

Validation Report
December 2018

Bhutan: Urban Infrastructure Development Project

Reference Number: PVR-551
Project Number: 38049-013
Loan Number: 2258



Raising development impact through evaluation

ABBREVIATIONS

ADB	–	Asian Development Bank
DMF	–	design and monitoring framework
DUDES	–	Department of Urban Development and Engineering Services
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
km	–	kilometer
LAP	–	local area plan
m ³	–	cubic meter
MOWHS	–	Ministry of Works and Human Settlement
MT	–	metric ton
O&M	–	operation and maintenance
PCC	–	Phuentsholing City Corporation
PCR	–	project completion report
PIU	–	project implementation unit
PMU	–	project management unit
PSC	–	Project Steering Committee
SDR	–	special drawing right
TA	–	technical assistance
TCC	–	Thimphu City Corporation
UFW	–	unaccounted-for-water
WTP	–	water treatment plant
WWTP	–	wastewater treatment plant

NOTE

In this report, “\$” refers to United States dollars.

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PROJECT BASIC DATA

Project Number	38049-013	PCR Circulation Date	12 September 2017	
Loan/Grant Number	2258	PCR Validation Date	Dec 2018	
Project Name	Urban Infrastructure Development Project			
Sector and subsector	Water and other urban infrastructure and services Transport	Other urban services; urban policy, institutional and capacity development; urban sanitation; urban sewerage; urban solid waste management; urban water supply Urban roads and traffic management		
Strategic agenda	Environment sustainable growth			
Safeguard categories	Environment		B	
	Involuntary Resettlement		A	
	Indigenous Peoples		C	
Country	Bhutan		Approved (\$ million)	Actual (\$ million)
ADB Financing (\$ million)	ADF: 24.60	Total Project Costs	30.75	30.25
	OCR: 0.00	Loan/Grant		
		Loan 2258	24.60	23.56
		Borrower	6.15	6.69
		Beneficiaries	0.00	0.00
	Others	0.00	0.00	
Cofinancier		Total Cofinancing	0.00	0.00
Approval Date	27 Sep 2006	Effectiveness Date	31 Jan 2007	31 Jan 2007
Signing Date	30 Oct 2006	Closing Date	31 Dec 2012	31 Aug 2016
Project Officers	T. Ueda R. Barba R. Slangen P. Cawrse K. Tamaki	Location ADB headquarters ADB headquarters ADB headquarters ADB headquarters ADB headquarters	From Jan 2007 Oct 2007 Dec 2011 May 2012 May 2015	To Sep 2007 Nov 2011 Apr 2012 Apr 2015 Aug 2016
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ADB = Asian Development Bank, ADF = Asian Development Fund, IED = Independent Evaluation Department, IESP = Sector and Project Division, OCR = ordinary capital resources, PCR = project completion report.

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I. PROJECT DESCRIPTION

A. Rationale

1. Urban infrastructure facilities and basic services in Bhutan required improvement, upgrading, and expansion at the time of project appraisal in 2006. The demand for urban services and strengthened urban management in Thimphu and Phuentsholing as a result of high levels of

rural to urban migration and the resulting urban sprawl, required intervention.¹ The Government of Bhutan requested the Asian Development Bank (ADB) to provide financial and technical assistance² to improve urban infrastructure and services in Bhutan's two largest cities, Thimphu and Phuentsholing, particularly in the cities' newly expanded areas. The government also asked for support in developing Dagana, one of the regional centers not previously assisted under aid programs. It should be noted that Dagana has a limited tax revenue base due to its classification in the non-urban category, and its administration's operational expenses depend entirely on central government subsidy e.g., for developing, maintaining, and operating public infrastructure and services in its jurisdiction.

2. The coverage of the Bhutan Urban Infrastructure Development Project involved the improvement, upgrading, and extension of urban infrastructure and services in Thimphu and Phuentsholing, and one regional center, Dagana.³ The project had five components: (i) improvements in Thimphu's water supply, wastewater treatment, solid waste management, and local area infrastructure development; (ii) enhancement of roads and footpaths, and social infrastructure in Phuentsholing; (iii) improvements in water supply, roads, and drainage and sanitation in Dagana; (iv) technical support through capacity building and training; and (v) project implementation support. There were two special features: (i) public awareness support and (ii) land pooling.⁴

B. Expected Impacts, Outcomes, and Outputs

3. The project's impact was improved standard of living and sustained economic growth in Thimphu, Phuentsholing, and Dagana. The outcomes were (i) improved urban infrastructure planning and management; (ii) improved road access and drainage in South Thimphu, Phuentsholing, and Dagana; (iii) increased quantity and improved quality of water supplied in project areas; (iv) broadened sanitation coverage in project areas; (v) improved solid waste management in Thimphu; (vi) improved community awareness on solid waste disposal, hygiene, and sanitation; and (vii) increased capacity of the Thimphu City Corporation (TCC), Phuentsholing City Corporation (PCC), and Dagana Dzongkhag (district or province) to undertake operational and management activities and reduce unaccounted for water.

4. The project's outputs were:

- (i) **Component A: Thimphu urban improvement.** These were city-level improvements in urban water supply, sanitation, and solid waste management; and urban development in four local areas in South Thimphu comprising of new urban road networks, utility conduits, and drainage connection in project areas in South

¹ The 2005 national population and housing census confirmed that Thimphu's urban population had increased at an annual average rate of 12.6% from 2000 to 2005. The total migration to Thimphu from other districts was estimated to be 34,378 people. National Statistics Bureau. 2008. *Socio-Economic and Demographic Indicators*.

² ADB provided five technical assistance (TA) projects in the urban sector since 2000. These included two project preparatory TAs to conduct detailed feasibility studies for two loans to the urban sector. ADB's support in the sector increased substantially through the Urban Infrastructure Improvement Project, completed in June 2005. This was followed by the current project, and both loans focused on urban areas in Thimphu and Phuentsholing municipalities and in Dagana.

³ ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant. Kingdom of Bhutan: Urban Infrastructure Development Project*. Manila.

⁴ Land pooling is a technique used to redefine ownership of land in a way that creates a new configuration of plots that is more appropriate for urban structures and uses. Urban land development is realized through the contribution of a certain portion of land from each owner proportionate to the holdings, which produces sufficient land for the provision of public roads, infrastructure, social facilities, and open space.

Thimphu, and water supply and sewerage networks in project areas in South Thimphu.

- (ii) **Component B: Phuentsholing urban improvement.** These consisted of improvements in road network, junctions, footpaths, and parking lots; and establishment of social infrastructure including an archery ground, a pedestrian bridge, footpaths, and street lights.
- (iii) **Component C: Dagana urban improvement.** These comprised construction of water supply and sanitation facilities in Dagana as well as new urban roads and drainage in central areas of Dagana.
- (iv) **Component D: technical support.** This included providing support on raising public awareness support and improving operational efficiency.
- (v) **Component E: project management support.** This involved delivering assistance to the project management unit (PMU) to support project implementation unit (PIU) design, monitoring, and supervision.

C. Provision of Inputs

5. An ADB loan from its ordinary capital resources was approved on 27 September 2006 and became effective on 31 January 2007. The loan closed on 31 August 2016, some 3 years and 8 months after the original approved closing date of 31 December 2012. The delay in completion was due to (i) the underestimation at appraisal of the time needed to obtain the landowners' agreements for land pooling, as based on the project completion report (PCR),⁵ a total of 99 hectares (composed of fragmented and at times untitled land parcels) was needed to establish the urban infrastructure facilities of the project; (ii) the underestimation of the difficult terrain and climatic working conditions,⁶ including delays in the slope stability study for Dagana; (iii) time setbacks in the procurement of civil works because bidders were unable to fulfill tender requirements necessitating re-tendering; and (iv) land acquisition problems i.e., delay in obtaining 100% agreement, which hindered the timely commencement of some of the civil works contracts.

6. The total project cost was estimated to be \$30.8 million equivalent at appraisal. ADB would provide a loan of \$24.6 million, 80% of the total cost, while the government was to finance \$6.2 million. At completion, the project cost was \$30.3 million—\$23.6 million or 78% from the ADB loan and \$6.7 million or 22% from the government. Loan reallocation in April 2015 increased the civil works proportion with reductions in the amount allocated to equipment and unallocated funds.⁷

7. International consulting firms were engaged as (i) project management consultants (51 person-months, international and 179 person-months, national) to assist the PMU and (ii) design, monitoring, and supervision consultants (49 person-months, international and 68 person-months, national) to assist the PIUs. Consulting services were allocated SDR1.76 million, with a total utilization of SDR1.18 million at project completion. An attached

⁵ ADB. 2017. *Completion Report: Urban Infrastructure Development Project in Bhutan*. Manila.

⁶ For example, there was a delay in the package *Construction of Intake, Water Supply Main Chamgang, and Water Supply Lines for Thimphu* attributed to the long time required to haul heavy ductile iron pipes due to the steep topography, which was compounded by the cold weather, resulting in harsh working conditions.

⁷ Civil works utilization increased, including water supply for all four project areas under land pooling. At completion, civil works comprised 88% of the total loan amount compared to 55% at appraisal. The largest difference was for equipment, amounting to a 10% reduction of the original allocation of \$3.1 million. The government's decision not to install mechanical aerators at the wastewater treatment plant (WWTP), but instead upgrade it to a sequencing batch reactor under a different ADB loan, reduced disbursements for equipment. Expenditures for training, surveys, project management, vehicle rental, and office equipment were also lower. The largest component of this was training, which was originally allocated \$819,697, but only 9% of this was spent.

technical assistance (TA) project in the amount of \$250,000 was approved in September 2006. The TA project was effective December 2006 and was completed in December 2009, after a 1-year extension from the original approved closing of December 2008, to enable the completion of surveys and databases on unaccounted-for-water (UFW) by the implementing agency.⁸ The attached TA project was implemented by ADB and the Ministry of Works and Human Settlement (MOWHS) acted as the executing agency. The TA project supported the Department of Urban Development and Engineering (DUDES) in developing a solid waste management strategy and action plan for Thimphu, a geotechnical and slope stability study in Dagana, UFW reduction and water calibration, and land pooling and urban facility management. The TA project was rated successful in the PCR.

8. The project was category B for environmental safeguards and A for involuntary resettlement. All landowners, although project beneficiaries, were considered affected persons. The project was category C for Indigenous Peoples. These ratings on safeguards can be considered as appropriate, based on prevailing conditions stated at project appraisal and appropriate actions by relevant agencies during project implementation.

D. Implementation Arrangements

9. DUDES was the executing agency of the project and the implementing agencies were the TCC for component A, PCC for component B, and Dagana Dzongkhag for component C, and DUDES for components D and E. This was in line with the arrangements proposed at appraisal. A PMU was established at DUDES, which was headed by a project manager. A central Project Steering Committee (PSC) chaired by the secretary of the MOWHS facilitated coordination among ministries, the executing and implementing agencies, and relevant stakeholders. The PSC provided overall guidance and oversight to the PMU and PIUs.⁹ Three local PSCs were also established in Thimphu, Phuentsholing, and Dagana, which were chaired by the TCC *thrompon* (mayor), the PCC *thrompon*, and the Dagana *dzongda* (district or province) to coordinate and provide guidance to the PIUs for local implementation.

10. There were 55 loan covenants, of which 54 were fully complied with according to the PCR (footnote 5). The project partly complied with the covenant on water and wastewater tariff increases of 6% per annum until 2012. Only three increases took place during project implementation, instead of the proposed annual increases, which were at 7% instead of 6% per annum. However, there were delays in complying with the covenants related to securing a 100% agreement from landowners for land pooling—this was resolved by introducing a pilot area, which was a contiguous portion of the local area plans where 100% agreement with landowners had already been reached.

II. EVALUATION OF PERFORMANCE AND RATINGS

A. Relevance of Design and Formulation

11. The PCR rated the project highly relevant. At the time of project preparation, urban infrastructure facilities and basic services in Bhutan needed improvements to better absorb

⁸ ADB. 2010. *Technical Assistance Completion Report: Capacity Building in Urban Infrastructure Planning and Management in Bhutan*. Manila (TA 4844-BHU).

⁹ The PSC was tasked to: (i) meet at least quarterly or more frequently if required; (ii) provide guidance for, and ensure the implementation of policies for the project; (iii) assist in resolving interagency implementation problems; (iv) review relevant reports and audit statements from the PMU and PIUs; and (v) ensure that conditions of the project agreements with ADB were met.

migration to the major cities. Problems with existing infrastructure were evident—there was inadequate water supply for the increasing population, wastewater and solid waste systems had either been reached or were close to capacity, and inadequacies in other urban infrastructure and services were present. The project design was responsive to the government's development plan set out in 2008, the Bhutan 2020 vision,¹⁰ its National Poverty Reduction Strategy,¹¹ and the five-year plans. The *Eighth Five-Year Plan, 1998–2003* stressed the need to provide basic urban services.¹² The *Ninth Five-Year Plan, 2003–2008* focused on poverty reduction and devolution to local governments.¹³ The project design was aligned with the draft Bhutan Urban Development Act, which included provisions for planned development and management of urban land and land pooling.

12. The project outcomes were aligned with ADB's Country Strategy and Program in Bhutan,¹⁴ supporting the overarching goal of poverty reduction through economic diversification. Development strategies for achieving this included infrastructure improvements and basic skills development. To avoid duplication of interventions by other development partners, and based on an agreement with government, ADB continued to assist the towns of Thimphu and Phuentsholing and also took up one of the remaining *dzongkhag* towns, Dagana. Since there was a need for infrastructure development in the newly extended areas of Thimphu, the government, ADB, and the World Bank agreed to split assistance in local area development geographically. ADB financed development in South Thimphu, and the World Bank did the same in the northern areas.

13. The time needed to obtain landowner agreements for land pooling was underestimated largely, and the project design should have considered the potential implementation difficulties more thoroughly. The difficult terrain and climate issues should have been anticipated and re-tendering delays foreseen.¹⁵ The design for the upgrading of the wastewater treatment plant (WWTP) in Babesa was inadequate¹⁶ and the subproject was cancelled from the project but eventually incorporated into a subsequent loan.¹⁷ The project design manifested these weaknesses, and these would have inhibited the achievement of the outcome had measures not been introduced to improve the design during implementation, e.g., land pooling (para.10). Land pooling was a useful innovation, and this validation considers the project relevant based on government needs and ADB's country strategy, despite a few deficiencies in project design.

¹⁰ Royal Government of Bhutan, Planning Commission. 1999. *Bhutan 2020: A Vision for Peace, Prosperity and Happiness*. Thimphu.

¹¹ Royal Government of Bhutan, Ministry of Finance. 2004. *Poverty Reduction Strategy Paper*. Thimphu.

¹² Royal Government of Bhutan. *Eighth Five-Year Plan (1998–2003)*. Thimphu.

¹³ Royal Government of Bhutan, Gross National Happiness Commission. *Ninth Five-Year Plan (2003–2008)*. Thimphu.

¹⁴ ADB. 2005. *Country Strategy and Program: Bhutan (2006–2010)*. Manila.

¹⁵ The most recent ADB assistance to the urban sector was through the Urban Infrastructure Improvement Project, completed in June 2005. ADB. 1998. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Bhutan for the Urban Infrastructure Improvement Project*. Manila. Lessons learned from this and other urban projects funded by the World Bank and the Danish International Development Agency indicated that resettlement issues should be negotiated and finalized early in the project cycle and sufficient funds budgeted in advance, so that resettlement agreements would be completed on time.

¹⁶ The project design included upgrading the existing WWTP in Babesa. By installing mechanical aerators in the existing facultative ponds, it had been expected that the capacity would increase to 5,250 m³/day. A study by the design, monitoring, and supervision consultants in 2009 showed that with the installation of the aerators, the quality of treated effluent under overloaded conditions would not meet standards and incur substantial capital and operational costs. The PSC decided that no new connections would be accommodated to avoid overloading the WWTP. As an interim measure, all new construction would require septic tanks for treating wastewater. Desludging equipment was procured and sludge taken to the WWTP. A sequencing batch reactor is being designed through the ongoing project, at an estimated cost of \$11.1 million.

¹⁷ ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Bhutan for the Urban Infrastructure Project*. Manila (Loan 2816-BHU).

B. Effectiveness in Achieving Project Outcomes and Outputs

14. The PCR rated the project effective. These are the outcome achievement performance:

- (i) **Improved urban infrastructure planning and management (not achieved).** A total of 74 individuals participated in various training activities, although the target was over 280 government staff from DUDES, TCC, PCC, and Dagana *dzongkhag* trained on various aspects of project implementation and municipal and infrastructure management. The PCR noted that the target was underachieved because of the government's decision to use its own financing for training and capacity building rather than loan funds.
- (ii) **Improved road access and drainage in South Thimphu, Phuentsholing, and Dagana (achieved).** New networks of 37.2 kilometers (km), from a target of 28.5 km, to benefit over 63,360 people (target 70,000 people).
- (iii) **Increased quantity and improved quality of water supplied in project areas (achieved).** New water treatment plants (WTPs) with a capacity 6,500 cubic meters per day (m³/day) from a target of 6,000 m³/day in Thimphu, 300 m³/day from a target of 300 m³/day in Dagana, and 27 km from a target of 27 km of supply main and associated infrastructure installed, to provide access to safe water to an additional 63,360 people from the target of 55,000 people in Thimphu and 1,282 people from the target of 1,200 people in Dagana.
- (iv) **Broadened sanitation coverage in project areas (partly achieved).** Sewerage coverage in Thimphu was increased from 12% to around 20% through an expansion by 28.5 km from a target of 16.5 km of the wastewater collection network. The collection network will be connected when the WWTP is upgraded in the next project. The target was to upgrade the WWTP from 1,750 m³/day to 5,250 m³/day. Wastewater in Dagana is treated through septic tanks that are desludged and treated in sludge drying beds constructed under the project (against a target of over 50% of residents of Dagana served by a newly constructed sewage treatment plant and collection system).
- (v) **Improved solid waste management in Thimphu (achieved).** The project improved solid waste collection and management capacity by constructing a new road to the unloading bay access road and procuring desludging equipment, dumper placers, and containers. At project completion, the collection had reached 50 metric tons per day (MT/day), against a target of TCC's solid waste collection and management capacity improved to potentially cover 10 years of waste generation and satisfactory disposal of 85 MT/day of solid waste by 2018.
- (vi) **Improved community awareness on solid waste disposal, hygiene, and sanitation (partly achieved).** The public awareness component and wash program were implemented in Thimphu (against a target of conducting the program in both Thimphu and Dagana).
- (vii) **Increased capacity of TCC, PCC, and Dagana *dzongkhag* to undertake operational and management activities and reduce UFW (achieved).** Improved operational efficiencies included the TCC's UFW reduction to 25% against a target of significantly improved operational efficiencies of TCC, PCC, and Dagana *dzongkhag* with UFW reduced from 34%–50% to 15%–20%.¹⁸ The PCR

¹⁸ Data from Thimphu municipality as of June 2013 suggests that only 30% of the Thimphu serviced area has water on an uninterrupted basis. Sector Assessment (Summary): Water and Other Urban Infrastructure and Services, Country Partnership Strategy: Bhutan, 2014–2018.

noted that efforts are being made to reduce UFW further with the replacement of old pipe networks with new ones in the core city area.

15. At the output level, there were four categories of targets to be achieved in Component A, Thimphu Urban Development.

- (i) **City-level improvements in urban water supply, sanitation, and solid waste management.**
 - (a) **Water supply (achieved).** At project completion, 63,360 people against a target of 55,000 people had access to safe water through the constructed WTP with a capacity of 6,500 m³/day (from a target of 6,000 m³/day) and its reinforced cement concrete intake, 26.9 km water mains and associated infrastructure.
 - (b) **Sanitation (not achieved).** Wastewater collection networks 28.5 km long were constructed in Thimphu, but will only be connected when the WWTP is upgraded under the next project. The target was over 19,000 people with access to safe sanitation through an expansion of more than 16.5 km of the sewerage network and upgraded WWTP from 1,750 m³/day to 5,250 m³/day.¹⁹
 - (c) **Solid waste (achieved).** At project completion, the collection reached the 50 MT/day target of satisfactory disposal with 85 MT/day of solid waste collected by 2018 through the rehabilitated landfill and composting plant, and new waste collection and landfill facilities.
- (ii) **Urban development in four local areas in South Thimphu (achieved).** The project constructed houses that can accommodate more than 25,000 (target of 11,000 people).
- (iii) **New urban road networks, utility conduits, and drainage connection constructed in project areas in South Thimphu (achieved).** The project built 33.7 km of secondary and tertiary roads with drainage, approximately 25.7 km of ducting for power and telecommunication and 265 access shafts for cables and associated structures against a target of 19.4 km of secondary and tertiary roads with drainage constructed, as well as approximately 14.6 km of ducting for power and telecommunications, 650 m of service pits, and associated structures.
- (iv) **Water supply and sewerage networks completed in project areas in South Thimphu (achieved).** Secondary and tertiary water distribution network 31.6 km long was constructed against the targeted 30 km and a sewerage collection network of about 28.5 km, (from the target of 16.5 km) with 819 sewer manholes (against a target of 300), 1,411 water and sewer inspection chambers, and associated structures.

16. Achievement of output targets in Component B, Phuentsholing Urban Improvement were as follows.

- (i) **Improvements in road network, junctions, footpaths, and parking lots for the city (achieved).** The project constructed 2.7 km of road network, 1.2 km of retaining walls, two culverts, two roundabouts, three road dividers, 2.9 km of drainage, 3.0 km of footpaths, and six parking lots (against the target of 2.4 km of road network and road junctions improved; four parking lots, and 1.2 km of footpaths).

¹⁹ The PCR noted that the PSC decided that new connections in the four areas under land pooling would not be connected until the WWTP is upgraded under the next project

- (ii) **Social infrastructure (archery ground, pedestrian bridge, footpaths, and street lights) in the city (achieved).** Against a target of constructing facilities including a pedestrian bridge, approximately 100 street lights, five fire hydrants, an archery ground, and a mini-stadium, the following facilities were built by the project—613 street light poles, 32 fire hydrants, two pedestrian bridges, 534 m realignment of water supply pipeline, and miscellaneous structures.²⁰
17. There were two categories of output targets in Component C, Dagana Urban Improvement.
- (i) **Water supply and sanitation facilities in Dagana (partly achieved).** Approximately 1,282 people (target 1,200) were provided with access to safer water with the construction of the WTP that has a capacity of 300 m³/day (against the target capacity of 300 m³/day) and the 7 km (against the 8 km target) transmission main and associated infrastructure. Four random rubble masonry pits (sludge drying bed) and a 225.0 m access road were constructed instead of a new sewerage network because of financial viability issues. The target was that approximately 790 people would have access to safer sanitation through connection to the new sewerage network and a sewage treatment plant with capacity of 300 m³/day.
 - (ii) **New urban roads and drainage in central areas of Dagana (partly achieved).** The project addressed drainage mainly through slope stabilization works. The road sub-base was built but final surfacing will be undertaken using government financing.²¹ The target had been that approximately 1,000 people provided would have access to 1.1 km of newly constructed roads with drains.
18. For Component D Technical Support, the output targets had two categories.
- (i) **Public awareness support.** The consultant recruitment was completed by late 2007 and the public awareness component and wash program was implemented by SNV Bhutan, including the public hygiene workshop and metering workshop in Dagana.
 - (ii) **Operational efficiency.** A total of 74 individuals participated in various trainings, below the target of 280 persons.
19. Component E Project Management Support output target achievements included:
- (i) **Project management unit support.** A fully functional PMU was established by the fourth quarter of 2007 although consultants were shortlisted in Q1 2007.
 - (ii) **Design, monitoring, and supervision support for project implementation units.** All the bid documents for works, goods, and services were prepared in line with the provisions of the loan agreement, project administration manual, ADB's Procurement Guidelines, Guidelines on the Use of Consultants by the Asian Development Bank and Its Borrowers, and standard bidding documents. The necessary staff were in place in the respective PIUs to implement the project components as per the planned schedule.

²⁰ Including one water pond, eight gazebos, one basketball court, an archery ground, one canteen with toilet facilities, and three planter boxes.

²¹ The government decided not to build blacktopped roads immediately and only provided a sub-base. This took account of experience in the areas under land pooling in Thimphu. Roads constructed prior to the erection of buildings were damaged because of their use by heavy vehicles.

20. The safeguards performance assessment confirmed that the project was category B for environment, category A for involuntary resettlement, and category C for Indigenous Peoples.²² The initial environmental examination was thorough and included adequate environmental impacts and mitigation matrix, as well as environmental management plans. The negative environmental impacts associated with construction during implementation were temporary and localized and were addressed appropriately. For example, at Thimphu, the impact of the encroachment on precious ecological areas was planned to be mitigated by reinstating vegetation on slopes and any other bare earth surfaces. Consultations with affected persons were undertaken throughout the project, following the Environmental Assessment Guidelines. There were no complaints over environment safeguards, although there was observed weakness in the environmental management plans. They contained insufficient information due to insufficient monitoring to assess compliance with appraisal requirements.

21. After extensive consultations with the local population, land pooling was the selected option for the project's resettlement and compensation framework, guided by relevant government and ADB policies. While social impact assessments and resettlement planning materially met ADB's requirements, the safeguards assessment noted that the only resettlement monitoring report dated 2011 was silent on the number of displaced persons requiring compensation and assistance, actual compensation and socioeconomic status before and after land pooling (footnote 9). Nevertheless, the PCR reported that resettlement impacts were appropriately identified during the design stage and that asset losses and temporary disruptions were minor. The PCR also stated that complaints received through the grievance redress mechanism were resolved at field level, although details of these were not contained in the resettlement monitoring report.

22. The project had no negative gender impacts. The social analysis conducted during project preparation showed that there was already gender equality, with women accorded equal or higher status, particularly regarding property inheritance, managing domestic finances, business, and household decisions—with women often heading households and businesses. The significant environmental and public health benefits from the project accrued to the general population (women and men). The project's water supply component specifically benefited women because women had a higher involvement than men in household and agricultural activities. This validation rates the project effective despite the observed shortfalls in achieving output targets, as resulting project outcomes were not negatively affected.

C. Efficiency of Resource Use

23. The PCR rated the project efficient. The reevaluation of the project's economic internal rate of return (EIRR) confirmed its achievement in providing incremental improvement in urban services, which would subsequently lead to improved environmental quality in Thimphu, Phuentsholing, and Dagana.

24. The EIRRs were recomputed for the project and its individual subcomponents. The recalculated EIRR for Thimphu components ranged from 14.1%–22.9%, compared with estimates of 17.2%–24.0% at appraisal. The recalculated EIRRs for the Phuentsholing component was 23.8%, compared with the 29.0% at appraisal. The recalculated EIRR for the Dagana component was 12.3%, compared with 11.9% at appraisal—exceeding the benchmark

²² ADB (IED). 2018. *Project Safeguard Assessment: Urban Infrastructure Development Project*. 16 May (internal).

rate of 12.0%. The EIRR for the whole project was 15.5% compared with 21.0% at appraisal.²³ The lower EIRR at completion was partially attributed to the reduced sewerage component in Thimphu; although the project remained economically viable through various scenarios in the sensitivity analysis: (i) base case, (ii) 10% increase in operation and maintenance (O&M), (iii) 10% increase in capital costs, and (iv) 10% decline in beneficiaries scenarios. Increased land values were used as measures of economic benefits from land pooling (as the intention of the scheme was the use of the land value increase to compensate for the asset losses of individuals) and slope stabilization, although ADB guidelines advise against using such data.²⁴

25. The requirement to obtain 100% landowner agreements for land pooling, while ensuring ownership by beneficiaries and significantly reducing grievances, contributed to the 2-year start-up delay. The project succeeded in advancing part of the infrastructure construction in May 2009 by dividing one local area plan (LAP) into a pilot area and a non-pilot area. The pilot area selected was a contiguous portion of the LAP where 100% agreement had already been reached. This enabled construction in the pilot area and the demonstration effect was crucial in securing agreement from the remaining landowners because it built trust in land pooling, which was being implemented for the first time. There were also delays because of the difficult terrain and climate (footnote 4),²⁵ including that of the slope stability study for Dagana. Procurement of civil works was also delayed because of the need to re-tender contracts when bidders were not able to fulfill all requirements, while there were also delays in land acquisition necessary for some of the civil works contracts. These problems contributed to the 3.8-year delay in project completion. The recomputed project EIRR at completion confirmed an overall return equal to or greater than the 12% economic opportunity cost of capital. Process efficiency was not rated highly since the project suffered various delays. The implementing agencies acted efficiently to minimize the impact of delays, and 93% of the total loan proceeds were disbursed. This validation rates the project efficient, in view of continuing project viability indicated by EIRRs and achieving most targets.

D. Preliminary Assessment of Sustainability

26. The project was rated likely sustainable in the PCR. The method used to reevaluate the financial internal rate of return (FIRR) followed the method adopted at appraisal.²⁶ The FIRR for the water supply subprojects was recalculated at 1.9% upon project completion, higher than the appraisal estimate of -4.0%. The higher return was attributed to changes in the technology of the water supply subprojects in Thimphu, and higher tariff increases during implementation than anticipated.²⁷ The FIRR for the solid waste management subproject was recalculated at -6.8% against -10.7% at appraisal. The recalculated FIRR for the project was 2.2%, higher than the

²³ The results of the sensitivity test show that even under unfavorable scenarios—a 10% increase in capital costs, O&M costs, a 10% decline in revenue, and 1-year delay in project completion, the EIRRs remain higher than the economic opportunity cost of capital of 12%.

²⁴ ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila. Many factors affect land prices and there is often a strong speculative element in price increases. The advice provided in the ADB guidelines is that as much as possible, efforts should be made to identify and value individual benefits other than land prices.

²⁵ For example, there was a delay in the package *Construction of Intake, Water Supply Main at Chamgang and Water Supply Lines for Thimphu* attributed to the long time required to haul heavy ductile iron pipes because of the steep topography, compounded by cold working conditions.

²⁶ The FIRR for the sewerage subcomponent was not recalculated: major investments were deferred to the subsequent Urban Infrastructure Project of ADB.

²⁷ The increase is at least partially attributed to government's expansion of district municipal boundaries to include agricultural areas in 2011. This took place in Thimphu and has contributed to the increase in revenues.

-7.5% at appraisal. The estimated weighted average cost of capital was 1.4%²⁸ compared to 1.0%–1.2% at appraisal. This indicates the financial viability of the investments when taken as a whole, although the solid waste management component was not financially viable.

27. Based on the PCR, the TCC is expected to have current account surpluses from fiscal year (FY) 2018 to FY2024 and the PCC from FY2015 to FY2024. For the TCC, the project incremental O&M costs are not a financial burden, since incremental revenues fully cover the incremental costs from 2016 onward for water and sewerage components. The urban infrastructure improvement in the project LAPs has enabled the TCC to acquire significant revenues from the land and urban house tax. The TCC increased its joint water supply and wastewater tariff three times during implementation, while periodic tariff increases are part of its plans for improved sustainability. Likewise, for the PCC, incremental revenues from the parking investments are projected to exceed incremental O&M costs from 2016. Government support exceeds the value of the surplus up to FY2016 in the PCC and up to FY2021 for the TCC. The implication is that project outcomes and outputs are financially sustainable, even without government support after FY2016 in Phuentsholing and after FY2021 in Thimphu.

28. The application of the resettlement framework was institutionalized in the government's land pooling practices with some modifications. Environmental management was given high priority; the Eleventh Five-Year Plan emphasizes sustaining a balance between development and the natural environment to improve disaster resilience.²⁹ On the other hand, although the physical network for water supply covers 100% of Thimphu, only 30% of the service area gets uninterrupted water supply.³⁰ On a positive note, government has prioritized provision of 24-hour water supply for all towns in the Eleventh Five-Year Plan.

29. The financial viability of the project investments was confirmed by the PCR, although sustainability is unlikely in Dagana.³¹ However, this validation views the assessment of environmental sustainability as limited due to the lack of information i.e., project environmental monitoring reports did not contain sufficient information and monitoring data to assess compliance with project-specific requirements, based on the project safeguard assessment (footnote 22). The ability of local governments to plan and prepare budgets, manage O&M, and deal with private sector service providers requires strengthening.³² Nevertheless, since the FIRR exceeds the weighted average cost of capital, and given the relative effectiveness of the TCC and the PCC in project implementation, this validation assesses the project likely sustainable. It should be noted, however, that action should be taken to bring the solid waste management component to financial viability, e.g., through the application of tariffs that enable cost recovery.

²⁸ Sensitivity analysis was undertaken: under varying scenarios, the FIRRs ranged from 1.49% to 2.22%. The results indicated that the project would remain financially viable under sensitivity assumptions with a 10% increase of O&M cost, 10% increase in capital costs, and a 10% decline in beneficiaries.

²⁹ Royal Government of Bhutan, Gross National Happiness Commission. *Eleventh Five-Year Plan Document*. 2013.

³⁰ Data from Thimphu municipality as of June 2013.

³¹ Insufficient O&M arrangements were identified for Dagana's water supply since the *dzhongkhag* was unfamiliar with the requirements for the proper maintenance of the system.

³² The government's policy calls for Thimphu and Phuentsholing to outsource maintenance rather than develop in-house capacity.

III. OTHER PERFORMANCE ASSESSMENTS

A. Preliminary Assessment of Development Impact

30. The PCR rated the impact of the project—improved standard of living and sustained economic growth in Thimphu, Phuentsholing, and Dagana—satisfactory. The impact was planned to be monitored 3 years after the end of the project to assess the improvement in well-being measured by the United Nations Development Programme national human development indicators and vulnerability index in urban areas, and the improvement in the indicators measuring the achievement of the Millennium Development Goals.

31. A 2016 report by the MOWHS confirmed that Thimphu had the highest average number of healthy days in a month, which was attributed to health facilities and improved sanitation facilities. Health and hygiene were promoted through the behavior change communication strategy prepared under the project. The improvements in managing solid waste in Thimphu has led to more investments in the landfill site. Operationalizing a compost plant led to reductions in the amount of waste dumped in the landfill and produced saleable compost. Citywide improvements in urban infrastructure and the transformational impacts of land pooling were significant for Thimphu.

32. Infrastructure from the project transformed South Thimphu and provide directions for Bhutan's further urban development, particularly the project-supported land pooling scheme. Land pooling is now considered as a model for urban development in Bhutan. Households in areas under land pooling are served by piped water connections and all buildings use septic tanks. Once rehabilitated, all plots are envisioned to be connected to the WWTP through the sewage network installed under the project. Investments in Phuentsholing included urban infrastructure, which reduced traffic congestion and improved access and drainage, provided self-financing parking spaces and civic amenities for communities, and increased safety through street lighting that covered 70% of the town. This validation considers the project impact satisfactory, since it is likely to have positive development impacts that outweigh the negative, based on reported project results.

B. Performance of the Borrower and Executing Agency

33. The PCR rated the performance of the borrower and the executing agency satisfactory. The project design reflected the government's national and local urban development policies and plans, ensured ownership and additional counterpart financing of \$0.6 million. There were effective implementation capabilities at the PMU and PIUs at the TCC and the PCC, with leadership and key staff members engaged and retained throughout project implementation; this was less so for the Dagana PIU, which led to implementation delays. The project design recognized the requirements for capacity development for the borrower, the executing agency, and government staff from the DUDES, TCC, PCC, and the Dagana *dzongkhag*. Nevertheless, the budget of \$900,000, which was allocated for training was underutilized because of government policy decisions (para. 14).³³ This validation rates the performance of the borrower and executing agency satisfactory because of the effectiveness of the PSC, PMU, and PSCs and PIUs within the TCC and PCC in project implementation.

³³ This is apparent in the Dagana *dzongkhag* whose existing staff neither benefited from training under the loan nor from external sources. The distant location of Dagana *dzongkhag*, and the relatively small works therein led to infrequent trips by the PMU, PMC, and the design and supervision consultants.

C. Performance of the Asian Development Bank and Cofinanciers

34. The PCR rated ADB's performance satisfactory. During the 8-year implementation period, ADB fielded 10 project administration missions totaling 261 staff person-days. This PCR deemed this sufficient for satisfactory supervision. ADB's safeguards work quality at appraisal was satisfactory, but there was a shortfall in monitoring the implementation of the environmental management and resettlement plans per the project safeguard assessment (footnote 22). The quality of environmental and resettlement monitoring reports of 2011 and 2012 were assessed as less than satisfactory, since they neither contained sufficient information nor monitoring data to assess compliance with project requirements. ADB promptly responded to requests for the approval of contracts and ensured timely fund disbursements. This validation rates ADB performance satisfactory.

D. Others

35. **Land pooling process.** The results of the land pooling exercise were transformational and the 2008 Bhutan's National Urban Strategy cites ADB's land pooling as an appropriate approach for urban development, which is equitable, participatory, does not disturb existing developed properties, and automatically resolves legal and social disputes. The Bhutan's National Urban Strategy further cites the TCC's experience in land pooling as a pioneering attempt that has been taken as the basis of indigenous adaptation of the method in other towns.

IV. OVERALL ASSESSMENT, LESSONS, AND RECOMMENDATIONS

A. Overall Assessment and Ratings

36. The PCR rated the project successful based on ratings of highly relevant, effective, efficient, and likely sustainable. The project was relevant to the government's urban development efforts. Land pooling was a pioneering initiative, which was unprecedented in scale, and it transformed southern Thimphu into a well-planned urban area. The government adopted this pilot as a model for urban development nationwide. This validation rates this project effective since it substantially achieved its intended outcomes, and in some cases, exceeded its targets. The PCR rated the project efficient and economically viable as well as likely sustainable based on projected financial revenues. This validation also rates the project successful, although unlike the PCR, it was only rated relevant due to deficiencies in project design, and less than effective because of the shortfall in achieving its outcomes and outputs. The efficient, and likely sustainable ratings of the PCR are supported. The table summarizes these ratings.

Overall Ratings

Validation Criteria	PCR	IED Review	Reason for Disagreement and/or Comments
Relevance	Highly relevant	Relevant	The project was well aligned with country development strategies and pertinent to the ADB country strategy, but the project design had weaknesses, which would have hindered outcome achievement if mitigating measures were not introduced to steady project implementation. Land pooling was a useful innovation, but the deficiencies in project design led to this validation's rating of relevant.

Validation Criteria	PCR	IED Review	Reason for Disagreement and/or Comments
Effectiveness	Effective	Effective	
Efficiency	Efficient	Efficient	
Sustainability	Likely sustainable	Likely sustainable	
Overall assessment	Successful	Successful	
Preliminary assessment of impact	Satisfactory	Satisfactory	
Borrower and executing agency	Satisfactory	Satisfactory	
Performance of ADB	Satisfactory	Satisfactory	
Quality of PCR		Satisfactory	

ADB = Asian Development Bank, IED = Independent Evaluation Department, PCR = project completion report.
Source: ADB (IED).

B. Lessons

37. **Project-level lesson.** The DUDES, TCC, and PCC, need to provide additional support for investments in the urban sector to ensure adequate funding to maintain, build capacity and public awareness, and improve access to urban services. The government's policy calls for Thimphu and Phuentsholing city governments to outsource maintenance rather than to develop in-house capacity.³⁴ This requires the DUDES, TCC, and PCC to enhance skills in project and program management and outsourcing.

38. **Results framework and methodology-level lessons.** When doing the design and monitoring framework (DMF) exercise, outcomes should describe the immediate and direct benefits of the project. Outcome statements articulate the change the project is expected to achieve—in this case, the management of in-migration. No separate outcome statement or concept was included in the DMF. Monitoring the project impact was expected to be the improvement in well-being, measured by the United Nations Development Programme's national human development indicators and vulnerability index in urban areas, and an improvement in the achievement of the indicators of the Millennium Development Goals. Nevertheless, it is doubtful if these indicators and indices would provide adequate impact indicators and targets since it is difficult to assess the project's contribution to their achievement. Hence, a more realistic approach when setting performance indicators should have been endeavored, and ensuring chosen indicators are monitorable and measurable is a lesson inferred from the project.

C. Recommendations for Follow-Up

39. There are two recommendations for the project. The PCR stated that the land pooling supported under the project is now considered a model for urban development in Bhutan. ADB could disseminate the lessons learned from this successful pilot. This validation opines that an impact analysis could be considered for 2019 or later, with special emphasis on land pooling and its effects to urban development.

³⁴ ADB. 2014. *Country Partnership Strategy: Bhutan, 2014–2018*. Manila.

V. OTHER CONSIDERATIONS AND FOLLOW-UP

A. Monitoring and Reporting

40. A project performance management system was designed in compliance with the covenant set out in the loan agreement. However, it is possible that the project performance management system was not comprehensive since there appears to be limited environmental information available. A major weakness of the DMF was that there was no outcome statement, suggesting a lack of a problem analysis during preparation.

B. Comments on Project Completion Report Quality

41. The PCR followed the prescribed guidelines and is coherent. However, this validation notes that there was no mention of the project's gender dimension, and although the report and recommendation of the President asserted that no special measures were necessary, the PCR would have added value if it included a discussion on the project vis-à-vis gender at completion, e.g., how the project benefitted women and the vulnerable. The assessment of relevance omitted a discussion on consistency with ADB country and sector strategies, and project design deficiencies were evident, e.g., there were many components implemented simultaneously and sequencing of works became a challenge. The EIRR and FIRR analyses were adequate, although the use of land price increases as a benefit can be further debated on land pooling cases. Otherwise, insights that could be used for the design and implementation of future projects were present, with the recommendation to take the land pooling experience forward. The PCR is rated satisfactory, although this validation notes that project changes and/or updates were not reflected in the project DMF.

C. Data Sources for Validation

42. This validation was based on reviews of the report and recommendation of the President, PCR, loan review mission reports, and the project safeguard assessment.

D. Recommendation for Independent Evaluation Department Follow-Up

43. Further outcome or impact assessment can follow-up on project achievements brought about by the upgrading of the wastewater facility in Thimphu and the bridge to be constructed in Phuentsholing, Urban Infrastructure Project,³⁵ as both are envisaged to bring further development impacts to the two project cities. ADB's Independent Evaluation Department could consider preparing a project performance evaluation report upon completion of the second project, and assess the combined impact of the two projects, with a parallel focus on the innovative strategy of land pooling in urban development.

³⁵ ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Bhutan on Urban Infrastructure Project*. Manila.