

SECTOR ASSESSMENT (SUMMARY): INFORMATION AND COMMUNICATION TECHNOLOGY

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. **Sector Overview.** Tonga has a population of about 102,000 and a high adult literacy rate of 99.2%. A Tongan diaspora of about 100,000 lives in Australia, New Zealand, and the United States and is a major contributor to the economy and the level of voice traffic. Tonga Power, the only provider of electrical power in Tonga, has about 20,000 subscribers and reaches 95% of the population. More than 70% of the population lives on Tongatapu where the capital Nuku'alofa is located.

2. Tonga was the first country in the Pacific to liberalize its telecommunications sector. Since 2002, access to basic telecommunications has increased significantly in Tonga. Retail tariffs for voice services in Tonga are among the lowest in the region and Tonga's level of penetration of mobile services is among the highest (about 60%). Broadband internet access, however, remains extremely limited in terms of penetration primarily because of its high cost and poor performance. Furthermore, actual download speeds experienced by users are estimated to be less than 30% of those achieved where supply is not restricted.¹

3. The principal constraint to further telecommunications and hence information and communication technology (ICT) development in Tonga is the lack of affordable good quality internet access because of the limited availability and high cost of international bandwidth resulting from Tonga's total dependence on expensive and scarce satellite capacity. This poor performance of internet service in Tonga has a negative effect on commercial and day-to-day life in Tonga. Tongans have difficulties conducting online transactions, and e-services like distance learning and telemedicine are virtually impossible. Recent empirical studies illustrate the disadvantages caused by the lack of access to broadband internet imposes in Tonga. A 2007 study estimated that for every percentage point increase in broadband penetration in a particular area, employment would increase 0.2%–0.3% per year.² A 2009 World Bank study indicates that a 10% increase in broadband penetration has led to a 1.38% increase in gross domestic product growth in low- and middle-income countries.³

4. **Operators, services, and competition.** Tonga Communications Corporation (TCC) and Digicel Tonga are the only two existing licensed telecommunications operators. TCC is the only provider of fixed line services, and subscribers are estimated at 26,000. A full range of national and international mobile voice services are provided by both operators, and the penetration is over 60%.⁴ Mobile tariffs in Tonga are among the lowest in the Pacific. Mobile data (Edge) service is now offered by both operators but is not seen as drivers of bandwidth or revenue because of the prohibitively high cost of the more sophisticated mobile handsets. Given the size of population and the high level of penetration, it is unlikely that another operator would enter the market without regulated infrastructure sharing.

¹ ADB. 2010. *ICT-based Inclusive Growth and Poverty Reduction in the Pacific*. Consultant's report. Manila (TA 7399-REG).

² R. Crandall, W. Lehr, and R. Litan. 2007. *The Effects of Broadband Deployment on Output and Employment*. <http://www.brookings.edu/views/papers/crandall/200706litan.pdf>

³ World Bank. 2009. Extending Reach and Increasing Impact. *Information & Communications Technology for Development*. Washington DC: World Bank.

⁴ Welcoming remarks by the Prime Minister of the Kingdom of Tonga at the Pacific ICT Ministerial Meeting. Nuku'alofa. 19 February.

5. Although five internet service provider (ISP) licenses have been issued, only TCC and Digicel are active. Both operators provide a number of plans ranging from 128/64 kilobyte per second (Kbps) to 512/128 Kbps. The overall internet broadband penetration rate is about 2.5%. One of the non-active license holders advised that the cost of entering the market has been prohibitive since they would have to provide their own satellite facilities as no wholesale offering is available. It is highly likely that at least one additional ISP would enter the market if an adequate supply of lower cost wholesale internet access and a supportive regulatory environment existed. Increased competition would help drive down prices, improve performance, and encourage the growth of innovative and value-added services.

6. **Infrastructure, networks, and technology issues.** Digicel and TCC completely rely on satellite for international connectivity. At about \$3,600/megabyte per second (Mbps)/month, this is typically four times that available on a submarine cable system. Satellite's inherent "round-trip" time delay (latency) can cause problems for some interactive internet applications, and services can be interrupted for up to 8 hours during hurricanes. Total demand for bandwidth is projected to increase from the current level of about 44 Mbps to 1.4 gigabyte per second (Gbps) by 2020, driven primarily by increased demand for broadband internet access.⁵ Such an increase in demand cannot be met by the current satellite capacity. The planned Tonga–Fiji submarine cable, scheduled for service by late 2013, will remove this dependency and should reduce the cost of international bandwidth by at least 50% while providing a more secure service. Following the arrival of fiber-optic international submarine cables in Kenya in 2009 and 2010, Kenya's telecommunications and broadband prices have fallen by 90%, enabling far cheaper tariffs for calling and internet services.⁶

7. At the national level, Tongatapu's infrastructure is adequate for the current internet services provided. In Nuku'alofa, fiber-optic cable and WiMax provide higher bandwidth services to businesses. The islands of Ha'apai and Vava'u are linked by satellite to the operators' international gateways in Nuku'alofa, which results in reduced quality of international service because of the "double-hop."⁷ A plan to link the three islands by domestic fiber-optic submarine cable has been discussed, but it may not be feasible because of the high capital cost. A terrestrial microwave system, with the latest technological advances, could provide adequate capacity to the islands in the near future at a fraction of the cost of a submarine cable system.

8. Following the introduction of affordable quality internet access, bandwidth-hungry applications such as video content for entertainment and distance learning purposes will fuel a drastic increase in demand. This will call for greater national backbone and "last-mile" (connection between backbone and user premises) capacities. Tonga Power has a plan for carrying fiber-optic cables on its power poles and offering wholesale capacity to interested parties. It would provide new ISPs with the infrastructure needed to enter the market, and offer future-proof backbone and access options to TCC and Digicel.

9. **Regulatory environment and institutional capacity.** The Government of Tonga is supportive of pro-competition reforms. Although the Communications Act 2000 provided a framework for a liberalized telecommunications market, it does not detail how those principles

⁵ Tonga Cable Limited. 2010. *TCL Business Case - Demand Projections*. Consultant's report. Unpublished.

⁶ Paul Budde Communication. 2010. *Kenya - Convergence, Broadband & Internet Markets*. <http://www.budde.com.au/Research/Kenya-Convergence-Broadband-Internet-Markets.html>

⁷ For international calls or internet access, communication signals from outer islands have to be transmitted twice via satellite.

are to be implemented. The Act primarily lacks detailed guidance for transparency, equality of access, and cost-based tariffs.

10. A potential conflict of interest exists where the government is the policy maker, regulator, and owner of the incumbent telecommunications operator, TCC. The government has been exploring the option of establishing a utility regulatory body covering water, electricity, telecommunications, and waste management, but it has not been implemented as of 2010. With change in government and fiscal difficulties in recent years, the government may not be able to commence institutional reform to establish an independent regulator. The Ministry of Information and Communication (MIC) would need time and resources to build its organizational and technical capacity to implement the reform initiatives.

11. The success of the proposed Tonga–Fiji submarine cable calls for a regulatory environment that will enable the provision of wholesale international connectivity capacity which is cost-based, transparent, and available on an equal basis to telecommunications operators and ISPs. Therefore, the regulatory body's capacity to develop relevant regulations and monitor compliance will be critical.

12. The proposed World Bank TA has identified key areas for regulatory reform which include (i) improving transparency in decision making in policy and regulatory issues; (ii) improving licensing regime and cost-based pricing; (iii) equitable access to the existing network infrastructure including the TCL's cable. Many of these will require amendments to the Act, which would take time. To address immediate requirements, the Asian Development Bank (ADB) has assisted the government to develop TCL's license with detailed terms and conditions that would ensure equitable and transparent access to the submarine cable capacity. In addition, ADB has advised the government to improve TCL's ownership and governance arrangements for independent and unbiased operation.

2. Government's Sector Strategy

13. The government developed a National ICT Strategic Plan in June 2009.⁸ It states that the government fully appreciates the vital role of ICT in national development. The need for (i) an enabling technical infrastructure and (ii) relevant legislation is emphasized as fundamental to the success implementation of focus areas, i.e., (a) connecting homes and communities; (b) education and skills development; (c) e-government; and (d) industry growth and economic development.

14. The government also recognizes the central role of the telecommunications sector in the country's economic and social development. The National Infrastructure Investment Plan of July 2010 mentions telecommunications as one of four major infrastructure initiatives. The National Infrastructure Investment Plan identifies high prices and poor internet performance as constraints to the development of new internet-based community applications and local business opportunities as well as impeding the introduction of internet-based government services. The planned Tonga–Fiji submarine cable is listed as one of the 11 top priority investments for 2011–2015.

3. ADB Sector Experience and Assistance Program

16. ADB has, up to the early 2000s, contributed to improving Tonga's domestic telecommunications infrastructure by enabling access to basic telecommunication services in

⁸ Government of Tonga. 2009. National ICT Strategic Plan. Nuku'alofa.

Tongatapu and the main outer islands.⁹ Moving into the new millennium, globalization and digitalization offer challenges and opportunities, particularly for small and isolated Pacific developing member countries (DMCs). ADB's Pacific Approach 2010–2014 prioritizes ICT to improve connectivity among Pacific DMCs and between Pacific DMCs and the rest of the world.¹⁰ Regional policy and advisory technical assistance (R-PATA) for ICT-based inclusive growth and poverty reduction will support regional knowledge sharing and identify new investment opportunities for ICT applications.¹¹

17. Pacific DMC stakeholders—government and private sector alike—have called for development partners' support to improve international connectivity beyond the current satellite links.¹² The World Bank's study in 2009 assessed the feasibility of submarine cables for the Pacific island countries.¹³ Submarine cable development carries a high risk for private sector investment as it requires (i) a large up-front capital investment with a long return period, and (ii) an enabling regulatory environment to realize the expected impact. Catalytic public investment and facilitation for regulatory improvement can reduce the risk and encourage private sector investment.

18. Following the 2009 assessment, the World Bank is developing a Pacific Regional Connectivity Program (PRCP), which will connect Samoa, Solomon Islands, Tonga, and Vanuatu by submarine fiber optic cables to the existing global international submarine cable network. The program will provide technical assistance on regional regulatory harmonization and capacity building in coordination with the Pacific Region Infrastructure Facility. The Government of France has been considering a submarine cable system to link its territories in the Pacific, and it may offer opportunities for ADB Pacific DMCs to link. Pacific Fiber, a proposed trans-Pacific cable linking Australia, New Zealand, and the United States, may also open options for some countries.

19. ADB will support the subprojects of PRCP through a project preparatory technical assistance to ensure the design quality of the subprojects and by financing key components upon request by relevant Pacific DMCs.¹⁴ Through the R-PATA, ADB will support other Pacific DMCs in assessing the feasibility of future investment options for further international connectivity and identifying appropriate applications for inclusive growth and poverty reduction.

⁹ ADB. 1973. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Tonga for the Telecommunications Project. Manila; ADB. 1979. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Tonga for the Multiproject Loan. Manila; ADB. 1986. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Tonga for the Third Multiproject and Tonga Development Bank Project. Manila; and ADB. 2001. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Tonga for the Outer Islands Agriculture Development Project. Manila.

¹⁰ ADB. 2009. *ADB's Pacific Approach 2010–2014*. Manila.

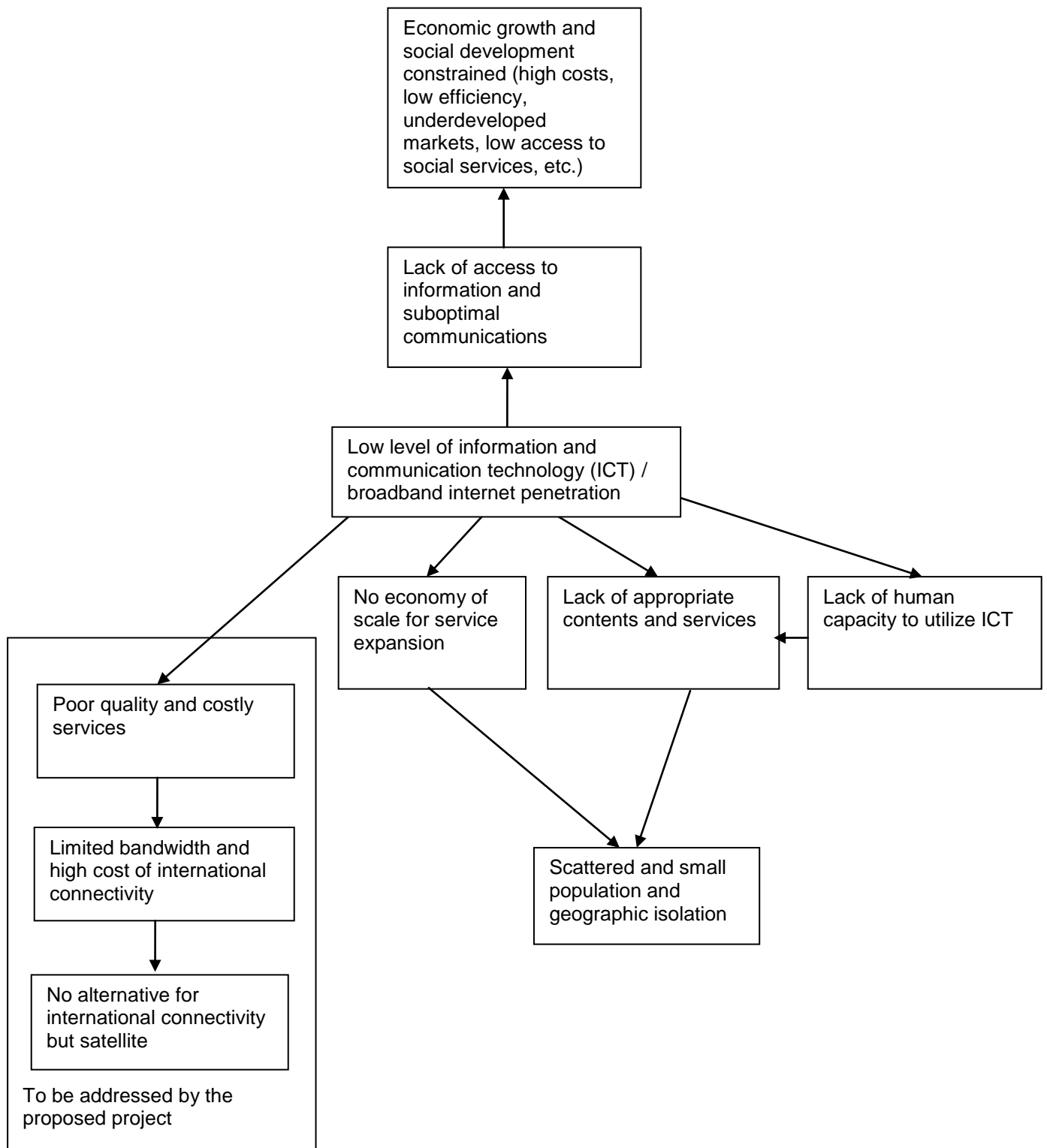
¹¹ ADB. 2009. *Regional Policy and Advisory Technical Assistance: Information and Communication Technology-Based Inclusive Growth and Poverty Reduction in the Pacific*. Manila.

¹² Pacific Islands Forum Secretariat. 2009. *The Pacific Regional Digital Strategy*. Suva.

¹³ World Bank. 2009. *Regional Telecoms Backbone Network Assessment and Implementation Options Study*. Consultant's report. Unpublished.

¹⁴ ADB. 2011. *Regional Project Preparatory Technical Assistance: Pacific Regional ICT Connectivity Project (Phase 2)*. Unpublished.

Problem Tree for Information and Communication Technology Subsector



Sector Results Framework (Information and Communication Technology, 2011–2015)

Country Sector Outcome		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contributions	Indicators with Targets and Baselines	Outputs with ADB Contributions	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Contributions
Strengthened private sector enabling environment (Strategic Development Plan 8, Goal 3: Promote sustained economic growth led by the private sector)	Increase in private investment/GDP ratio from 17.5% (baseline, FY2004) to 23% (in FY2012)	The population on Tongatapu has access to good quality broadband internet services at a lower price.	<p>By 2016, the number of broadband internet service subscribers has increased by at least 50% and the internet retail tariffs have decreased by at least 50% against the 2011 baseline.</p> <p>An industry standard internet speed test shows at least a 100% improvement against the 2011 baseline within 6 months of TCL capacity being used by ISPs.</p>	(i) Planned Key Activity Areas: Tonga–Fiji Submarine Cable project (\$9.7 million)	<p>(i) Planned Key Activity Areas: The Tonga–Fiji submarine cable system is in service and being efficiently operated by TCL.</p> <p>Effective implementation of regulations on open and fair access and transparent cost-based pricing by the national regulatory authority</p>

ADB = Asian Development Bank, FY = fiscal year, GDP = growth domestic product, ISP = internet service provider, TCL = Tonga Cable Limited.

Source: Asian Development Bank.