north-east coast of Guadalcanal. Many outer islands are coral atolls and raised coral reef.

The islands are mostly of volcanic origin, rugged and mountainous although the group includes some low-lying coral atolls. The country is relatively rich in mineral, hydropower and forest resources but uncontrolled and destructive logging has been a long-standing and serious problem with irreparable damage to the environment, the forests and the country's economic future.

The main islands are high, mountainous and often have sharp ridges with steep sided valleys in between. Flat land is restricted to coasts and is of limited extent, except in the north-central part of Guadalcanal, referred to as the Guadalcanal Plains. These plains are the largest in the country covering an area of approximately 1,200 km^2 with width varying from 2 to 13 km.

The main islands have numerous hydrological regions while the outlying islands are usually raised coral atolls, only a few metres above sea level with no surface water. Water for domestic consumption is supplied mainly from roof catchments and/or shallow groundwater lens.

Geology

The Solomon Islands lie along the south-western border of the Pacific Ocean, and are predominantly andesine affiliation, being composed largely of lava and volcanically derived sediment. Pleistocene, recent and contemporary volcanoes are important features of the landscape of several islands. A

substantial part of the sedimentary pile is organogenic, and biothermal limestone are frequent (Manser 1985).

Some of the islands show large exposures of "basement complex" almost certainly pre-Tertiary in age, consisting of older sedimentary rocks, lavas, gabbroic, dioritic and granitic rocks. Some of those older rocks have been lightly metamorphosed. The ultrabasic rocks are a prominent feature of the islands. Apart from serpentinous fragments within the tertiary sediments, all other ultrabasic rocks are intrusive. All occurrences show extensive intrusion brecciation and some of them have probably suffered semi-continuous plastic intrusion up to the present. A provisional estimate of the age of initial emplacement is Upper Oligocene – the same for all of the islands on which they have been found (Manser 1985).

The oldest rocks, which apparently extend in age well into the Mesozoic, are the "basement" schists and plutonic rocks. For the most part these consist of meta-sediments, amphibolites derived from lavas and tuffs, and massive to schistose dioritic and gabbrioc rocks.

The Pliocene period appears to be represented entirely by volcanic rocks where they are the oldest units exposed, ranging from picritic basalt flows through basalts to andesites. The Pleistocene is represented throughout the whole group of major and minor islands by reef limestone and back-reef sediments.

The various islands differ considerably in their broad structural characteristics, though all may fit into a general evolutionary pattern. Some of the islands are intensely faulted, showing no true folding of any importance.

The low-lying islands are predominantly formed of limestone on reefed islets and others compose mainly of atoll islands. On the higher volcanic islands are flatlands which are formed of recent sediments and coral limestone.

Soils

Soils were studied on the islands of Guadalcanal, Kolombangara, Santa Isabel, San Jorge, and Makira Ulawa, mainly under tropical rain forest in mountainous inland regions. In the areas studied soils on stable sites are deep, and intensely weathered and leached. On steep slopes soils are shallow and unstable, with much colluvial rock debris. Most soils are strongly acid to acid (pH 3 to 5) clays and have very low plant nutrient contents.

The Solomon Islands soils are related to similar soils in Hawaii, Western Samoa, New Caledonia, New Zealand, Australia, the West Indies and south-east Asia. In general the most strongly leached Solomon Islands soils have reached a stage of degradation beyond that of similar soils described from other regions. There is apparently an almost closed organic cycle of nutrient turn-over under rain forest, with most of the available plant nutrients concentrated in organic-matter-enriched surface soil horizons and with little contribution to plant growth from underlying mineral horizons.

There is little evidence of close relationships between soils and vegetation, except in soils derived from serpentine which have a forest dominated by Casuarina papuana. Large-scale destruction by fire of Casuarina forest on soils from serpentine has resulted in loss of surface horizons by erosion, failure of the forest to regenerate, and formation of laterite on the bare soil surface. Small-scale destruction of forest for native gardens appears to have little long-term effect on soils or vegetation. 'Soil' animals are usually confined to logs and other above-ground habitats and are rare in the soil, apparently due to the extreme wetness and probably partial anaerobiosis of below-ground habitats.

Climate

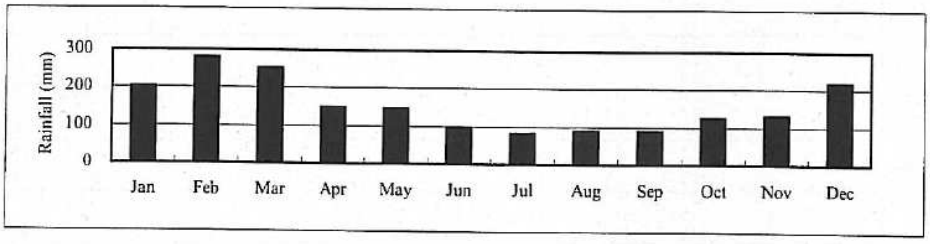
Solomon Islands have a tropical climate, hot and humid with an oceanic modification. During the day, a sea breeze blows on shore, and at night a cool breeze flows from mountain areas. The air temperature at the capital Honiara is representative of the island chain as a whole and varies only by a few degrees around a mean of 27°C (IOH 1993; Solomon Islands Meteorological Service 2003).

Rainfall is generally high, but with distinctive wet and dry seasons during the year associated with the trade winds and orographic effects, i.e. a localised effect imposed by the topography of the islands. The average annual rainfall is mostly within the range 1,500 to 5,000 mm on the larger islands, the total exceeding 8,000 mm on high peaks (IOH 1993). As can be seen in the following table, inn most of the Solomon Islands, the wettest months are November to April during the North-west monsoon season, with a tendency for reduced rainfall during February when the equatorial trough is normally furthest south. May to October is a relatively dry period

Honiara Monthly Rainfall (mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1986	273	182	263	251	366	40	84	116	141	9	208	37	1970
1987	94	231	114	84	60		66	30	63	98	166	299	1305
1988	318	409	123	78	33	104	95	139	130	198	453	549	2629
1989	244	483	152	247	207	146	34	36	72	65	71	171	1928
1990	231	71	333	160	168	53	112	48	123	42	74	274	1689
1991	274	275	235	151	189	140	144	154	139	74	35	16	1826
1992	91	423	109	117	61	46	68	35	24	131	100	155	1360
1993	62	233	131	188	60	112	98	96	33	41	43	168	1265
1994	258	364	344	140	174	201	73	97	19	55	18	98	1841
1995	76	98	344	152	151	40	41	71	129	260	15	175	1552
1996	149	162	369	154	91	93	109	134	71	218	124	517	2190
1997	188	306	583	74	35	61	5	112	151	98	36	45	1692
1998	264	240	396	56	130	46	22	273	115	25	182	351	2098
1999	350	601	179	119	221	78	43	114	99	189	226	364	2584
2000	212	181	304	245	429	94	44	68	25	51			
2001		417	244	203	148	123		35	48	192	118	198	
2002	196	306	236	105	120	45	232	33	181	237	226	163	2078
2003	201	95	248	102	73	178	167						
2004	49	303	275	217	72	169	56	31	35	269	140	123	1738
2005	334	250	72										

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average	203	281	253	150	147	98	83	90	89	125	131	218	1868
Lowest	49	71	72	56	33	40	5	30	19	9	15	16	
Highest	350	601	583	251	429	201	232	273	181	269	453	549	



Natural disasters

The vulnerability and particular needs of small island countries has been acknowledged by the World Water Council by the inclusion of the "Water in Small Islands Countries" theme in the 3rd World Water Forum (Scott et al. 2002). In Solomon Islands there are two major types of risk that can be caused by water. Both have occurred in Solomon Islands. They are:

- o Too much water (flooding, etc.),
- o Too little water (drought, etc.)

In 1986 water completely inundated a major part of Guadalcanal Plain claiming more than 100 lives. In 1995 parts of Solomon Islands experienced too little rain causing severe water food shortages. Cyclone Zoe in 2002 devastated the eastern Solomon Islands. Other natural hazards such as volcanic activity, earthquakes and tsunamis are a threat to the country. In 2007, an earthquake and tsunami devastated the western Solomon Islands clearly highlighting the need for disaster preparedness in the country. These extreme events require an appropriate level of preparedness. Education in the form of awareness is a very important tool to address vulnerability and adaptation by means of preparedness. Disaster preparedness policy is essential to the government in reducing the impact of any manmade and natural disasters to human lives.

In addition to current climatic variability, there is the possibility of climate change and sea level rise due to the enhanced greenhouse effect resulting from worldwide emissions of greenhouse gases. Climate change scenarios for PICs vary according to location and the models used. Lastly there are other economic and social issues that can be threat to the as experienced in the last few years when the country went through a dark period as a result of ethnic conflict amongst the different island groups. Social services, infrastructures and economic hardships were experienced as a result of the social crisis.

Vegetation

The Solomon Islands is one of the world's most extensively forested countries (FAO 2000). Much of the country is under lowland rainforest with a small proportion of mainly swamp forest, including mangroves, and upland forests. The under-story of the lowland rainforest contains a variety of short, thick-stemmed, low-stature trees as well as palms, bamboos and shrubs.

The main islands of Choiseul, New Georgia, Santa Isabel, Guadalcanal, Malaita, and Makira have rainforested mountain ranges of mainly volcanic origin, deep narrow valleys, and coastal belts lined with coconut palms and ringed by reefs. More than 90% of the islands traditionally were forested, but this has come under pressure from current logging operations. The coastal strips are sheltered by mangrove and coconut trees. Luxuriant rainforest covers the interiors of the large islands. Soil quality ranges from extremely rich volcanic to relatively infertile limestone. More than 230 varieties of orchids and other tropical flowers brighten the landscape.

Solomon Islands has around 24,000 km^2 of natural forest (approximately 80-85% of the total land area) and almost all is in customary ownership (Sheehan 2000). However, only about 10% is considered suitable for commercial exploitation. The non-commercial areas are situated on steeply sloping land or scattered across many small islands and are presently not economically feasible to log (FAO, 2000). Despite the fact that only 10% of total forest was considered viable for commercial logging, current logging practice is probably extending to areas not strictly suitable for logging, e.g. steep topography. This could imply that logging has probably exploited much greater than 10% of the forest. This generalisation is probably reasonable because the current rate of logging is estimated to be more than twice the sustainable rate.

According to FAO (2001) Solomon Islands natural forest cover was reduced at a rate 2% during the period 1999-2000. CBSI (2003) reported that Solomon Islands recorded its highest logging production during this period. Sheehan (2000) reported that the sustainable timber harvest rate for Solomon Islands was estimated at 250,000 m^3 per year. However, the actual logging rate is approximately 550,000 m^3 per year (more than double the sustainable rate). Such an elevated logging rate could see the depletion of Solomon Island's forests in the next decade (Sevilla n.d).

Agriculture

The Solomon Islands is an agriculturally based society. Agriculture commodities have been the major exports from the Solomon Islands since the country attained its independence. In 2003 the agriculture sector contributed a Gross Domestic Product (GDP) value of SI$39.3 million or 14.5% to the economy and a sectoral growth of 24.2%. Agriculture will continue to form the basis of the economy.

A survey conducted in the 1970s identified 338,100 hectares or 12% of the total land area as having the potential for agriculture development, but only 21,500 ha or 6.4% have been presently developed based on the Ministry of Agriculture and Livestock records.

The agriculture sub-sector in the Solomon Islands comprises of three distinctive components; the small holder subsistence sector, small holder cash agriculture and the commercial sector which was greatly affected by ethnic unrest recently experienced in the country. While in the context of the agriculture sector the household unit is the predominant economic or production unit whereby individuals or families operate from.

A vast majority of Solomon Islanders are engaged in agriculture activities. The census of 1999 shows 111,905 people participating in some kind of unpaid activity; 78.3% engaged in agriculture activities while fishing accounted for 5.3%. The agriculture industry is the largest single employment sector in the country with 20.6% or 11,859 paid workers employed in the agriculture sector and of these 53.2% were male and 46.8% female (SIG 1999).

The main industries are copra, timber, palm oil, fish, cocoa and to an extent beef cattle. Main exports are timber, fish, copra, cocoa and palm oil/kernel. Agriculture, forestry, livestock and fisheries account for about 70 percent of the GDP (Wahananiu et al. 1993). Ruminant livestock production plays a declining role in the economy of the Solomon Islands, but Government has made plans toincrease local production.

Geomorphology

The higher islands are commonly of volcanic origin with mountainous and steep sided characteristics. The lower regions usually have stability while the upper regions become more unstable with outcrops of volcanic rocks. There are usually large drainage systems dissecting the larger islands which become narrower and steep sided in the interior of the islands. Freshwater is abundant on most islands in the form of flow streams/rivers, springs and groundwater. These streams and rivers are usually flows from upper watersheds through to the oceans.

The low lying atolls rarely have flowing water in the form of stream or rivers. Most of their water comes from rain and thin lens aquifer underlying the islands and usually under threat from contamination from the surface human activities.

Water resources availability in Solomon Islands varies considerably. It ranges from sizeable rivers to small streams from high mountainous and dense rainforest islands to rainwater harvesting and thin freshwater lens of underground aquifers of the small low-lying atolls and islets.

Evidence exists in the Solomon Islands that the quality and quantity of fresh water is reducing. The rate of reduction is not very well understood because of inadequate or unreliable hydrological data and limited knowledge of local hydrology and water resources. There is a need for a change in attitudes towards water which must be acknowledged to be a precious resource. In addition training for hydrologists and other staff dealing with water must be sustained as an on-going activity as part of capacity building for the department to address this issue.

The main source of drinking water in Solomon Islands comes from surface water in the form of streams, springs or rivers. Some small atoll islands collect rainwater for drinking and utilise brackish water from shallow hand dug wells for most of their other domestic needs. Some communities on the higher volcanic islands also use groundwater for domestic purposes. The major users of groundwater resource are Honiara city and Guadalcanal Plains. The Guadalcanal Plains on the northeast coast of Guadalcanal have abundant potential for groundwater. However, with increasing agricultural developments in the area there is an urgent need for proper planning and management of the resource.

Annex E - Government of the Solomon Islands

The former 'British Solomon Islands Protectorate' achieved independence from Britain on 7 July 1978 and became the Independent State of Solomon Islands. The Solomon Islands has failed to achieve a level of political maturity sufficient to permit the formation of stable governments. There has been a high turnover of governments – ten in twenty-three years – and seven prime ministers. Despite this instability it is reassuring that, except for the change of government brought about by a coup in June 2000, all other changes have been constitutional. The Head of State is Queen Elizabeth II, represented by the Governor General, Sir Nathaniel Waena who is elected by 50 Members of Parliament. The Prime Minister is Sir Allan Kemakeza, who appoints a Cabinet composed of 20 members out of 50 members of an elected Parliament. Elections are normally held every four years, the most recent in December 2001. Key changes in government since 1989 are summarised in Table 1.6.

Table 1.6: Changes in Solomon Islands Government from 1989 – 2005

Term in Office	Mamaloni 1989 - 1993	Hilly 1993 - 1994	Mamaloni 1994 – 1996	Ulufa'alu 1997 - 2000	Sogavare 2000 - 2001	Kemakeza Dec. 2001 – 2005
Governor General	Sir Moses Pitakaka	Sir Moses Pitakaka	Sir George Lepping	Sir George Lepping	Sir John Ini Lapli	Sir John Ini Lapli (2003) Sir Nathaniel Waena (2003 - present)
Prime Minister	Solomon Mamaloni	Francis Billy Hilly	Solomon Mamaloni	Batholomew Ulufa'alu	Manaseh Sogavare	Sir Allan Kemakeza
Ruling party or Parties	Peoples Alliance Party (PAP)	National Coalition	Solomon Islands Govt for National Unity	Solomon Islands Alliance for Change (SIAC)	Solomon Islands government for National Unity, Reconciliation and Peace (SIGNUR)	National Coalition Partnership (NCP)
Minister responsible for Water Resources	Allan Paul	Hilda Kari	Eric Seri; then David Vouza	Walton Naezon	Walton Naezon	Walton Naezon (2002) Stephen Paeni (2003- 2004) Basil Manelegua (2004-2005)
Comments	PAP won majority seats and form the government	Coalition of several parties; was taken over by an opposition group	Mamaloni took over from Hilly in vote of no confidence	Coalition of small political parties (i.e. Liberal, Labour, independents)	Unscheduled election after the SIAC was overthrew by MEF / joint paramilitary group in June 5th 2000 coup	Coalition between PAP and Association of Independent Members

Note: MEF = Malaita Eagle Force

In recent years, the Solomon Islands has experienced considerable unrest and economic decline, the roots of which stretch back to colonial days. Serious civil

unrest on the largest island of Guadalcanal, which has a large migrant population from the most populated island, Malaita (see Table 1.2), began with armed conflict in late 1998, leading to a state of emergency in June 1999 and a coup in June 2000. The Townsville Peace Agreement (TPA) was signed in October 2000 between the two warring parties, Isatambu Freedom Movement and Malaita Eagle Force. Despite the peace agreement unrest has not ended although tensions began to ease after the arrival of the Australian-led 'Regional Assistance Mission to Solomon Islands' (RAMSI) in July 2003.

In 2002 the UN produced the Common Country Assessment for the Solomon Islands (CCA 2002), which provided an excellent context for considering national development issues and prospects. The following points are summarised from the report.

1. Eighty seven percent of the land area of the Solomon Islands is under customary resource tenure. The traditional land and sea resource management regimes of the Solomon Islands are community based, and participatory. In essence, a "corporation" owns an area and its resources, the directors of which are "primary rights holders" who collectively have the authority to allocate use rights (through the Chairman, the spokesman for the line). Ordinary members are those who hold "secondary" rights. Customary land and sea tenure systems, although ancient in origin and constant in principle, have changed. Much of this change is positive since it demonstrates a capacity to adapt to new circumstances. Development on customary land and in customary sea is achievable through carefully developed adaptive management regimes that ensure that benefits are equitably shared among stakeholders.

2. The Solomon Islands faces a crucial test of sustainability as a nation. Its component provinces resent the rule of its centralist government. The economy, weakened through a decade of poor economic management and low quality governance, has been pushed to the brink of collapse by a civil uprising between militia of two of the country's main islands. Post-Independence gains in health, education and infrastructure are being eroded. The commercial timbers of the nation's natural forest resources are almost depleted.

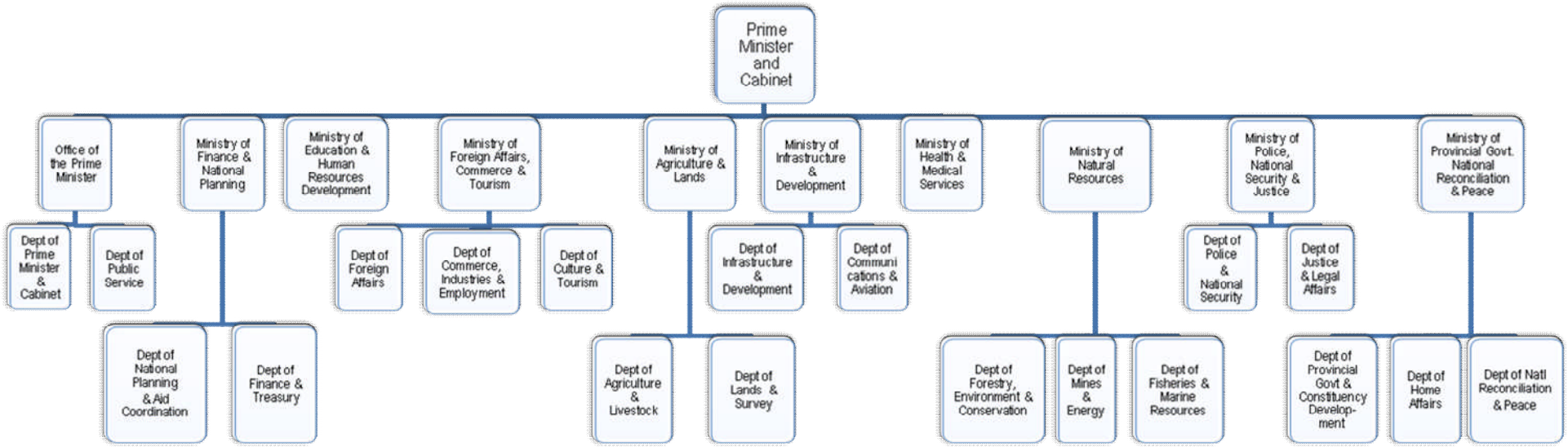
3. The Solomon Islands is economically under enormous pressure, with negative economic growth, very low Government revenue, increasing public debt, and low levels of foreign reserves. The national development goals and objectives of all governments since Independence in 1978 have consistently favoured large-scale, export-oriented resource development projects. The current Government has stated its intention to "reverse the decline in our country's production, exports and income, reform the management of the Government's finances, reduce expenditure, increase revenue and improve debt management, initiate a new deal for

provinces and allocate resources more equitably, repair, upgrade and maintain our physical infrastructure, and revive programmes in our social sectors, particularly in health and education."

4. The Solomon Islands ranks 13th of 15 Pacific island countries and 121st in the world in the UNDP's Human Development Index. Women's participation in decision-making is improving but remains relatively low.

5. Since the CCA was completed in March 2002 the economy is slowly recovering but remains fragile. Customary land tenure is still often viewed by government and investors as a constraint to the development of local resources, including water.

Government of Solomon Islands Structure



ANNEX F – Issues raised by stakeholders,

Solomon Islands County Visit July 2006

Situational Analysis: Issues Raised

The following issues were raised during one-on-one interviews with 29 people working in the water or associated sectors in the Solomon Islands from 20 – 29 July 2006.

Key problems/gaps/issues

Longer Term

Climate change impacts on rainfall, seawater levels unknown etc

Water resource

Honiara source has seen a drop in water availability in the catchment (50%) reduction in dam, but not sure why.

Catchment issues

Inadequate planning to control development in catchments and conflicting legislation (i.e. granting of development rights, logging license in catchment or conservation area)

Erosion and downstream effects from logging operations on water supply/ water quality/reef/mangrove areas/fisheries/ etc.

Effect of this erosion on aquatic biodiversity

Poor understanding of cause and effect of logging/erosion/ downstream effects on reefs/fisheries/etc amongst loggers

Water supply and sanitation

Water and land ownership are a major source of conflict affecting supply.

Lack of awareness that water is for everybody (rel. to ownership)

High losses and leakage through water supply systems

Maintenance of Rural Water Supply and Sanitation systems (RWSS)

Need for better baseline information for RWSS planning

Pollution problems increasing with rapid population growth

Cultural understandings and beliefs about water and sanitation

Health and livelihoods

Health (particularly malaria and skin diseases) related to water supply and sanitation

Important to understand the cultural constraints that prevent behavioural change with respect to sanitation.

ANNEX G – Detailed research proposal for Australian Water Research Facility

DRAFT Detailed research proposal for AWRF in Solomon Islands

PROJECT TITLE: Catchment-based risk assessment research – Solomon Islands

AIMS AND BACKGROUND

Aim

To develop a framework determining priorities for water resource management actions in catchments

Background

Water resource managers face numerous constraints around ownership of the resource, financing, lack of awareness, poor legislative framework and limited technical capability. Managers must choose the most effective actions for greatest benefit with limited information. Recent activities in developing the Water Sector Steering Committee and the efforts through the Solomon Islands Water Governance Program provide a foundation for an integrated analysis of issues affecting catchment management. Environmental Health from the Ministry of Health, Water Resources Division from the Ministry of Natural Resources and Solomon Islands Water Authority are currently engaged in this sector wide approach.

A recent analysis of priorities for the water sector by the SOPAC administered Solomon Islands Water Governance Program identified in January 2006 four key pilot areas for attention: policies; legislative framework; creating and organisational framework; and awareness. At a recent study visit to Samoa for the same program, water shortages in catchments, a lack of data and awareness were raised as key priorities.

Applied research priorities

The situation analysis has lead to the identification of key research priorities for water in the Solomon Islands. These revolve around the areas of:

1. Water as a resource: questions of quality and quantity and climate change
2. Catchment issues: questions of causative impacts from logging, development, erosion, compaction, community management
3. Water supply and sanitation
4. Health and livelihoods

The research approach to be taken by AWRF in the Solomon Islands focuses around catchment management.

The research uses a case study approach. The case study proposed involves initially a case study of the Kongulai catchment which is the major water supply to Honiara. Pressures on the Kongulai include illegal settlements, logging in the catchment, customary ownership arrangements, leakage in the system and possible compaction of the source. Working with key water stakeholders in Honiara, the research will lead to practical frameworks to identify and manage risks to catchments.

APPROACH

Based on an initial assessment of current water resource issues in the Solomon Islands, it has been identified by the AWRF team that a major challenge that can be addressed through research is the lack of catchment approach to management of water and natural resources. Interactions between landscape, hydrological processes and human activities at catchment level are poorly understood.

Key research questions underpinning water resource management through a catchment approach are:

1. How does the water cycle relate to human activities? This relates to the need to map a catchment in biophysical, social and economic terms.
2. What are the most significant water-related risks to community, environment and development values in a particular catchment?
3. What are the priorities for water resource managers in managing risk for the short- and long-term?

Methodology

The methodology is flexible to allow for progressive development as the project team's understanding of the context evolves. The AWRF Team has developed this methodology building on its situational analysis of data collected on current issues for water research and development in the Solomon Islands. Undertaking research in a catchment case study enables the research to be based on a whole-of-water-cycle approach. Bayesian Networks are a tool for representing the interactions that control real world systems. They are essentially a diagram that shows the cause and effect relationships about particular systems that act as a tool for management decisions. Using this tool provides rigour to measuring the social, environmental and economic interactions within a catchment. A whole of water cycle approach will:

- Integrate water related issues
- Draw out links between water and poverty and health
- Lead to adopting long-term planning
- Encourage active community participation

The following outlines the main components of the research methodology.

1) Catchment selection

Selection of an appropriate catchment for the case study will be determined in conjunction with Solomon Islands Government (SIG) and AusAID based on criteria for a priority catchment. The following table presents catchments considered by the study and key characteristics of these.

The team recommends that the study be based on the ***Kongulai Catchment,*** the major water source to Honiara. Kongulai and the issues associated with urban supply were raised by many of the stakeholders interviewed during the situational analysis. Study of this catchment will have the greatest benefit in terms of capacity building with the Water Resources Division and SIWA, both of which are based in Honiara. Additionally, the framework for risk assessment and management prioritisation can be subsequently applied to other Provincial centres.

Table 1. Characteristics, issues and existing project activities underway associated with the Kongulai Catchment, Guadalcanal Province.

Characteristics	Major issues	Existing activities
- Kongulai the major source of water supply to 50-60% of Honiara population - There is a catchment protection area but difficult to enforce - There is a dam to supply the water, managed by SIWA. Dam is only filling up 50% capacity from before. - Up to 65% losses in water supply through leakage	- Reduction of water from source (50% previous capacity but cause unclear) - Compaction of aquifer - Logging in catchment - Illegal settlements in catchments with poor sanitation - Rapid population growth (currently 60,000, estimated to double by 2008) - Relationship with customary owners	- Water Governance reform through Water Resources Division (WRD/ SOPAC) - Urban Infrastructure Project (SIWA/ JICA)

Key stakeholders involved in the management and use of water of the Kongulai catchment include:

- Solomon Islands Water Authority (SIWA)
- Honiara City Council
- Water Resources Division
- Environmental Health, Ministry of Health
- Customary owners
- Illegal squatters

It is proposed that the AWRF research team initially partner with the Water Sector Steering Committee (Water Resources Division, Environmental Health and SIWA) and also include, where possible, lecturers and students from the Honiara campus of University of South Pacific. As the research program develops AWRF hopes to bring in NGOs working in related areas, including Live

and Learn. In principle agreement for this has been obtained from these organisations.

2) Develop conceptual framework and identify values. This will occur through workshop and consultation with key stakeholders to build an understanding of catchment interactions. Stakeholders will help build a conceptual map of the catchment identifying links between factors (for example, clearing and water availability).

3) Data collection. This stage will involve a mutual learning process with stakeholders to refine the conceptual framework and 'populate' it with data. The workshop will also identify data available and gaps in data. Through this process priority data requirements will be identified. Rather than averaging data across a catchment, information will be disaggregated to enable comparisons within and between catchments. Specific techniques will include a combination of one-on-one interviews and group discussions.

4) Model development. Convert data from workshop and consultation into a Bayesian Network and populate it with existing data.

5) Risk identification. Identifying risks using the conceptual framework will be undertaken with key stakeholders to relate threats to values and then calculate risks (= likelihood x consequences). Prioritisation of these risks by partners will assist in the prioritisation of management actions to protect water resources from identified risks.

Expected Results

- Conceptual map of Honiara catchment
- Capacity building with local counterparts (particularly Water Resources Division and SIWA)
- Practical usable framework for identifying values and risks in catchments that can be used more broadly within SI (e.g. in Provincial centres)
- Using newly established Water Sector Steering Group to collaborate around a specific activity/problem

ACADEMIC SIGNIFICANCE

While the need for interdisciplinary approaches is now well recognised in environmental management, particularly linking social and economic to biophysical environmental sciences, there is a recognised scarcity of approaches to achieve this. One of the needs recognised is for strong, interdisciplinary conceptual frameworks which provide a common language across disciplines and practical utility in synthesising and explaining phenomena. This project will develop and test a conceptual framework and risk assessment approach for catchment processes in Solomon Islands, which is readily adaptable to other developing and developed country contexts.

RELEVANCE TO AUSAID

Good water management is essential for long term planning in Solomon Islands, particularly as it relates to public health and broad based economic growth. Water is a cross cutting issue for the AusAID Solomon Islands program, affecting activities in Health, Agriculture and Rural Development, Forestry, Lands and Community Support. Developing the capacity for integrated water management through the Water Sector Group, and building a practical usable framework for identifying values and risks in catchments will benefit have benefits for water planning and allocation as it affects all of the activities mentioned. In addition, the AWRF team sees an opportunity for such a framework to be developed over the next two years into a tool for use by NGOs working in rural water supply and sanitation.

COLLABORATION

Key in-country counterpart proposed is the Water Sector Steering Committee which includes the Water Resources Division (Ministry of Mines and Energy), Environmental Health Division (Ministry of Health) and Solomon Islands Water Authority (SIWA). Given the focus in Kongulai catchment, SIWA will be the most relevant of these counterparts. SIWA is responsible for the management of supply to Honiara city. Water Resources Division is responsible for promoting the most efficient and beneficial use of water and the maintenance and improvement of the quality of all natural water, and Environmental Health Division for water quality.

In-country risk workshops will also involve community based organisations, NGOs and the private sector active in the case study catchment. The team will collaborate with the Water Sector Governance Program through the South Pacific Applied Geoscience Commission, and maintain communication with the JICA funded water infrastructure project.

COMMUNICATION OF RESULTS

Results will be reported in the following forms:

- Awareness raising materials for use within the Solomon Islands with key messages
- 'Plain English' reports and policy briefings to partners and AusAID as required
- Conference papers and publications in international journals of repute

RISKS

- SIWA does not have capacity for in-depth involvement in framework development
- Water Sector Steering Committee's focus on governance overshadows catchment management related work
- Bayesian Network approach too technical for uptake by Water Sector Steering Committee

AWRF PERSONNEL

Professor Helen Ross, Professor of Rural Community Development in the School of Natural and Rural Systems Management, the University of Queensland

Professor Mike Grace, Director, Water Studies Centre, and Professor in Environmental Chemistry, Monash University

Dr Terry Chan, Water Risk Assessment, Monash University

Bronwyn Powell, AWRF Program Officer and IWC Executive Manager

ANNEX G – Detailed research proposal for AWRF in Solomon Islands

AWRF WORK PLAN	2005-06								2006-07												2007-08												2008-09			
	N-05	D-05	J-06	F-06	M-06	A-06	M-06	J-06	J-06	A-06	S-06	O-06	N-06	D-06	J-07	F-07	M-07	A-07	M-07	J-07	J-07	A-07	S-07	O-07	N-07	D-07	J-08	F-08	M-08	A-08	M-08	J-08	J-08	A-08	S-08	O-08
SOLOMON ISLANDS																																				
Desk situation analysis complete																																				
Trip delays and tensions																																				
In-country situation analysis and data collection																																				
Development and preparation of consultative process/workshop																																				
Science, Technical and Research SOPAC meeting 21-24 Sept																																				
1st workshop held with Kongalai stakeholders																																				
Further data collection																																				
Develop and populate model																																				
Follow-up workshop on risk with stakeholders																																				
Work with SIWA to develop practical framework																																				
Write-up and publish results																																				
Review case study and expand to rural case study																																				
Further case study work and application of framework																																				

Annex H - Potential catchment areas for AWRF case study

Table of potential catchment areas considered for AWRF case study

Catchment	Characteristics	Major activities/ issues	Stakeholders	Existing activities
Honiara, Kongulai Catchment Guadalcanal Province ***Urban***	- Kongulai the major source of water supply to 50-60% of Honiara population - There is a catchment protection area but difficult to enforce - There is a dam to supply the water, managed by SIWA. Dam is only filling up 50% capacity from before. - 65% losses in water supply through leakage Area: Population: 60,000	- Reduction of water from source (50% previous capacity but cause unclear) - Compaction of aquifer - Logging in catchment - Illegal settlements in catchments with poor sanitation - Rapid population growth (currently 60,000, estimated to double by 2008) - Relationship with customary owners	- SIWA - Honiara City Council - Water Resources Division - Environmental Health, Ministry of Health - Customary owners - Illegal squatters	- Water Governance reform through Water Resources Division (WRD/ SOPAC) - Urban Infrastructure Project (SIWA/ JICA)
Marovo, Western Province ***Rural***	- Lagoon marine protected area previously proposed as World Heritage Area Area: 5,028km^2 Population: 62,739 (7,324 from wards 22,23 and 24 near the catchment) Households: 9,992	- Logging runoff affecting water supply, fishers, lagoon - Large-scale oil palm plantation - Potentially prospecting (mining)	- Western Provincial Government - Environmental Health (MHDS) - Villagers (Landowners) - Rural Water supply and Sanitation project (RWSSP)	- Coastal and reef management study by University of Queensland (MacArthur Foundation)
Aluta Basin, Malaita ***Rural***	Area: 4,200km^2 Population: 122,620 Households: 18,606 (8,588 from wards 14 and 15 near the catchment) Major activities in catchment:	- Possible of large-scale oil palm activity	Malaita Provincial Government Environmental Health (MHDS) Villagers (Landowners) Rural Water supply and Sanitation project (RWSSP)	- Oil palm activity planned (World Bank)

	logging and agricultural project (oil palm)		
Vachu Basin, Choiseul Province ***Rural***	Area: 3,837km^2 Population: 20,008 (6,859 from wards 6,7 and 8 near the catchment) Villages: Households: 3,142 Major activities in catchment: logging	- Logging runoff affecting downstream lives - Potential effect of prospecting (mining)	Choiseul Provincial Government Environmental Health (MHDS) Villagers (Landowners) Rural Water supply and Sanitation project (RWSSP)

** Other areas/catchments considered as second order priority for the case study were: Auki, Makira (Makira Province), Rennel Island (Central Province), Tetepare, Malaita (Malaita Province) and Buala (Isabelle Province)*