



## GOVERNMENT OF KIRIBATI

GoK(12)DPF.07

### DEVELOPMENT PARTNERS FORUM

*Tarawa, Kiribati*

25 – 27 June 2012

### AGENDA ITEM 6: WATER AND SANITATION ISSUES

#### Purpose

1. To inform the meeting on water and sanitation issues that the Government has identified as priorities for external funding to improve the health and welfare of the people of Kiribati.

#### Background

2. I-Kiribati have always recognised that freshwater is a precious and finite resource. Droughts are common and freshwater is often scarce. In recent times, especially in urban areas, population pressure due to inward migration and natural population growth has put pressure on the limited water resources available, and has resulted in contamination of local groundwater sources, causing an increase in waterborne diseases. These issues are expected to be further exacerbated in the future by climate change and continued population growth.
3. Addressing water and sanitation issues has been identified as being essential in improving the living standards and health of I-Kiribati, as well as being necessary in development and poverty alleviation throughout the nation.
4. A comprehensive and co-ordinated framework for leadership and action in the supply of safe, adequate and financially, technically and environmentally sustainable water services to rural, outer island and urban communities in Kiribati and for the protection, conservation, sustainable use and efficient management of Kiribati's water resources, the Government of Kiribati are contained in the *National Water Resources Policy (NWRP)* and accompanying *National Water Resources Implementation Plan (NWRIP)*. The two documents are approved by Cabinet in January 2009.
5. A *National Sanitation Policy (NSP)* and *National Sanitation Implementation Plan (NSIP)* were also submitted to Cabinet on 8<sup>th</sup> April 2010.
6. The four documents, *NWRP*, *NWRIP*, *NSP* and *NSIP*, are consistent with all local, regional and relevant international documents and initiatives and have been used as the

basis for drawing up a list of priority water and sanitation projects requiring donor funding as given in this document.

7. Improving water and sanitation for the outer islands of the Gilbert group is addressed through the EDF10: Water and Sanitation for Outer Islands project.

## Updates

8. Improvement of Water and Sanitation for the outer islands or the Kiribati Water and Sanitation (KIRIWATSAN) Project Phase I is now underway since 2011. An Office for the Project staff has been constructed within MPWU compound, and project staff is on board. Currently MPWU and MISA and other stakeholders are collaborating in carrying out community mobilization of the target 70 villages on the 16 selected Outer Islands. SOPAC is also to be contracted to conduct hydro-geological assessments on the selected villages.
9. Under KAPII Project, a Water System was installed at a Catholic Secondary School in N.Tarawa. Community Consultation was also carried out on the 2 of target villages (for water system installation) on North Tarawa.
10. Water and sanitation needs for the outer islands of the Gilbert group are thus not included in this funding proposal. This funding proposal instead focuses on the needs for the two urban centres, i.e. South Tarawa and Kiritimati Island.
11. Initial engineering and social study of sanitation system on South Tarawa have been done through ADB funded South Tarawa Water and Sanitation Improvement commencing in 2011. This also includes hydro-geological assessment of the ability of the groundwater resources underlying the urban development of South Tarawa to sustain fresh water, pour-flush systems. The draft Tarawa Water and Sanitation Roadmap document (Volume 1, 2 and 3) has been prepared which provides details of the results of this study. Detail costing including environmental pros and cons of the options in the Roadmap are yet to be prepared or made available.
12. Assessment of current PUB system in the Roadmap highlighted some urgent issues for the Water Sector: i) currently the Bonriki water reserve is being overpumped, ii) desalination plants seems to be a cost effective option to be adopted with 4 plants to be installed soon under the project iii) additional desalination plants is needed by 2020. The success of implementing or relying heavily on desalination for South Tarawa requires a combination of factors, from political will, technical aspects, as well as an extensive community education and awareness program, and capacity training of PUB staff to maintain the system, and assistance with water governance to ensure asset management plans are established and followed.
13. There are also issues highlighted in the Roadmap which constitutes major problems associated with sanitation facilities for South Tarawa i) The existing sewerage system on

South Tarawa is in a near state of collapse and it is proposed that rehabilitation be undertaken between 2012 to 2014 ii) Strategies need to be established and implemented to ensure effective ongoing operation and maintenance of the rehabilitated system including adequate resourcing, staff training and the provision of sufficient ongoing maintenance funding.

14. Under KAPII, training of PUB staff in leakage detection was undertaken, based on a small pilot zone in Betio. The results of this training/investigation revealed that there was minimal leakage from the distribution network in this pilot zone. According to ADB Water and Sanitation Project, the wastage associated with the current water supply system is as high as 67%. The primary source of this wastage is understood to be at the household supply level and is not associated with leakage from the transmission and distribution networks. Reducing this wastage would contribute to improved service (through higher pressures), an increase in water available for consumer use, reduction in cost of water delivered (pumping not being “wasted”), and improved water quality (less risk of contamination of water into the system).
15. It has been suggested that the water lens underlying Betio may be able to be cleaned to potable standards. While some people believe this will not be technically or financially viable, a technical study needs to be undertaken to categorically consider the issues to inform further discussion. Again, the recently completed draft Tarawa Water and Sanitation Road Map document concluded that it is not technically or financially viable to utilize the water lens underlying Betio as a potable water supply source.
16. Design work is currently being undertaken for an integrated rainwater harvesting scheme for the proposed new Betio Hospital Maternity Ward and the existing Betio Hospital main building. The components of the integrated rainwater harvesting scheme associated with the new Betio Hospital Maternity Ward are being undertaken utilizing funding from AusAID. The components of the integrated rainwater harvesting scheme associated with the existing Betio Hospital main building are being undertaken utilizing funding from the NZ Aid Programme.

#### **Issues not yet addressed**

17. A study of water and sanitation needs on Kiritimati Island was undertaken in 2006 by the ADB. This report identified improvements which need to be made if Kiritimati Island is to be able to support a significant increase in the population, as it in line with Government policy.
18. A community wastewater collection network in on South Tarawa is currently only available to the residents of Betio, Bairiki and Bikenibeu. This system, which uses salt water for flushing, is currently in very poor condition, and is in urgent need of rehabilitation. The remainder of the population of South Tarawa use septic systems (many of which are leaking and are inappropriately designed given the underlying water lens), pit latrines, or the beach or lagoon. Inadequate sanitation is believed to be partly

responsible for the very high incidence of water-borne illnesses and diseases on South Tarawa. Addressing this issue has thus been identified as being of critical importance.

19. The PUB water supply for South Tarawa does not extend to all areas of South Tarawa, and there are frequent complaints that the pressure is inadequate for filling the 500L household tanks. In addition there is frequent vandalism of the system. Improving the water supply to the residents of South Tarawa has two subcomponents: maintaining and upgrading and expanding the current system, and increasing the water available for supply.
20. The PUB rising mains and distribution pipelines are exposed in a number of locations, and as a result are regularly damaged. Particular areas of vulnerability are the rising main at Stewart causeway, and the distribution pipeline across the Tanea-Buota causeway. These lines need to be protected to ensure the security of supply.
21. Infilling the ponds on the western, lagoon side of the Bonriki reserve would enable more water to be pumped from the Bonriki water reserves. As these are normally brackish they contribute salinity to the groundwater in the water reserve. This land is already leased by the government as part of the water reserve; hence infilling this land will not affect any settlements. After infilling, several more pumps and galleries could be constructed on the water reserve.
22. Removing some trees and deep rooted vegetation from the centre of the Bonriki water reserve, and perhaps from Buota water reserve, would enable the water reserve to be pumped at a higher rate. A coconut tree consumes up to 150L of water per day, which is the potable water allocation of over three people. As the trees are on the water reserve, thinning the tree population down should not impact on the local population.
23. It has long been suggested that an islet be created in the sand flats of North Tarawa to create a water lens for meeting the needs of South Tarawa. There is considerable uncertainty with regards the environmental impacts, financial cost, feasibility, vulnerability to climate change, and social impacts of such an islet. A prefeasibility study to investigate the environmental, hydrological, financial, legal, cultural and social issues needs to be undertaken to inform further discussion. This is not a commitment to construct such an islet, merely to look at the issues involved.
24. Redirecting rainwater runoff that is excess to that being collected directly into the groundwater via exfiltration galleries may improve the quality of freshwater, especially in larger population centres. A pilot project to investigate whether this will actually result in measurable benefits is required.
25. The water and sanitation systems at the various medical facilities (Tungarau central hospital, Betio hospital, various clinics) on South Tarawa are in a very poor state. This not only has a detrimental effect on patient care, but it can also result in significant wastage of water. An example of the latter is at the Tungaru Central Hospital. While this

hospital has a very extensive network of in ground rainwater tanks, which would have enabled the hospital to be almost independent of the PUB supply in the past year, as the pumps are currently broken none of this rainwater has been able to be accessed.

26. Under KAPII, a Consultant was tasked with undertaking a detail audit of water and sanitation facilities at Tungarau Central Hospital. He has identified over \$1,600,000 worth of improvements to be made to the delivery system and the facilities themselves (toilets, showers, basins, sluices, laundry etc), with a further \$1,315,000 being required for a waste water treatment plant to prevent hospital waste being pumped to the edge of the nearby reef. Please note that KAPII only has a budget of up to about \$200,000 for improvements, which will be spent on the delivery system, not on any improvements to facilities.
27. A similar audit of water and sanitation facilities to that undertaken at Tungarau Hospital is required for Betio Hospital, and the various clinics. It is expected that extensive improvements will also be required at Betio Hospital, including water treatment, rehabilitation of toilet blocks, showers, sluices, water for kitchen, etc. Improvements for clinics should be on a much smaller scale.
28. Water and sanitation on medical facilities on the outer islands should be adequate as these facilities have all been very recently built or refurbished.
29. While there is generic understanding of the potential effects of climate change on water lens in South Tarawa (eg through overtopping, reduction in thickness of water lens as the sea level rises and land area is reduced etc), there is no quantitative analysis. Such a study would provide useful information for planning, and for background information at climate change related meetings, and for applying for donor funding. There have been calls for such a study, but current topographic data is inadequate to support such an undertaking (current topographic data has contour intervals of 1 m, whereas contour intervals of 0,1m are required). Thus funding of a detailed topographic (probably aerial) study of South Tarawa is required. The information obtained would also be extremely useful for other land planning activities.
30. A range of water and sanitation-related awareness raising and social marketing programs are required, including covering installation and maintenance of rainwater harvesting systems; safe water projects (teaching households to undertake audits of their water supply as well as education re washing hands, other means of sterilizing water, non contamination of water in the home, well protection etc); water conservation programs (including leakage issues such as dripping taps, drought programs, and responsible water usage); stewardship of the water reserves; assist and support communities in the development of community water and sanitation committees. The focus of these programs will generally need to be quite different for urban and rural area.
31. Capacity building in a range of fields is required to support the water and sanitation sector eg., training of water technicians, plumbers, secondment of a sanitation engineer to the MPWU, and perhaps to PUB, assistance to Councils re implementation of water

related sections of the building code. Much of this would be undertaken concurrently with other larger-scale projects, but should not be limited to these projects.

## **Recommendations**

Funding priorities have been identified as follows:

### **(ii) Improvements to sanitation on South Tarawa.**

- Extension of the existing ocean outfalls into the deep water zone to ensure effective dilution.
- Improvement of the existing saltwater flushing system on South Tarawa
- Review and revision of the current PUB Ordinances to provide a comprehensive and effective water and sanitation legal framework for Kiribati.
- On acceptance and endorsement of draft Tarawa Water and Sanitation Road Map by Cabinet, undertake the capital works required. This may include i) the installation of new facilities and/or rehabilitation, expansion of the current system ii) installation of communal sanitation facilities for villages currently not connected to the existing system.
- A complimentary and extensive community education and awareness program should be undertaken in conjunction with the capital works. There will also need to be extensive capacity training of PUB staff to maintain the system, and assistance with sanitation governance to ensure asset management plans are established and followed.

### **(iii) Improvements to water supply on South Tarawa.**

- Undertake a detailed assessment of loss/wastage from the transmission and distribution pipelines and household supply connections for all of South Tarawa.
- A complimentary and extensive community education and awareness program should be undertaken to address system leakage at household level (which is estimated to be around 80% of the overall leakage to the PUB system).
- Protection of PUB assets, particularly rising mains and distribution pipelines, where they are most vulnerable as well as the infrastructure on the Tarawa Water Reserves.
- Protection of the Tarawa Water Reserves on Bonriki and Buota which are in danger of encroachment and vandalism.

- Infilling the ponds on the western, lagoon side of the Bonriki reserve to increase capacity of Bonriki water reserve.
- Removal of some trees and deep rooted vegetation from the centre of the Bonriki water reserve and perhaps from Buota, to increase the sustainable yield of the reserves.
- Review the results of the study assessing the feasibility (technical, financial, sustainability issues) of cleaning water in Betio water lens to potable standard and confirm the study recommendations.
- Arrange for a presentation of the key water supply improvement findings contained in the draft Water and Sanitation Roadmap document to be made to Cabinet and seek endorsement of the proposed strategy and action plan associated with water supply and sanitation improvement.
- Undertake a pilot project to determine the potential benefits from artificial recharge of groundwater lenses using run-off water.
- Increase rainwater harvesting facilities (tanks and guttering) for maneabas, churches and government offices and businesses, and possibly at household level.
- Improvement of household connections to water distribution network
- Undertake a thorough cost-benefit analysis of relying heavily on desalination for potable water supply for South Tarawa in future.

**(iv) Improvements to water and sanitation supplies for medical facilities on South Tarawa.**

- Undertake improvements to Tungarau Central Hospital as already identified in a recent study.
- Undertake a study of the needs for the Betio Hospital and various clinics (taking into account the current rainwater harvesting project proposed for the new Betio Hospital Maternity Ward and Betio Hospital Main Building), and implement the improvements identified.