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PROJECT PERFORMANCE ASSESSMENT REPORT



PERU

Lima Water Rehabilitation and
Management Project
and National Rural Water Supply and
Sanitation Project

Report No. 106723

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Report No.: 106723

PROJECT PERFORMANCE ASSESSMENT REPORT

Peru

LIMA WATER REHABILITATION AND MANAGEMENT PROJECT

(IBRD-38110)

and

NATIONAL RURAL WATER SUPPLY AND SANITATION PROJECT

(IBRD-7142 IBRD-7978)

June 30, 2016

Currency Equivalents (annual averages)

Currency Unit = Peruvian nuevo sol (S/.)

2003	US\$1.00	S/. 3.48
2005	US\$1.00	S/. 3.29
2010	US\$1.00	S/. 2.83
2011	US\$1.00	S/. 2.75
2012	US\$1.00	S/. 2.64
2013	US\$1.00	S/. 2.70
2014	US\$1.00	S/. 2.84

Abbreviations and Acronyms

APT	<i>Agua para todos</i>
BOT	Build-Own-Transfer
ERR	Economic rate of return
FONCODES	<i>Fondo Nacional de Cooperación para el Desarrollo</i> or National Fund for Development Cooperation
IEG	Independent Evaluation Group
ISR	Implementation Status and Results Reports
JASS	Juntas Administradoras de Servicio y Saneamiento (local water and sanitation management boards or rural community water and sanitation services associations)
JBIC	Japanese Bank for International Cooperation
MTR	mid-term review
PRONASAR	<i>Programa Nacional de Abastecimiento de Agua e Saneamiento</i> or National Rural Water Supply and Sanitation Project
QAE	Quality-at-Entry
RAS	Reimbursable Advisory Services
SEDAPAL	<i>Servicio de Agua Potable y Alcantarillado de Lima</i> or Lima Metropolitan Area Water Supply and Sewerage Service Company
SUNASS	<i>Superintendencia Nacional de Servicios de Saneamiento</i>

Fiscal Year

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This report was prepared by Ramachandra Jammi, who assessed the project in July 2015 along with Ryotaro Hayashi. The report was peer reviewed by Vijay Jagannathan and panel reviewed by Fernando Manibog. Richard Kraus and Romayne Pereira provided administrative support.

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Principal Ratings

Peru: Lima Water Rehabilitation and Management Project - P008051

	ICR*	ICR Review*	PPAR
Outcome	Satisfactory	Satisfactory	Moderately Satisfactory
Risk to Development Outcome	Negligible to Low	Negligible to Low	Moderate
World Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Moderately Satisfactory	Moderately Satisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible World Bank department. The ICR Review is an intermediate Independent Evaluation Group (IEG) product that seeks to independently verify the findings of the ICR.

Peru: National Rural Water Supply and Sanitation Project - P065256

	ICR	ICR Review	PPAR
Outcome	Moderately Unsatisfactory	Unsatisfactory	Unsatisfactory
Risk to Development Outcome	High	High	High
World Bank Performance	Moderately Unsatisfactory	Unsatisfactory	Unsatisfactory
Borrower Performance	Moderately Unsatisfactory	Moderately Unsatisfactory	Unsatisfactory

Key Staff Responsible

Peru: Lima Water Rehabilitation and Management Project - P008051

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Peru: National Rural Water Supply and Sanitation Project - P065256

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Independent Evaluation Group Mission: Improving World Bank Group development results through excellence in evaluation.

About this Report

The Independent Evaluation Group (IEG) assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the World Bank's self-evaluation process and to verify that the World Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses 20-25 percent of the World Bank's lending operations through field work. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or World Bank management have requested assessments; and those that are likely to generate important lessons.

To prepare a Project Performance Assessment Report (PPAR), IEG staff examine project files and other documents, visit the borrowing country to discuss the operation with the government, and other in-country stakeholders, and interview World Bank staff and other donor agency staff both at headquarters and in local offices as appropriate.

Each PPAR is subject to internal IEG peer review, panel review, and management approval. Once cleared internally, the PPAR is commented on by the responsible World Bank department. The PPAR is also sent to the borrower for review. IEG incorporates both World Bank and borrower comments as appropriate, and the borrowers' comments are attached to the document that is sent to the World Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the IEG Rating System for Public Sector Evaluations

IEG's use of multiple evaluation methods offers both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (additional information is available on the IEG website: ieg.worldbankgroup.org).

Outcome: The extent to which the operation's major relevant objectives were achieved, or are expected to be achieved, efficiently. The rating has three dimensions: relevance, efficacy, and efficiency. *Relevance* includes relevance of objectives and relevance of design. Relevance of objectives is the extent to which the project's objectives are consistent with the country's current development priorities and with current World Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, and Operational Policies). Relevance of design is the extent to which the project's design is consistent with the stated objectives. *Efficacy* is the extent to which the project's objectives were achieved, or are expected to be achieved, taking into account their relative importance. *Efficiency* is the extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. The efficiency dimension generally is not applied to adjustment operations. *Possible ratings for Outcome:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Risk to Development Outcome: The risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized). *Possible ratings for Risk to Development Outcome:* High, Significant, Moderate, Negligible to Low, Not Evaluable.

World Bank Performance: The extent to which services provided by the World Bank ensured quality at entry of the operation and supported effective implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of supported activities after loan/credit closing, toward the achievement of development outcomes. The rating has two dimensions: quality at entry and quality of supervision. *Possible ratings for World Bank Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower (including the government and implementing agency or agencies) ensured quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development outcomes. The rating has two dimensions: government performance and implementing agency (ies) performance. *Possible ratings for Borrower Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Preface

This is a Project Performance Assessment Report (PPAR) by the Independent Evaluation Group (IEG) for two projects in the urban and rural water and sanitation sectors of Peru supported by the World Bank and other development partners.

The Lima Water Rehabilitation and Management Project was approved in November 1994 for a total cost of US\$306.2 million. This comprised an initial loan of US\$150 million and additional financing of US\$20 million from the International Bank for Reconstruction and Development (IBRD); and co-financing of US\$156.2 million from the Japan Bank for International Co-operation or JBIC (now Japan International Co-operation Agency or JICA). Total project cost at completion was US\$311.8 million. The project was approved on November 22, 1994, and closed on March 31, 2009, nearly eight years after the original closing date of June 30, 2001.

The National Rural Water Supply and Sanitation Project was approved on April 29, 2002 for a total cost of US\$130.9 million. This was supported by an initial IBRD loan of US\$80 million and additional financing of US\$30 million; and US\$5 million of co-financing from the Canadian International Development Agency (CIDA). The project was restructured in May 2006, resulting in a significant downward revision of targets in the results framework. The project cost at completion was US\$121.5 million. The project closed on June 30, 2013, four and a half years after the original closing date of December 31, 2008.

The assessment is based on a review of all relevant documentation, interviews of World Bank staff at headquarters and in the country office, and the findings of an IEG mission that visited Peru during June-July 2015. Project performance was discussed with government, state and municipal officials engaged with the projects, representatives of donors, staff of the World Bank's country office, and beneficiaries in different regions through focus groups. The list of persons met during the mission is attached in Appendix B. Their cooperation and assistance in preparing the report is gratefully acknowledged.

Lessons learned from this assessment will be used as inputs into IEG's forthcoming evaluation of the World Bank Group's support to the water and sanitation sector.

Copies of the draft PPAR were sent to government officials and implementing agencies for their review. Comments from the implementing agency are attached in Appendix E.

Summary

This Project Performance Assessment Report (PPAR) assesses the development effectiveness of two projects in Peru’s water supply and sanitation sector: (i) the Lima Water Rehabilitation and Management Project and (ii) the National Rural Water Supply and Sanitation Project.

The objective of the Lima Water Rehabilitation and Management Project was to improve the efficiency of water and sanitation delivery in the Lima-Callao metropolitan area. The project sought to promote water conservation, support the Lima water utility, SEDAPAL's, privatization, rehabilitate damaged water supply and sewerage systems, expand services to the urban poor in low-income neighborhoods, and support reforms in the legal and institutional framework of the water and sanitation sector.

The objective of the National Rural Water Supply and Sanitation Project was to increase the sustainable use of water supply and sanitation facilities in rural areas and small towns while emphasizing improvement in hygiene practices and training in operations and maintenance.

Project performance and ratings

Lima Water Rehabilitation and Management Project. The overall development outcome is rated **moderately satisfactory**. Relevance of the development objective is rated **substantial**. The project addressed critical challenges in providing adequate and sustainable water and sanitation services to the Lima-Callao metropolitan area, with a growing population of over 10 million, nearly 35 percent of Peru’s population. The momentum of privatizing SEDAPAL, the water utility, was somewhat diminished by the presence of a “back-up” plan to strengthen SEDAPAL’s capacity in case the privatization did not go through. Relevance of the development design is rated **substantial**. The project's components were complementary and well-balanced for achieving the project development objective, by covering water conservation, system rehabilitation and expansion, institutional strengthening, and demand-side management. The project design provided for capacity building and performance-linked financial incentives for management and staff to keep the focus on achieving targets, in the event that the proposed privatization was not realized.

The efficacy of the project is rated **substantial**, being underpinned by significant physical and institutional achievements. The number of new water and sewerage connections met or exceeded targets at project completion and the percentage coverage of the population for water and sewerage services has been generally maintained in the face of population increase since then. Targets were broadly met for water conservation, loss reduction, per capita residential water demand, and operational and financial indicators. Although the plans for privatizing SEDAPAL’s operations were dropped by the government, the alternative approach of upgrading management capacity and introducing performance-based incentives yielded the targeted physical infrastructure and financial results. The achievements in expanding services to the urban poor exceeded the revised targets; however, the pilot exercise for using low-cost “condominial” water and sewerage networks did not yield significant results.

Efficiency is rated **modest** considering the implementation delays of nearly eight years (beyond a planned 6.5-year project), due to multiple factors that were reasonably under government or World Bank control, even though the ex-post economic rate of return was very favorable. Risk to development outcome is rated **moderate**, given the still large needs for infrastructure rehabilitation (which are being partly addressed through follow-on projects) especially in the poorer northern Lima region; lack of adequate coordination with urban planning; and the absence of a coherent strategy for ramping up coverage to unserved peri-urban areas, which involves social, legal, and technical challenges.

World Bank performance is rated **satisfactory** based on identical ratings for quality at entry and of supervision. The project's design, and elements of the results framework, were logically linked to achieving the project development objective, but, in retrospect, the planned time-frame was optimistic, especially given the initial gaps in the state of readiness for implementation and in procurement capacity. Lack of flexibility in certain World Bank procurement norms prevailing at that time and delays in issuing “no-objection” to bidding documents contributed to some extent to delays in project implementation. Borrower performance is also rated **moderately satisfactory**, based on moderately satisfactory government performance and satisfactory implementation agency performance. In the government, institutional and bureaucratic differences contributed to avoidable course changes and long delays in implementation. The implementing agency, SEDAPAL, radically changed its corporate management approach and work culture over the project period with increased focus on performance.

National Rural Water Supply and Sanitation Project: The overall development outcome is rated **unsatisfactory**. Relevance of the development objective is rated **negligible** before and after restructuring (which was essentially a significant reduction in project targets rather than a change in project objectives). At project appraisal, there was no clear policy and institutional context to benchmark the country's priorities and strategies for rural water and sanitation services, and towards the end of the project, the government rolled back the principle of cost recovery in providing infrastructure, which was out of line with a basic premise of the project. Relevance of the project design is rated **substantial** before and after restructuring. The project appropriately sought to shift the sector from the prevalent supply-driven to a community-driven demand-responsive approach, introduced co-financing by the municipalities and communities, and provided for improving capacity at different levels.

In terms of the achievement of project objectives, the principal objective of increasing the sustainable use of water supply and sanitation facilities in rural areas and small towns is rated **negligible** before restructuring, when less than 10 percent of funds had been disbursed, and **modest** after restructuring, with the actual number of people connected to improved water supply and sanitation facilities falling significantly short of even the downwardly revised targets. The first supporting objective of improving hygiene practices is rated **negligible** before and after restructuring as an impact evaluation did not see any significant differences in such behavior vis-à-vis non-project control areas. The second supporting objective of improving training in operations and maintenance is also rated **negligible** before and after restructuring due to a general lack

of any discernible cost recovery for operations and maintenance, continuing lack of capacity to manage the facilities, and lack of administrative and financial support down the chain of government agencies, municipalities and local government, and rural community water and sanitation services associations (JASS).

Efficiency is rated **negligible** before and after restructuring. The appraisal's cost valuation of US\$107 per beneficiary rose nearly five-fold to US\$486 per beneficiary at project completion. Moreover, project implementation took 11 years, nearly twice the originally planned six years. Risk to development outcome is rated **high** due to several uncertainties regarding community participation and the viability of community-based management of water and sanitation assets through JASS for reasons of lack of capacity and incentives to carry out this function. Behavioral change for improved hygiene is unlikely to get traction without frequent and longer term interventions.

World Bank performance is rated **unsatisfactory** based on unsatisfactory quality at entry and moderately satisfactory quality of supervision. Costs of sub-projects were greatly underestimated, as was the capacity of firms and nongovernmental organizations that were given a big role in implementing the project's social and technical components. Borrower performance is rated **unsatisfactory**, based on moderately unsatisfactory government performance and unsatisfactory implementation agency performance. Government support for and ownership of the project were uneven over the project duration. The performance of the implementing agency was negatively impacted by undue centralization, lack of adequate participation of local level stakeholders, and inadequate monitoring and evaluation.

Lessons

A strong focus on project outcomes and adequate accountability mechanisms are key factors to the achievement of significant improvements in service provision.

The project's design focused on performance and outcomes, and provided for a management contract between SEDAPAL and the line ministry with annual performance targets, with arrangements for institutional capacity development and performance-linked financial incentives, accompanied by effective monitoring.

Efforts to replicate successful experiences from other contexts must carefully take into account the receptivity of the implementing institutions and beneficiaries. The pilot effort to bring low-cost condominium networks to low-income peri-urban areas yielded limited results and was eventually discontinued due to insufficient social acceptance, the preference of beneficiaries for conventional networks, and the reluctance of SEDAPAL and contractors to depart from conventional network norms and methods. In retrospect, the receptivity of both beneficiaries as well as SEDAPAL and the contractors was not adequately gauged.

Conserving water resources through demand and supply management can yield quick benefits to liberate water resources for new clients. The project provides a successful example of the comprehensive and synchronized application of demand and supply management techniques to liberate water resources. These made it possible to simultaneously achieve improved coverage and continuity of service in what had been,

before the project, a heavily constrained resource that was widely rationed. It also provides a powerful illustration of the potential magnitude of customer response by sending economic signals through the pricing of water.

Project design needs to address gaps and weaknesses in sector institutions and governance identified during project preparation, failing which the risk to achieving project outcomes and timely implementation is much increased. In this project, the World Bank made an adequate diagnosis of the sector institutions, but failed to make significant provisions to deal with them, thus affecting project implementation.

The modalities of cost-sharing and community participation need to be adapted to the local context and supplementary resources made available as needed. Many municipalities did not have significant budgetary resources to participate in the project. In addition, over time, rural communities became less inclined to contribute free labor or local materials as other economic opportunities opened up. This affected contractor interest and overall project progress. In such situations, alternative means should be sought to fill the resource gap.

Community participation in planning and operations underpins sustainability, but adequate training support, financial incentives, and contractual arrangements are necessary for continued and effective participation. JASS are seen as key to the operations and maintenance of rural water and sanitation facilities. In practice, they have generally not been effective and there is a lot of turnover, due to insufficient capacity and financial resources. It appears that well-organized and trained people may assume the management, operation, and maintenance of rural facilities, but to ensure sustainability, there needs to be provision for training, a contractual arrangement of accountability, and compensation.

Behavioral change for improved water and sanitation-related hygiene requires ongoing engagement with the community and collaboration with health and education sectors. The effort to change and sustain hygiene-related behavior needs to go much beyond sporadic visits to communities by extension staff during the project. It is important to reinforce the messages after the project; doing this requires a multi-sectoral approach that includes not only the health and education sectors but also the private sector, to the extent possible. Continuous training of frontline workers and delivery of such training through local governments appears to be key to this effort.

Marvin Taylor-Dormond
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1. Background

1.1 Peru has a population of about 31 million, with 78 percent living in urban areas and 22 percent living in rural areas. The country has a varied topography with a coastal plain in the west, high rugged mountains in its center (the Andes), and a lowland jungle in the east that leads into the Amazon River Basin. From 2004 to 2013, the country's economy grew on average by 6.4 percent. Between 2004 and 2010, about 4 million people exited poverty, with the poverty rate falling from 49 percent to 31 percent. Despite these impressive results, a great deal of disparity remains across the country: 60 percent of the poor reside in rural areas and over 61 percent of those living in the highlands are poor.

Sector Background

1.2 In 2015, 87 percent of the Peru's population had access to improved water supply.¹ This is significantly below the average for the Latin America and Caribbean region (95 percent) and broadly comparable to that of its neighbors Colombia (91 percent) and Ecuador (87 percent). In terms of access to improved sanitation,² Peru (76 percent) lags significantly behind the Latin America and Caribbean region (83 percent), Colombia (81 percent), and Ecuador (85 percent). (Table 1)

1.3 During the five-year period from 2010 to 2015, national access to improved water supply in Peru has marginally increased from 85 percent to 87 percent, and for improved sanitation from 72 percent to 76 percent. During the same period, in urban areas, the access to water supply has remained stagnant at 91 percent, while in rural areas, there has been a modest improvement from 64 percent to 69 percent. Access to improved sanitation in urban areas shows a small improvement from 80 percent to 83 percent; while in rural areas there was a significant increase from 45 percent to 53 percent. (Table 1)

Table 1. Trends in Access to Improved Water Supply and Sanitation

	Access to Improved Water Supply (% of population with access)						Access to Improved Sanitation (% of population with access)					
	ALL		Urban		Rural		ALL		Urban		Rural	
Years	2010	2015	2010	2015	2010	2015	2010	2015	2010	2015	2010	2015
Peru	85	87	91	91	64	69	72	76	80	83	45	53
Colombia	91	91	97	97	73	74	79	81	85	85	63	68
Ecuador	85	87	92	93	73	76	81	85	85	87	73	81
LAC*	93	95	97	97	80	84	81	83	87	88	59	64

Source: World Development Indicators

* Latin America and the Caribbean Region

¹ An improved drinking water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from fecal matter contamination (for example, borewells, piped water as opposed to surface drinking water sources).

² An improved sanitation facility is defined as one that hygienically separates human excreta from human contact (for example, a pit latrine with slab, flush/pour flush to sewer system; as opposed to open defecation or shared sanitation facilities).

1.4 The government decentralized water sector operations in 1989, when all responsibilities for water supply and sanitation service provision were transferred to local governments. With the exception of the water utilities in Lima and Trujillo, all subsidiary sector companies were decentralized. In 1992, the Ministry of the Presidency assumed responsibility for sector developing policies, favoring viable and autonomous water companies, and established a special privatization committee for SEDAPAL, the Lima water utility, to promote private sector participation. In addition, in 1994, the government established SUNASS (*Superintendencia Nacional de Servicios de Saneamiento* or Superintendency of Sanitary Services) as the regulator for the sector. The water and sanitation reform also included the enactment of the Water and Sanitation Services Law in 1994, as well as the preparation of accompanying regulations.

1.5 Between 1992 and 1997, total investments in Peru's rural water and sanitation sector increased from US\$15 to US\$88 million per year, mostly through FONCODES (*Fondo Nacional de Cooperación para el Desarrollo* or the National Fund of Cooperation for Development) and nongovernmental organizations, but decreased significantly by the early 2000s due to the closing of external loans and FONCODES' loss of prominence. FONCODES represented more than 75 percent of all rural water supply and sanitation (WSS) investments between 1992 and 2000, and is reported to have built, improved, or rehabilitated approximately 13,000 rural water and sanitation systems.

1.6 However, baseline studies carried out in 2002 in preparation for the National Rural Water Supply and Sanitation Project (PRONASAR) showed that around 80 percent of existing rural water and sanitation systems required additional investments for rehabilitation and 20 percent were not operational, indicating a significant lack of sustainability of investments. At that time, about 62 percent of Peru's rural population had adequate water supply services—defined as access to either piped systems feeding household connections, yard taps or public standposts, or to point sources such as wells—and approximately 30 percent of Peru's rural population has access to either onsite or (occasionally) piped sanitation systems.

1.7 Lima's water supply and sanitation system is one of the most complex and challenging in Latin America, being situated on the arid Peruvian coast in an area of small rivers and low rainfall. The city relies on surface water from the Rimac, Chillón, and Lurín Rivers (which are augmented by flows from two inter-basin transfers), as well as groundwater from the Rimac-Chillón and Lurín aquifers. Although groundwater is conjunctively used to diversify water resources in a scarce environment, its use requires careful and prudent usage given a series of challenges such as limited recharge, salinity, and saltwater intrusion, as well as impacts of overdraft that can lead to land subsidence. Moreover, climate change will significantly reduce the city's future water supplies, increasing scarcity, variability, and uncertainty.

1.8 Lima's water and sanitation challenges have been exacerbated in recent decades by unplanned growth from internal migration from rural areas. The high rates of urbanization have put a strain on existing infrastructure, particularly in districts with higher concentrations of low-income households within Northern Lima. While water supply coverage in the Lima-Callao area has expanded over the years and stands at 93.5 percent in 2014 with average

water availability of 21.6 hours a day, these figures conceal wide disparities in service quality between the central and peri-urban sections of Lima. Lack of public water services continue to affect the more distant and marginalized areas, with an estimated 1.2 million poor residents still lacking access to safe drinking water and sanitation in peri-urban areas within the outskirts of Lima and Callao. Many of those without any access to the main water supply have to purchase water from private vendors at prices up to 12 times higher than those receiving water through public service providers.³ Overall, a majority of residents experience very low water pressure and discontinuity of water services.⁴

1.9 SEDAPAL, the water utility responsible for water and sanitation service provision in the Lima metropolitan area, had suffered more than a decade of low tariffs, inadequate management, and spiraling costs in the period leading up to the Lima Water Rehabilitation and Management Project. In the early 1990s, some important steps were taken, including raising the average water tariff several times and cutting the workforce which helped to enhance the cost-recovery capacity and financial health of the utility. However, many operational deficiencies remained to be addressed to improve the company's efficiency and financial sustainability. The government set out to privatize SEDAPAL in the early 1990s (through a proposed long-term concession to private operators) which helped attract significant sums of public money to be used in the mitigation of the most urgent problems (including the Lima Water Rehabilitation and management project). Due to the complexity and the techno-political risks involved, privatization was postponed several times and eventually cancelled in 1997.

1.10 Going forward, SEDAPAL's task of covering the huge and expanding area of Lima is made even more difficult by continuing and uncontrolled migration and a lack of sufficient coordination with the urban planning function. In many portions of the Lima-Callao region, water and sewerage networks are in poor physical condition with frequent leaks, blockages, and breaks, mainly due to community self-construction using sub-standard techniques and materials. There are technical and economic constraints to expand the utility's conventional networks and therefore require non-network or non-conventional service delivery solutions.

World Bank Support for Peru's Water and Sanitation Sector

1.11 The World Bank's involvement in water sanitation in the past 15 years has been principally through the two projects being assessed in this report. The ongoing Optimization of Lima Water and Sewerage Project (P117293) aims to improve the efficiency, continuity, and reliability of water supply and sanitation services in the Northern area of Lima, which has the highest physical and non-revenue water losses in the region. In addition, in the broader water sector, the World Bank recently completed the Water Resources Management

³ Aguilar-Barajas, Ismael, Jürgen Mahlknecht, Jonathan Kaledin, Marianne Kjellén, Abel Mejía-Betancourt eds. 2015. *Water and Cities in Latin America: Challenges for Sustainable Development*. Earthscan studies in water resources management. [[AQ: this should be in the references list, not footnoted. Please use author-date citation system in the text.]]

⁴ According to the Association for ACME: *An International E-Journal for Critical Geographies*, 2015, 14(4), 1161 – 1186. [[AQ: again, this should be in references list, not footnoted.]]

Project (P107666), which addressed the management of water resources through the strengthening of the borrower's capacity for participatory, integrated, basin-scale water resources management at the central level and in selected river basins. The World Bank has also provided reimbursable advisory services (RAS) on "Increasing Water Supply and Sanitation Services in Peri-Urban Areas of Lima" (P149453 and P151314) with the objective of supporting SEDAPAL in the development of non-conventional water supply and sanitation solutions for poor populations residing in peri-urban areas of metropolitan Lima.

2. Lima Water Rehabilitation and Management Project

Objectives, Design, and Relevance

2.1 The project development objective in the loan agreement is stated as follows:

"To improve the efficiency of water and sanitation delivery in the Lima-Callao metropolitan area. The project will promote water conservation, support privatization of SEDAPAL (*Servicio de Agua Potable y Alcantarillado de Lima*), Lima's water utility, rehabilitate damaged water supply and sewerage systems, expand services to the urban poor in the *pueblos jóvenes* [low-income neighborhoods]."

2.2 The project development objective in the project appraisal document also mentions "... and support reforms in the legal and institutional framework of the water and sanitation sector.". This aspect is covered as part of this assessment, given the presence of an institutional development component (see section on "components and costs").

COMPONENTS AND COSTS

The project comprised four components as below:

2.3 Water Conservation (cost at appraisal, US\$44.2 million; at completion, US\$74.7 million). This had two sub-components. The first was a program for reducing unaccounted-for water, including the preparation of a customer cadastre, reconstruction of substandard water meters, and installation of 406,000 new water meters for 56 percent of Lima-Callao customers of SEDAPAL. The second developed conjunctive use of surface and groundwater in three areas of Lima where groundwater was depleted and saline contamination presented a threat.

2.4 Rehabilitation (cost at appraisal, US\$148.90; at completion, US\$145.97 million). This had three sub-components. The first was to rehabilitate water supply networks in the metropolitan area, the second to rehabilitate sewer networks in those same districts, and the third to rehabilitate 39 wells with diminished yields and provide equipment for 85 new wells.

2.5 Service Expansion (cost at appraisal, US\$40.10 million; at completion, US\$51.32 million) This component sought to finance works to serve upwards of 600,000 low-income people in the poorer peri-urban areas of Lima-Callao. Works included transmission lines, pumping stations, reservoirs, interceptors, and waste water treatment plants. In March 2003,

the World Bank approved an additional loan for extending services to the remaining 130,000 of the originally targeted 600,000 people in low-income peri-urban areas.

2.6 Institutional Strengthening (cost at appraisal, US\$18.80 million; at completion, US\$39.79 million). This included resources for consultant services, training, equipment, and logistical support in six thematic areas: operational management assistance, modernization of financial management, assistance to transform SEDAPAL from being a direct service provider to being more of a contract administrator, capacity-building for a newly-created National Superintendence for Sanitary Services (SUNASS), baseline studies supporting a water basin authority in the region, and feasibility studies to analyze different waste water disposal options and a water treatment plant.

2.7 Without changing the overall project development objective, some of the physical targets were revised and funds reallocated at the mid-term review (MTR) in July 1998. This was required mainly to accommodate an increase in engineering design and civil works supervision costs for Component B covering rehabilitation. Consequently, feasibility studies for waste water disposal were financed by a grant from the Japanese Bank for International Cooperation (JBIC).

PROJECT FINANCING AND DATES

2.8 Overall project costs at completion were US\$311.8 million. This was slightly higher than the appraised estimate of US\$306.2 million, which included physical and price contingencies of US\$25.20 million and US\$29 million, respectively. Although the actual cost for rehabilitation (US\$145.97 million) was almost the same as at appraisal (US\$148.90 million), the costs were significantly higher for the other three components: water conservation (69 percent), network expansion (28 percent), and institutional support (112 percent). These increases were covered almost entirely by the physical and price contingencies. Actual borrower contribution was US\$63.0 million compared to US\$81.1 million estimated at appraisal.

2.9 In March 2003, the World Bank approved additional financing of US\$20 million to meet the targets for new connections in Lima-Callao's poor neighborhoods under Component C (service expansion). This was done because FONAVI (*Fondo Nacional de Vivienda*), the housing agency, collapsed midway through the project due to accumulated bad debts at a time when only two-thirds of the targeted 302,000 new beneficiaries had been connected to the new water supply and sanitation system, which had excess capacity. The World Bank's additional financing, together with an extra US\$1.7 million from JBIC, covered the US\$17 million shortfall in the borrower's contribution and the increased expenditures of US\$5.6 million.

2.10 The project spanned 15 years against the planned implementation period of about 6.5 years from November 1994 to June 2001. First, there was an 18-month delay until project effectiveness pending action on tariff regulations. Second, an additional 24 months (from June 30, 2001 to June 30, 2003) was granted to allow for the submission of the additional financing request, following which the project was extended until December 31, 2006. Finally, the closing date of the project was extended until March 31, 2009, due to difficulties

encountered by SEDAPAL in implementing the additional works. Other factors that contributed to the delay are discussed in some detail under “Implementation.”

RELEVANCE

Objectives

2.11 The relevance of objectives is rated **substantial**. The project addressed the efficiency of water and sanitation delivery in the Lima-Callao metropolitan area, with a population of 6.4 million at project appraisal, and presently over 10 million, being nearly 32 percent of Peru’s population. At appraisal, Lima-Callao faced low water and sewerage services coverage, especially in peri-urban areas; inefficiencies in the production and distribution of potable water; and weak financial and operational performance of the water utility, SEDAPAL. The project development objectives were consistent with the borrower's commitment to the Millennium Development Goals of reducing poverty and improving access of the poor to safe water and, in particular, to the government’s targets for extending water and sanitation services to some 600,000 poor inhabitants of unserved urban and peri-urban areas, improving services to over 1.5 million residents, and strengthening public utilities. The project objectives remain relevant to Goal 6 of the Sustainable Development Goals—“to ensure availability of sustainable management of water and sanitation for all”. In retrospect, including support for privatization of SEDAPAL in the project development objectives seems ambitious given the political constraints that would have been apparent even at project appraisal.

2.12 The project development objectives were consistent with: (i) the World Bank’s country assistance strategy (FY1995-1997) for Peru, especially for alleviating poverty, rehabilitating critically damaged infrastructure, and supporting the private sector in utility service delivery; (ii) two of the three pillars of the country partnership strategy (FY2007-11), namely, economic growth, with its emphasis on increasing physical infrastructure including the water sector, and social development, with its focus on improving the basic living conditions of the poor, including improved water and sanitation; and (iii) the country assistance strategy (FY2012-2016) with its strategic results area (2.1) of improved supply of water and sanitation services under the broader objective of connecting the poor to services and markets.

DESIGN

2.13 The relevance of design is rated **substantial**. The project's design and elements of the results framework were directly linked to achieving the project development objective. The efficiency of water and sanitation delivery was sought to be improved through water conservation, system rehabilitation and expansion, and institutional strengthening, especially the organizational transformation of SEDAPAL. The project had a large number of —nine outcome and 18 intermediate outcome indicators—but they were appropriately selected and balanced across the outputs and intermediate outcomes as explained in more detail in the following section, “Monitoring and Evaluation.”

2.14 A concession process to turn SEDAPAL's operation over to private firms and consortia had already been initiated by the government at appraisal. However, the World Bank retained an alternative approach in the project design to protect the project's viability with or without the concession of SEDAPAL and included this provision in the legal documents. The alternative approach was to focus on improving the institutional capacity of SEDAPAL through training and technical assistance, and formulating financial incentives for the management and staff for good performance. While this flexibility may have been justified to ensure that the project implementation would not be jeopardized, the lack of any privatization indicators in the monitoring and evaluation (M&E) framework (discussed in the next section) suggests that privatization was not considered a likely outcome, thus sending conflicting signals between the privatization objective and project design.

2.15 Additional financing of US\$20 million provided in 2003 incorporated the implementation of a pilot low-cost "condominial" approach for water and sewerage expansion in low-income peri-urban areas. While this approach was well-founded, it had to contend with uneven acceptance by potential beneficiary communities and insufficient support and commitment from SEDAPAL and contractors. However, the project was successful in incorporating the concept of social and technical intervention at the community level; this was a complete change of culture within SEDAPAL as they were being requested to include social specialists in their teams, with lower budgets for works but a more intensive and long-term involvement. This, however, caused a reaction and those with vested interests in continuing with the conventional system managed to make the Government go back on its decision to scale up the initiative. This is further discussed in the sections on "Implementation" and "Efficacy."

MONITORING AND EVALUATION

2.16 M&E Design: The project had a large number of key performance indicators—nine for outcomes and 18 for intermediate outcomes—but they were appropriate, measurable, and well balanced across the four project components. The indicators covered physical infrastructure (for example, the percentage increase in water and sanitation coverage), quality of client service delivery (for example, continuity of service and installation of pumping stations), rationalization of demand (number of installed water meters and average domestic consumption), and organizational efficiency and productivity attributes (for example, measured by SEDAPAL's indicators, such as working capital ratio and labor productivity per 1,000 connections). The intermediate outcome indicators were appropriately selected to measure the operational effectiveness of water conservation activities and the rehabilitation and expansion of water and sanitation services. The outcome indicators were focused on improving the efficiency of the water and sanitation delivery system in the Lima-Callao metropolitan area in keeping with the project development objective. In retrospect, the wide scope of this project would have warranted additional intermediate outcome and outcome indicators to track the improvement in public health and sanitation conditions to reflect the ultimate objectives and impacts of providing water and sanitation services. Additionally, SEDAPAL has taken the initiative of benchmarking itself against seven leading utilities in the region, though this information was not made available to the IEG mission.

2.17 M&E Implementation: SEDAPAL was well equipped to track most agreed indicators, as demonstrated by the figures provided in the section on “Efficacy.” The key performance indicators were tracked throughout project implementation by SEDAPAL. The World Bank’s supervision missions regularly received the information required to analyze performance and identify issues needing attention.

2.18 M&E Utilization: The regular flow of monitoring data helped the World Bank team to work with the borrower and implementing agency to: (i) appropriately change the focus and funding priorities of the project over its long, 15-year duration, particularly in the wake of the government’s decision not to privatize SEDAPAL; and (ii) recommend additional financing, as explained in more detail in the section on “Implementation.” SEDAPAL’s management voluntarily introduced a performance agreement with the government’s asset holding company (FONAFE) to link staff bonuses and incentives to the achievement of operational and efficiency targets. SEDAPAL officials indicated that the benchmarking of financial performance was being carried out in the context of SEDAPAL’s credit rating, with a medium-term objective of being publicly listed.

M&E Quality is rated **Substantial**.

Implementation

2.19 The project preparation took place against the backdrop of the government’s decision to award a 30-year concession contract for SEDAPAL with a required minimum investment program of US\$3 billion. At Board approval of the project in November 1994, three international consortiums were already pre-qualifying to bid for the concession. However, during the run-up to general elections in mid-1995, the government decided to postpone the final bid submission date for the concession. Following its re-election, the government gradually decided not to go ahead with privatization.

2.20 The project was scheduled to begin by mid-1994 and be completed by end-2000. However, the project faced delays at different stages due to various reasons. Initially, project implementation was delayed by about 18 months. Conflicting provisions in the Municipalities Act and the General Law of Sanitation Services needed to be resolved, which delayed loan effectiveness until August 31, 1995. Linking project effectiveness to the approval of these acts appears to be an informed decision by the Bank to keep this process on track. The approval of the parallel financing did not become effective until 1996. The Project Administration Unit did not have experience with the World Bank’s procurement guidelines and needed additional time to prepare bidding documents, which took 12 months longer than expected during the first bid for civil works. The Project Implementation Plan estimated a period of 180 days for the contracting of civil works. However, this overlooked the need to develop adequate technical documentation to support the bidding documents, resulting in the completion of initial contracting processes stretching to 300 to 400 days. An international firm was selected competitively to help with procurement which ultimately helped to streamline the process.

2.21 The original closing date of June 30, 2001 was extended three times by a total of 18 months as a direct result of an International Monetary Fund (IMF) agreement that imposed

annual investment ceilings on all public agencies and consequently delayed project execution during its final three years. Another extension was granted until June 30, 2003, for an additional financing request for US\$20 million under the service expansion component of the project, following which the closing date was further extended until December 31, 2006. A final extension was made until March 31, 2009, due to difficulties encountered by SEDAPAL to implement the additional works, which were undertaken using the condominium approach that was new to the sector in Peru.

2.22 Other factors that contributed to the overall delay related to specific procurement issues, and teething problems for SUNASS, the regulatory agency. A six-month delay resulted from dealing with a dumping claim by a local producer against a Chinese firm that was contracted through international competitive bidding (ICB). A tax surcharge was applied to the imported water meters, which had to be paid by SEDAPAL. Ultimately, the borrower decided to finance the metering program with its own resources, while the resources from the World Bank loan were reallocated to buy the valves needed for the installation of the water meters.

2.23 The newly created regulatory agency, SUNASS – whose formation which strongly supported by the Bank during project preparation – experienced a number of problems during the first five years of project implementation from a lack of autonomy in decision making, and limited institutional and technical capacity. While these issues were ultimately addressed, delays were experienced initially in approving tariff regulations that were a condition for project effectiveness, as well as delays in the authorization to apply tariff increases scheduled by the regulator.

2.24 Since regulations in place at the time did not permit SEDAPAL to build the secondary distribution networks in the *pueblos jóvenes* mainly due to titling issues, responsibility for achieving this key objective of the original World Bank project was divided between SEDAPAL and FONAVI (*Fondo Nacional de Vivienda*), the housing agency. SEDAPAL undertook the extension of the trunk water mains towards the *pueblos jóvenes*, with finance from the network expansion component of the World Bank project. Meanwhile, the secondary networks needed to connect the primary infrastructure to the local residents, were separately funded by the housing finance agency, FONAVI, which lent money to local residents who then contracted the construction of the works. This arrangement broke down in 2000, when FONAVI was dissolved due to an accumulation of bad debts. This meant that the project was only able to reach 82 percent of the population originally targeted by the end of 2002, and left a portion of the trunk mains financed under the project without connection to the intended beneficiaries. Additional financing of US\$20 million was extended to fill the gap left by FONAVI to extend services to the remaining 130,000 people from the originally targeted population. This included the implementation of the “condominial” approach for water and sewerage expansion in low-income areas, which faced constraints on various fronts as discussed in the section on “Efficacy.” The documentation relating to the Additional Financing does not mention any other financial implications to the project from the transfer of responsibility from FONAVI to SEDAPAL.

SAFEGUARDS AND FIDUCIARY COMPLIANCE

2.25 The project was classified as Category B for purposes of OP 4.01 for Environmental Assessment. All the implementation status and results reports (ISR) rated safeguards performance as satisfactory, and the team reported that the project was in compliance with safeguard polices at the end that project, although no evidence was presented. Given the nature of the project's water and sanitation civil works, the most likely impacts were short-term, localized, and manageable construction nuisances in highly-populated areas, such as increased dust, traffic congestion, or pedestrian safety, and programmed water shut-offs. The project dealt with complaints and resistance to works by carrying out advance public dissemination of information about upcoming work schedules and having contractors participate in training sessions on facilitating dialogue with the local population where necessary. There were no reports of any resettlement or land acquisition being necessitated by the project. The project expected to have had a positive effect on the environment as a result of increased sewerage coverage in the project area.

2.26 The financial management of the project was carried out in accordance with the arrangements stipulated in the legal documents. Procurement processes improved noticeably after start-up problems in the first few years, as explained in some detail in the section on "Implementation." Annual project audits were conducted in accordance with international standards, although there were some delays in submission. No incidence was noted of non-compliance with fiduciary procedures giving rise to qualified audits.

Achievement of Objectives

2.27 Achievement of the project development objective—to improve efficiency in provision of water supply and sewerage services in Lima Metropolitan Area through water conservation, demand management and privatization of SEDAPAL's operations—is rated **substantial**.

2.28 Attribution. The project was embedded within a much broader US\$600 million investment, of which the World Bank financed 25 percent. Investments by other donors and government of about US\$300 million outside of the World Bank-financed project included acquisition of critical fixed assets, rehabilitation, systems expansion, additional water conservation efforts as well as studies related to the optimization in the use of available water resources. While it is difficult to separate the World Bank's financing specific contribution to the achievement of project objectives, it is noted that the World Bank played a key role in ensuring that an adequate institutional framework was in place and in keeping the focus on outcomes, which can be considered critical factors in the project's success.

2.29 The efficiency in provision of water supply and sewerage services is reflected in the following indicators: Number of new connections, volume of water produced, water availability in hours per day, number of employees per 1,000 connections, and personnel costs as a share of operating cost.

2.30 At project completion in 2008, almost all these outcome indicators had been met or exceeded. Updated data until 2014 obtained by the IEG mission show that there has been significant progress for these indicators while others have been maintained at similar levels.

This performance is considered in the context of the estimated population growth in the Lima-Callao region since 2008 of about 15 percent.⁵

2.31 *New and rehabilitated water supplies and sewerage connections* reached 633,000 people in the targeted areas (target 578,000). This included 307,000 new water connections (target 302,000). New and rehabilitated sewerage systems reached 432,400 people, more than twice the target of 202,600. This included 148,000 new connections (target 108,900). Figures obtained from SEDAPAL show in an increase of the total number of connections have increased from 1,231 million at project completion in 2009 to 1.438 million by end-2014.

2.32 *Volume of water produced* has increased from 658.7 million cubic meters at project completion to 687.6 million cubic meters by end-2014.

2.33 *Average daily water supply duration* increased from 11.5 to 21.5 hours a day during the project period, which has been maintained approximately at the same level till 2014. Total water connections increased from 763,000 in 1994 to 1,231,000 in 2008, and further increased significantly to 1,428,000 by 2014.

2.34 *The number of employees per 1000 connections* which was 1.77 at project completion (target 1.96) has dropped further to 1.70 by end-2014.

2.35 Similarly, the personnel costs as a share of operating costs decreases from 22.0 percent at project completion to 19.2 percent by end-2014.

Table 2. Water and Sanitation in the Lima Callao Region: Key Operational Performance Indicators, for 2008-2014

Indicator	End of Project		2009	2010	2011	2012	2013	2014
	Target	Actual						
Number of connections ('000)		1,231	1,293	1,318	1,344	1,387	1,412	1,438
Water coverage (% of population)	83	91.0	92.5	92.8	92.8	93.4	93.5	93.5
Sewerage coverage (% of population)	81	90.4	91.6	92.0	89.8	90.3	90.3	90.3
Metering coverage (% of connections)	46	70.3	68.8	69.2	77.3	81.5	82.5	82.6
Total average consumption (liters/day)	188	155.0	146.8	146.0	148.4	152.9	153.3	152.3
Volume of water produced (m. cu.m)	-	658.7	671.6	680.8	683.2	682.4	679.9	687.6
Volume of water billed (m. cu.m)	-	414.9	415.9	423.6	447.0	472.4	482.8	487.3
Physical water losses (%)	29	24.0	N.A	N.A	N.A	N.A	N.A	N.A
Non-Revenue Water (%)	41	37.0	38.1	37.8	34.6	30.8	29.0	29.1

⁵ "Perú: Estimaciones Y Proyecciones De Población Total Por Sexo de Las Principales Ciudades". Instituto Nacional de Estadística e Informática (INEI) (in Spanish). Scribd. March 2012. p. 32. Retrieved 14 March 2014.

Water availability/ continuous water offerings (average hours a day)	-	21.5	21.6	21.7	21.8	21.9	21.9	21.6
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Source: SEDAPAL

2.36 The outputs and intermediate outputs that contributed to the project development objective consisted of the following: water conservation, demand management, rehabilitation of damaged water supply and sewerage systems, and privatization/institutional strengthening – each of which is described below.

Water conservation

2.37 Physical losses were reduced as a result of the Supply Management Program from 31 percent in 1994 to 24 percent in 2008, leading to a saving of 2.5 cubic meters /s (as against a target of 1.3 cubic meters/s) and lower costs. SEDAPAL did not provide updated information of physical water losses. However, non-revenue water losses have fallen significantly from 37.0 percent in 2008 to 29.1 percent in 2014.

2.38 Groundwater use fell from 8.6 m³/s to 5.3 m³/s through investments combining use of surface and groundwater at project completion. This reduced the groundwater deficit. No updated information was available in this respect.

2.39 There were no specific efficiency indicators in the project to measure efficiency of sewerage improvements. However, sewerage collection coverage improved with 384,000 people benefiting from sewerage system improvement and 148,000 people benefiting from network expansion at project completion. The percentage of population covered by sewerage remained at approximately 90.4 percent since 2008, and has thus kept up with population growth during the period.

Demand Management

2.40 Various outputs contributed to improved demand management:

- The share of metered connections increased from 3.8 percent in 1994 to 70 percent in 2008 and further to 82.6 percent by 2014. The customer cadastre was updated reaching 971,095 customers; 330,121 water meter boxes were rehabilitated, and 426,712 new water meters and 689,000 valves were acquired and installed. Water savings from the metering program was 6.2 cubic meters per second (cubic meter/s) by 2008; no updated numbers were available for 2014.
- Water billing increased from 59 percent of all water produced in 1994 to 63 percent in 2008 to 71 percent by 2014.
- Average combined water and sewerage tariff increased 61 percent in real terms from 1994 to 2008, and reached the marginal cost by 2008. Between 2008 and 2014, the average combined tariff has increased from US\$0.70/cubic meter in 2008 to US\$0.96/cubic meter in 2014.
- Conjunctive use of surface and ground water sources in the areas of San Miguel, Los Olivos and Callao, resulted in the completed works substantially exceeding those originally projected allowing 92.3 kilometers of the distribution network to be

connected to La Atarjea treatment plant and divided in sectors as part of the central mains sectorization program.

2.41 Overall, per capita residential consumption decreased by 34 percent, from 236 liters per capita per day (l/c/d) in 1994 to 155 l/c/d in 2008, and slightly lower at 152.3 l/c/d by 2014. This is reflected in overall demand being reduced from 729 million cubic meters/day in 1994 to 659 million cubic meters/day in 2008 (target was 890 million cubic meters/day). This has increased marginally to 687 million cubic meters/day by 2014. Table 2 summarizes the key performance indicators for improved efficiency and coverage, updated until 2014.

Rehabilitation of damaged water supply and sewerage systems

2.42 New and rehabilitated water supplies and sewerage connections reached 633,000 people in the targeted areas (target 578,000). This included 307,000 new water connections (target 302,000). New and rehabilitated sewerage systems reached 432,400 people, more than twice the target of 202,600. This included 148,000 new connections (target 108,900).

2.43 Around 1995, through its strategic plan, SEDAPAL implemented sectoralization (a sector can have up to 15,000 connections) for improving the grid and optimizing it; to better locate sources of leaks, plan rehabilitation; and move towards fully automated and centrally controlled distribution of water using a SCADA⁶ system. Changes were made from pre-stressed concrete pipes to light strength polymer, which is low cost almost like PVC. Micro-measurement systems were installed to reduce levels of unaccounted water. Global diaphragm walls were used for reservoirs; and valves were replaced with modern digital ones. While the SCADA system coverage is close to 100 percent, information is sometimes inconsistent, and the system is in need of an upgrade with automated control systems.

2.44 As explained in some detail in the section on “Implementation,” additional financing of US\$20 million was extended in 2004 to contribute to the gap left by the financial collapse of FONAVI, and to extend services to the remaining 130,000 people from the originally targeted number of 302,000 new beneficiaries in low income peri-urban neighborhoods to connect to the new water supply and sanitation system. With the additional financing, SEDAPAL was able to provide water and sanitation service to an additional 164,000 people, surpassing its original goal by 11 percent at an incremental cost of 28 percent.

2.45 The effort to connect people in low-income peri-urban neighborhoods included the implementation of the “condominial” approach – a low-cost sewerage network technology used most successfully in Brazil to reduce significantly investment costs and service tariffs by up to 40 percent through the joint connection by blocks rather than more traditional and more expensive individual connections (see Appendix C). However this approach required significant community cooperation, and responsibility for maintenance. Specific figures of households connected through condominial networks were not made available to the mission,

⁶ Acronym for supervisory control and data acquisition, a computer system for gathering and analyzing real time data. A SCADA system gathers information, such as where a leak on a pipeline has occurred, transfers the information back to a central site, alerting the home station that the leak has occurred, and carrying out necessary analysis and control. (Source: Webopedia.com)

and may not have been updated at all. However, it is clear that this number is very small compared to conventional network connections. After making a strong and commendable effort, the condominal approach was essentially discontinued, and the project administrative unit looking after this task was dissolved. The *Agua para todos* (APT) program that was begun in 2006 adopted the condominal approach, but the APT itself ran into governance issues and was withdrawn.

2.46 The condominal experiment warrants a deeper examination to draw lessons for future efforts of this kind, and the mission met with retired engineers that were involved in developing the condominal systems in Lima's peri-urban areas as well as social promoters that worked with the beneficiary communities. The mission also visited a peri-urban community District Ventanilla-Cono Norte, which has a functioning condominal system. An account of this the findings from this visit is included as Appendix C.

2.47 Overall, the execution of condominal works faced difficulties related to (i) lack of legal property deeds for some of the beneficiaries, (ii) high entry costs incurred by the beneficiaries, (iii) diminished project credibility given the time lag between the development of workshops and the execution of the works for project beneficiaries, (iv) preference of conventional networks on part of the beneficiaries; and (v) lack of ownership, interest and flexibility on the part of SEDAPAL and contractors. After lack of activity on this front for several years, SEDAPAL has decided to go with conventional system after 2013 for peri-urban areas. More recently, the Government has requested advice from the Bank through Reimbursable Advisory Services (RAS) for increasing W&S services in Peri-Urban Areas of Lima through the development of non-conventional water supply and sanitation solutions for poor populations residing in peri-urban areas of Metropolitan Lima.

Privatization/Institutional Strengthening

2.48 At the time of appraisal, the government had initiated the process of handing over SEDAPAL's operation over to private firms/consortia. Subsequently, a full concession did not prove to be politically feasible. As an alternative approach that was built into the project design, SEDAPAL went through a major upgrading of management capacity through a series of management training programs aimed at changing the culture and mind-set of the management. This effort involved doubling the resources dedicated to the project's institutional support component (from US \$19 million to US \$40 million). The incentive framework was changed so that management performance was measured in terms of results achieved, and bonuses were tied to meeting or exceeding pre-set outcome targets.

2.49 Furthermore, while a full concession did not prove to be politically possible, SEDAPAL engaged in other more limited forms of private participation. These included the awarding of a Build-Own-Transfer (BOT) contract for a water treatment plant on the Chillón River, as well as increasing the outsourcing of many company functions, such as maintenance services, meter-reading, and leasing of vehicles and other equipment. The World Bank assisted in the preparation of the feasibility studies of the Chillón water treatment plant and advised in the BOT bidding process through workshops and provision of expert consultants.

2.50 Following the government's decision to abandon the concession model for SEDAPAL, the company went through an intense process of managerial reforms designed to bring about institutional development within the public sector. The very wide range of measures taken included a major reform of the company's human resource policies, as well as the adoption of modern software for commercial, accounting, and administration processes, among others.

2.51 An important institutional change was the signing of Management Contracts between SEDAPAL and the line Ministry determining annual performance targets, an innovation introduced by the World Bank loan agreement in the absence of the concession. Annual Management Agreements were also signed with the government's asset holding entity FONAFE, under the Ministry of Finance, linking staff salary bonuses with the achievement of corporate performance objectives.

2.52 From discussions with the task team as well as the representative of a leading bilateral lender in Peru, the positive change in managerial culture at SEDAPAL appears to be very significant. The training and incentive frameworks changes can be reasonably linked to improved technical and managerial skills as well as the sector outcomes both in terms of physical achievements (Table 2), as well as financial indicators listed in Table 3, and summarized below:

- Debt service ratio decreased from 5.8 to 3.0 (though this was still greater than the target of less than 1.5), and stands at 2.30 in 2014.
- As mentioned in the context of overall efficiency, personnel costs as a share of total operating costs were reduced from 32.0 percent in 1994 to 22.0 percent in 2008, and further to 19.2 percent by 2014. Much of this was because of continued employee rationalization. In 1987 there were 6.38 staff per 1,000 water connections; at the start of the project this was 2.49 and by 2008 it was 1.79 (target was 1.96), and by 2014 this had decreased marginally to 1.70.
- Average operating costs have increased by 108 percent (from US\$0.23/m³ to US\$0.48/m³) and have continued to rise to US\$0.81/m³ by 2014. Despite limited tariff increases, revenues increased because of better management of water sales and billing by 144 percent (from US\$0.34/m³ in 1994 to US\$0.83 in 2008) and further to 1.03/m³ by 2014. As a result the working ratio (operational expense/operational revenues) improved from 1.51 in 1994 to 0.58 (target 0.6) in 2008, and has been maintained at that level till 2014.

2.53 Operations at the end of the project were guided by a Master and a Financial Plan up to the year 2030, a Strategic Plan for the period 1996-2020 that were prepared and approved during implementation, as well as annual Operational Plans with specific goals, outcomes and products.

Table 3. Water and Sanitation in the Lima Callao Region: Key Financial Performance Indicators, 2008-2014

Indicator	End of Project		2009	2010	2011	2012	2013	2014
	Target	Actual						
1. Water & Sewerage Average Tariff (US\$ / m3)	-	0.70	0.81	0.88	0.96	1.08	1.03	0.96
2. Average Operating Revenues (US\$ / m3)	-	0.83	0.89	0.94	1.03	1.16	1.10	1.03
3. Average operating costs (US\$ / m3)	-	0.48	0.50	0.59	0.68	0.83	0.85	0.81
4. Debt Service Coverage Ratio	1.50	3.00	2.50	2.50	2.30	1.80	2.57	2.30
5. Working Ratio (%)	60	44	42.2	51.2	50.6	49.2	58.9	58.3
6. Internal cash generation / investments (%)	-	44	32.0	47.7	29.1	44.6	76.5	53.7
7. Number of employees / 1000 connections	1.96	1.77	1.67	1.65	1.70	1.64	1.69	1.70
8. Personnel costs as Share of Operating Cost (%)	-	22.0	21.7	22.1	20.4	18.4	20.0	19.2

^{1/} Including the fixed charge, to December of the year it indicated.
* As reported by the end of implementation of the World Bank project and results, September 28, 2009;

Source: SEDAPAL

Efficiency

2.54 Ex-post cost-benefit analysis was applied to the first three project components, using the same methodology as at appraisal. The internal economic rate of return (ERR) and net present value (NPV) were calculated and compared with the counter-factual ("no project") scenario with prices in 1994 constant dollars to make them comparable with the cost-benefit analysis done at appraisal. The actual NPV and ERR were US\$439 million and 54 percent, respectively, compared to the ex-ante figures of US\$361 million and 23 percent. There were some shortcomings in efficiency due to delays in implementation and cost overruns as a new and innovative approach was adopted by the client at the urging of the World Bank.

2.55 Despite the large time overrun, the ex-post ERR was higher than at appraisal due to exceeding the targets for physical loss reduction, and the revised number of beneficiaries, especially in the low-income peri-urban areas where they had been paying exorbitant rates for informal sources of water. The rehabilitation of the network led to a 7 percent reduction in physical water losses over the period 1994-2008, which is equivalent to 2.5 m³/s of increase in water supply. This figure was higher than expected at the time of appraisal, when a 2 percent reduction in physical losses and a 1.3 m³/s increase in water supply were predicted. At the time of appraisal, approximately 800,000 people were living in low-income peri-urban areas without direct water and sanitation services. They had to rely on water supplied by tanker trucks or standpipes connected to SEDAPAL's system, and had to pay up to 20 times per unit of water compared to households connected to the piped water system. At the same time, many of those households living in low-income areas with service access were receiving highly deficient services, with very few hours of service per day. With

additional financing it was possible to exceed the targets expected at appraisal, despite the collapse of FONAVI. The service expansion targets were fully achieved, reaching 102 percent of the intended water supply beneficiaries and 136 percent of sewerage beneficiaries.

2.56 Efficiency was impacted by several factors that were reasonably under the government's control. As discussed in greater detail in the section on "borrower performance", long delays were experienced in resolving conflicting legal provisions between entities, obtaining parallel financing, early procurement efforts, and the settling period for SUNASS, the regulatory agency. While these issues were ultimately addressed, they collectively added several years to the project implementation period.

2.57 Taking all the above factors into consideration, Efficiency is rated **modest**.

Project Ratings

OUTCOME

2.58 The overall development outcome is rated **moderately satisfactory**. Relevance of the development objective is rated **substantial**. The project addressed critical challenges in providing adequate and sustainable water and sanitation services to the Lima-Callao metropolitan area, with a growing population of over 10 million, nearly 35 percent of Peru's population. The intention of privatizing SEDAPAL, the water utility, was somewhat diminished by the presence of a 'back-up' plan in case the privatization did not go through. Relevance of the development design is rated **substantial**. The project's components were complementary and well-balanced for achieving the project development objective, by covering water conservation, system rehabilitation and expansion, institutional strengthening, and demand side management. The project design provided for capacity building and performance-linked financial incentives for management and staff to keep the focus on achieving targets, in the event that the proposed privatization was not realized. The efficacy of the project is rated **substantial**, being underpinned by significant physical and institutional achievements (while noting that the privatization and condominium activities did not succeed). Efficiency is rated **modest** considering the implementation delays feeding into the eight and a half-year delay (beyond the planned six and a half-year project), due to multiple factors that were reasonably under government or World Bank control, even though the ex-post economic rate of return was favorable.

RISK TO DEVELOPMENT OUTCOME

2.59 Most of the improvements achieved during the project in terms of operational and financial performance have been maintained in the years following project completion. These include improvements in the physical infrastructure base, efficiency of resource use, provision of basic services to previously unserved and underserved households, and facilitation of a transformational change in SEDAPAL's management. Enhanced technical proficiency, managerial professionalism, and a more stable financial foundation is expected to allow SEDAPAL to continue expanding services to unserved areas while improving services to those areas already served.

2.60 However, the larger picture shows that the progress in physical and service coverage parameters conceal disparities in service quality between the central and peri-urban sections of Lima. There are an estimated 1.2 million poor residents that still lack access to safe drinking water and sanitation in peri-urban areas within the outskirts of Lima and Callao, where it is technically and economically unviable to expand the utility's conventional networks and therefore require non-network or non-conventional service delivery solutions. Around half a million people mainly living in the deprived peri-urban sections of Lima, still have to purchase water from private vendors at prices 12 times higher than those receiving water through public service providers.

2.61 The unabated migration from rural areas into the Lima-Callao region makes the universal provision of services a constantly moving target. Efforts to reduce this gap are undermined by insufficient coordination between the urban planning function and the water and sanitation administration as indicated by respondents that were interviewed by the mission. To cope with the growing population and water needs, increased water sources will need to be harnessed to expand services to new unserved communities, apart from reducing non-revenue water.

2.62 Tariff levels set by SUNASS, the regulatory agency are below cost recovery levels. SEDAPAL receives 50 percent of its financing needs from the government budget, and 20 percent from external agencies. SEDAPAL has a risk classification of AA, and has a medium- /long-term goal of entering public listing.

2.63 The World Bank and other multilateral and bilateral agencies are assisting SEDAPAL in address some important challenges. The World Bank supports the Optimization of Lima Water and Sewerage Systems Project ("Lima Norte 1"), and the "Lima Norte 2" Investment Program led by SEDAPAL (co-financed by the German Development Bank (KfW), the Japanese International Cooperation Agency (JICA), SEDAPAL and the IBRD) that addresses reduction of non-revenue water in northern Lima. The Lima Norte 1 Project also supports the contracting of key strategic consultancy services to fully integrate SEDAPAL's networks under the SCADA and GIS system, a study on demand and consumption. The World Bank is providing RAS for assessment of WSS private operators and development of a framework of technical, social and institutional and complementary alternatives for water supply and sanitation service delivery.

2.64 Considering the scale and variety of challenges for water and sanitation in the Lima-Callao region, the overall progress since the completion of this project, and the efforts underway to address the issues, on balance, risk to development outcome is rated **moderate**.

Bank Performance

2.65 Quality-at-Entry (QAE): The project's design and elements of the results framework were directly linked to achieving the project development objective. The project was well-conceived within a much broader investment package, which facilitated the complementary co-financing. The Project Management Unit was appropriately situated within SEDAPAL with high visibility and access to the Senior Management Committee and Board of Directors, and a high degree of autonomy over investment, contracting and

procurement decisions. Private sector involvement in public utilities was “hedged” by an alternative approach contained in the legal documents of the project. In retrospect, the original time scale was optimistic – the project spanned a total of about fifteen years (including additional financing) against the planned implementation period of seven years. As discussed in the section on ‘implementation’, approval of additional financing took almost two years but there were also several other delays which the World Bank could have prevented at least partially, for example, through better judging government commitment for building technical capacity, including in procurement. Quality at entry is rated **satisfactory**.

2.66 Quality of supervision: The World Bank displayed diligence in overseeing implementation of the project and initiating transformational changes in SEDAPAL's management culture. Implementation was closely supervised by both regular missions and through the active involvement of Country Office staff. The World Bank’s proactive interventions were important in securing a highly professional degree of operational and financial management expertise in SEDAPAL itself and through outsourcing. The decision to provide additional financing to compensate for the shortfall in connections to low-income peri-urban neighborhoods (including supporting the condominium network pilot), as well as improving SEDAPAL’s management in the latter years of implementation, was carried out with the intention of reducing the risk to development outcome and enhancing the entity's capacity to expand delivery of water & sanitation services.

2.67 In respect of procurement, selection processes for works did not allow for modifications in the minimum contractual amounts for bidders. This is reported to have discouraged many small businesses from participating in the bidding. However, this situation arose from the lack of flexibility in World Bank procurement norms at that time. Delays in the issuing of the World Bank's No Objection to bidding documents are seen to have contributed to implementation delays. Quality of Supervision is rated **satisfactory**.

Overall World Bank performance is rated **satisfactory**.

Borrower Performance

2.68 Government: The government decided not to privatize SEDAPAL as originally intended. The reasons for this were ultimately political given that a private investor would have to put up large upfront investments to improve the existing infrastructure, and would need much higher tariffs to recoup those investments, which would not be politically feasible. However, the government followed the World Bank’s recommendation to sign a back-up management contract agreement between SEDAPAL and the Ministry of Economy and Finance. Under this arrangement, the government demonstrated strong commitment to the project throughout implementation by approving critically important sector reform measures, tariff structures and legal frameworks, and supporting SEDAPAL to implement the required reforms.

2.69 There were a number of institutional and bureaucratic conflicts, which resulted in course changes and long delays in implementation as detailed in the section on “Implementation”. Given the fiscal and financial situation of the country in the late-1990s and beyond, the Ministry of Economy set ceilings on investment levels, which resulted in

restrictions on loan disbursements from the third quarter of 1999 through the end of 2002. Government performance is rated **moderately satisfactory**.

2.70 Implementing Agency: During the project, the implementing agency SEDAPAL radically changed its corporate management approach and work culture including the adoption of a new performance-based compensation and incentive system based on reaching results targets. SEDAPAL delegated project implementation to a specialized Project Administration Unit, created in March 1995. Earlier, during project preparation, a project director was appointed to lead the project preparation, reporting directly to the general manager of SEDAPAL. Overall, the borrower's staff spent a significant amount of time with the World Bank's team in Lima to complete the analysis and discuss project scope, objectives, components and implementation arrangements, demonstrating its commitment and ownership. The Project Administration Unit demonstrated its capacity for implementing the project and the large US\$600 million investment program within which it was embedded, and to simultaneously support an ambitious and wide ranging program of managerial reforms designed to improve SEDAPAL's overall performance. Two aspects contributed favorably to project implementation. First, a Managerial Investment Committee was created to avoid isolation of the Project Administration Unit by providing a high level interface with the rest of SEDAPAL. This committee, which was headed by the General Manager of SEDAPAL, comprised a full quorum of the company's managers, met frequently throughout project implementation and was responsible for approving all of the key procurement and implementation decisions prior to the World Bank's no objection. It played a critical role in ensuring coordination between the Project Administration Unit and other areas of the company. Second, the continuity of staff both on the Project Administration Unit and on the Managerial Investment Committee also contributed considerably to the ease of implementation.

2.71 There were some shortcomings, including dissolving the Project Administration Unit in charge of implementing condominium projects in low-income peri-urban areas at the end of the project, which has resulted in a loss of expertise. With the benefit of hindsight, the condominium implementation unit could have been better anchored within SEDAPAL in order to allow the better rooting of the condominium project principles within the company's main line of business. Overall, implementing agency performance is rated **satisfactory**.

2.72 Overall Borrower performance is rated **moderately satisfactory**.

3. National Rural Water Supply and Sanitation Project

Objectives, Design, and Relevance

OBJECTIVES

3.1 According to the project's Loan Agreement as well as the Project Appraisal Document, the project development objective was to "increase the sustainable use of water

supply and sanitation facilities in rural areas and small towns while emphasizing improvement in hygiene practices and training in operation and maintenance.”⁷

3.2 There is some difference in the wording of the project development objective between the Loan Agreement and the Project Appraisal Document. In the Loan agreement, words “new and rehabilitated” were not included and “in the territory of the Borrower” was added for the Additional Financing in December 2010. However, this difference in wording does not change the essence of the project. The objective stated in the loan agreement will form the basis of the evaluation.

Components and Costs

3.3 The project components and costs were as below:

- **Water Supply and Sanitation in Rural Areas** (cost at appraisal, US\$68.0 million; additional financing cost, US\$48.3 million; at completion: US\$102.0 million). This component included: (i) rehabilitation and expansion of water supply and sanitation systems for about 750,000 people in about 2,500 communities, and on-site sanitation services for about 300,000 people in rural areas; (ii) construction of water supply and sanitation systems and on-site sanitation provision for about 125,000 people in about 600 communities; (iii) technical assistance on accounting, system repair and hygiene education to local water and Sanitation Service Administrative Boards (JASS) and technical assistance on long term administrative and technical support for municipalities. The additional financing was used to fund the significant cost overruns of this component.
- **Water Supply and Sanitation in Small Towns** (cost at appraisal, US\$4.0 million; additional financing cost, US\$0.0 million; at completion: US\$6.6 million). This component covered: (i) technical assistance to help municipalities delegate water supply and sanitation services to private autonomous operators, and (ii) rehabilitation, improvement and expansion of water supply and sanitation systems in about 12 municipalities with delegations agreements to operate them.
- **Capacity Building** (cost at appraisal, US\$2.0 million; additional financing cost, US\$0.0 million; at completion: US\$1.1 million). Included were: (i) technical assistance and training to strengthen the Rural Division of the General Sanitation Directorate (DGSR), the rural water supply and sanitation sector leader, including the preparation of policy and sector studies; and (ii) training to municipalities, regional operators, contractors and skilled labor for: (a) orientation and strengthening of regional operators; (b) accreditation of local professionals and systems operators; (c) health and hygiene education campaigns; (d) analysis of existing sewerage systems in rural areas; (e) micro-credit schemes for rural households to make in-house sanitation investments; (f) designing rural water supply and sanitation information systems; (g) evaluation of watershed protection based upon international and national best practices; (h) review of design standards for rural water supply and sanitation services; and (i) determination of household water consumption patterns.

⁷ 1.2

- **Project Management** (cost at appraisal: US\$2.5 million; additional financing cost, US\$ 2.6 million; at completion: US\$11.3 million). This component covered: (i) operation of the project management unit including external audits, and M&E systems; (ii) technical assistance and logistical support to the regional offices of FONCODES (*Fondo Nacional de Cooperación para el Desarrollo* or National Cooperation Fund for Social Development), which reports to the Ministry of Women and Social Development (MIMDES).

3.4 The components were not revised during project implementation.

PROJECT FINANCING AND DURATION

3.5 The actual project cost was US\$121.5 million. This was somewhat lower than the estimated project cost of US\$130.9 million, which was the sum of the originally appraised project cost of US\$80 million plus additional requirements of US\$50.9 to cover cost overruns and increase in the value of the Peruvian sole. The original World Bank Loan of US\$50 million was fully disbursed. Additional finance of US\$30 million was approved in 2010, but US\$5.1 million of this amount was cancelled at completion. Of CIDA's co-financing amount of US\$5 million, only US\$0.53 million (11 percent) was disbursed. The ICR does not explain the reason for this shortfall, and the mission team did not get any response on this matter from CIDA. Actual borrower counterpart funding of US\$38.1 million exceeded the total US\$33.5 million committed (US\$12.6 million at appraisal plus US\$20.9 million at the time of additional financing). The project was approved in March 19, 2002 and came into effect in January 2003. The Credit closing date was extended twice for a total of 38 months – for 25 months in 2007 – and closed in June 2010.

RELEVANCE

Objectives

3.6 While the need for improving rural water and sanitation in Peru was clear, there was no clear policy and institutional context at the time of appraisal to benchmark the country's priorities in this regard. However, the project development objectives were consistent with the country's commitment to the Millennium Development Goals, and remain relevant to Goal 6 of the recently adopted Sustainable Development Goals – “to ensure availability of sustainable management of water and sanitation for all”. The project reflects the priorities of the current Medium Term Plan (2013-2016) of Peru's Ministry of Housing, Construction and Sanitation for improving the health of rural populations through the provision of better water supply and sanitation services. The project objectives were consistent with two of the three pillars of the World Bank's Country Partnership Strategy (FY2007-11), which emphasized focus on improving the basic living conditions of the poor, including improved water and sanitation, and are in line with the Country Assistance Strategy (FY2012-2016) with its strategic results area of improving supply of water and sanitation services under the broader objective connecting the poor to services and markets.

3.7 Relevance of project objectives is rated **substantial**.

DESIGN

3.8 The project design was clear with the components linked logically to the project's objective of increasing the availability and use of water and sanitation services in rural areas and small towns. The project appropriately addressed weak capacity in the water and sanitation sector at different levels, particularly the communities and municipalities. It included features based on experience in countries at similar levels of development and sector characteristics: (i) a shift from the prevalent supply-driven to a community-driven demand-responsive approach; (ii) introduction of co-financing by the municipalities and communities; (iii) the provision for Regional Operators to be contracted to provide support for community mobilization and organization, engineering design and education activities in project communities; and (iv) piloting of alternative models of delegated management in small town water supply and sanitation, which included local private sector participation ("Specialized Operator").

3.9 The project targeted the rural poor who represented 60 percent of the rural population through the FONCODES poverty map of Peru. The poverty map classified Peru's 1,821 districts by poverty level (extremely poor, very poor, poor, marginally acceptable and acceptable) using indicators such as percent of households without access to potable water and adequate sanitation, percent of households without access to health clinics, and level of inaccessibility by road. Even though the implementation agency changed for the rural WSS component from FONCODES to the project management unit or UGP-PRONASAR in 2006, the project was implemented in some of the poorest departments in the country: Apurímac, Arequipa, Ayacucho, Huancavelica, Huánuco, Junín, Lima, Pasco, Piura, Amazonas, Ancash, Cajamarca, Cusco, Puno, Lambayeque, San Martín and Ica.

3.10 The original objectives remained in force throughout implementation but the targets were changed significantly. In addition, key performance indicators were modified during project restructuring in 2010 to reflect the achievable goals within the remaining implementation time and budget, as outlined in the table below.

3.11 Relevance of project design is rated **substantial**.

MONITORING AND EVALUATION

3.12 M&E Design: The project reports on 2 outcome and 13 intermediate outcome indicators which cover connectivity, and adequacy, reliability, and quality of services; as well as institutional and financial matters such as JASS inspections, billing, and plans and data collection systems. The indicators in the appraisal document and the completion report cover the same ground but are better articulated in the latter. A major shortcoming is the lack of any baseline values. The agency responsible for gathering data was not clearly specified though it was implied that FONCODES (Fondo Nacional de Cooperación para el Desarrollo or National Cooperation Fund for Social Development) which reports to the Ministry of Women and Social Development (MIMDES) – and which was in charge of the operation in the initial years – would be involved.

3.13 M&E Implementation: M&E implementation barely got started and became even weaker over time. The difficulties of accessing the remote locations of the several interventions made it even worse.

3.14 M&E Utilization: Little use appears to have been made of M&E. The World Bank itself could obtain little information on the status of the delivery of the sub-projects or the project outcomes.

3.15 M&E Quality Rating is rated **negligible**.

Implementation

3.16 At appraisal, the project aimed to support the implementation of a demand-responsive and sustainable basic water and/or sanitation services project for approximately 850,000 people in 2,950 rural communities through the construction and rehabilitation of water points, piped systems and sanitation facilities as well as training, operation and management of water and sanitation facilities and extensive hygiene education. Other beneficiaries included 400 municipal governments, which were expected to provide technical assistance to the communities to manage their system better. The Vice Ministry of Sanitation (VMS) was expected to oversee sector, through its General Directorate of Sanitation (*Dirección General de Saneamiento Rural* – DGSR).

3.17 The target for the number of direct beneficiaries with access to improved water sources was reduced from 685,000 in 2006 to 256,400 and beneficiaries with access to sanitation services in rural areas was revised from 616,500 to 242,700 within the same period. The drastic decrease in the number of beneficiaries is a result of cost overruns for which the reasons are explained immediately below.

3.18 The project was restructured four times during calendar years 2006, 2008, 2010 and 2013 (see Table 4). The first restructuring transferred responsibility for implementation from FONCODES (*Fondo Nacional de Cooperación para el Desarrollo* or National Cooperation Fund for Social Development) which reports to the Ministry of Women and Social Development (MIMDES) to the project management unit (PMU) or UGP-PRONASAR, reallocated funds between components and made changes in some project indicators and targets. The second restructuring extended the original project's closing date to December 31, 2010 and address delays in implementation of the sub-projects. The third restructuring provided additional financing of US\$ 30 million to address cost overruns from: (i) underestimation of original costs at appraisal which were based on non-representative experiences of NGOs operating on a small scale; and also to take account of the higher (and initially underestimated) costs for reaching remote and difficult to access areas such as in the Amazon region; (ii) changes in implementation approach following the transfer of responsibility from FONCODES to the dedicated Project Management Unit as well as the expansion of the technology options for sanitation from dry pit latrines to pour flush latrines and ecological toilets; and (iii) inflation and the impact of the increase in the value of the Peruvian Sol given the implementation delays. The first two factors – underestimation of costs and changes in technology options – accounted for over 80 percent of the increase in costs. The fourth and last restructuring advanced the closing date by six months, as the

project design was no longer aligned to the government's policies and the government's PNSR program, which replaced PRONASAR. Feedback from sector staff adds that the project faced administrative obstacles during the period 2001-2006, when Government policies did not enable the set-up of a dedicated/separate project Management Unit (PMU).

Table 4. Project Restructurings*

<i>Restructuring Date(s)</i>	<i>Amount Disbursed at Restructuring in US\$ M</i>	<i>Reason for Restructuring & Key Changes Made</i>
05/05/2006	7.38	Transfer implementation responsibility from FONCODES to the project management unit UGP-PRONASAR and revise targets in results framework.
11/20/2008	21.5	Extend original project's closing date to December 31, 2010
12/13/2010	35.36	Support implementation of additional financing for US\$ 30 million to address shortage of funds; revise targets in the results framework.
06/11/2013	74.36	Close the project as the project design no longer aligned to Government of Peru's policies in the rural water sector; Project closed to allow all rural water and sanitation interventions in Peru to be aligned with the National Rural Sanitation Program.

* All the restructuring were Level which do not require Board approval.

Source: Implementation Completion Report

3.19 The original implementing agency, FONCODES, was expected to build on its expertise in efficiently transferring funds and executing small works in rural areas, and additionally work on the social mobilization and support aspects of the project. However, FONCODES had to contend with delays during the first three years of project implementation, and also faced difficulties in transferring resources from the Ministry of Housing, Construction and Sanitation.

3.20 Weak sector policy and institutions were identified as constraints at project appraisal, and continued to weigh on the project during implementation. Towards the end of the project, the government introduced competing government strategies and programs, principally the PNSR (*Programa Nacional de Saneamiento Rural* or National Rural Sanitation Program), that provided 100 percent financing for infrastructure as opposed to PRONASAR's main principle of co-financing by both the municipality and community (through unskilled labor). After the first project restructuring in 2006, the PRONASAR had around 500 sub-projects in contract under the demand-responsive approach strategy. SEDAPAL clarified that these projects are still being served through the PNSR. Many mayors decided to switch to the options of 100 percent financing. SEDAPAL explains that the PNSR identified the poorest localities with populations between 200 and 2,000 rural inhabitants and excluded localities covered by PRONASAR. Therefore, Mayors that withdrew from PRONASAR projects may have done so due a lack of financial resources.

3.21 By early 2006, after almost two years of unsatisfactory performance, the project handed over to the project management unit (PMU) or UGP-PRONASAR, which had been

implementing the small town's component since the beginning. Following this, disbursements improved, but the time lag began to increase between finalization of technical designs and the start of works, reaching an average duration of 734 days or 2 years as estimated by one source.⁸ The delay was attributed partly to the restructuring process, which emphasized the hiring of Technical Social Operators and Supervisor Operators, which required a 'no objection' from the World Bank, a process that added to the delay. This was compounded by excessive administrative and licensing regimes that led to significant delays in the implementation of sub-projects. Overall, it took around 1,624 days or a little over four years for a sub-project to be completed and transferred and closed, according to official regulations. This was almost three times the amount of time originally planned. This experience was common to all other development agencies.

3.22 The NGO sector was expected to contribute to implementing the project's technical and social components at the regional level, but was unable to play a significant role due to lack of capacity, and difficulty in adjusting to the rigid clauses of the contracts and the demand for a large number of sub-projects to be implemented in each department. Also, there were not enough qualified and experienced Technical Social Operators and Supervisor Operators to handle the large scale of PRONASAR activities. Feedback from sector staff suggests that private sector implementation capacity was mainly limited for two specific reasons: (i) the creation of the National Public Investment System- SNIP, which reduced the capacity of all the consulting companies because it was a new pre-investment process and there were not enough professionals that met the requirements for all the projects that were under preparation; and (ii) given the overall availability of government resources, there was an unusual high demand for water infrastructure projects (Water for All Program), which put additional pressures on the limited supply of qualified consultants.

3.23 During 2001-2004, the favored technical solution or sanitation was the VIP latrine, but this was not found acceptable by rural population which wanted the type of sanitation available to city dwellers. During 2005-12, a hydraulic variety of sanitation base unit was used, made of local material and without any sink outside. From 2012 onwards, the Baños Dignos (stand-alone bathrooms with toilet, washbasin and shower), which is more expensive, is being deployed under the government's PNSR program. This solution was not favored by the World Bank which cited the higher needs for water as one constraint for its use. This concept appears to be changing now – authorities understand that the practical solution is somewhere between latrines and Baños Dignos.

3.24 From the interviews during the mission it is noted that the National Sanitation Plan at the time of project approval included an intervention strategy for rural projects similar to that of PRONASAR's. This policy included: (i) the participation of the community in all the project phases; (ii) co-financing as a key aspect to the community ownership of the service; and (iii) selection of locations through a Demand Response Approach process. However, all of these strategies were ignored during the period 2006-2011, when the indiscriminate

⁸ Unpublished report by the Swiss Agency for Development and Cooperation, quoted by the Project Implementation and Results Report.

transfer of funds without any requirements was intensified, with the only condition of having a project profile, without considering its quality or relevance.

3.25 Bank and government staff explained that during project implementation there were up to four parallel programs in the Sector (PNSR, PROCOES, and Amazonia Rural) negatively impacted PRONASAR's effectiveness. Each one of these programs had different intervention strategies and competed with PRONASAR, since they did not demand any requirements to access their funds (whereas PRONASAR required proof of demand and local commitment as part of its demand driven approach). As a result, several projects that were already on pre-investment phase were lost as the local authorities chose to tap at other doors which did not have such requirements.

SAFEGUARDS AND FIDUCIARY

3.26 Environment and Social Safeguards. The project was placed in Category B under the World Bank's environmental and social safeguard policies. The provisions for Environmental Assessment (OP 4.01) and Physical cultural resources OP/BP 4.11 were triggered. An environmental impact assessment was prepared and appropriately disclosed during project preparation. While most of the project beneficiaries were indigenous people, and had been mainstreamed in the project design, the Indigenous Peoples OP/BP 4.10 was also triggered after the 2006 restructuring, and a social assessment focused upon indigenous people was carried out. An updated "Environmental and Social Management Framework" (ESMF) was prepared and disclosed following the additional financing. New environmental guidelines for consulting firms were updated in 2009 and publicly disclosed in September 2010. This was "incorporated" into the project's revised operational manual.

3.27 It was expected that environmental impacts would not be significant, irreversible or unprecedented. Negative environmental impacts were partially mitigated by proper screening and design, and were expected to be mitigated further by close supervision of construction and operation practices. Environmental clearance for each single subproject was obtained at the prefeasibility stage from the Ministry of Housing, Construction and Sanitation, according to national public investment legislation and environmental sectoral regulations. The responsibility for compliance during implementation was placed on the consulting firms that had to demonstrate compliance the safeguard policies in order to be paid. No major environmental issues are reported to have occurred in the implementation of the parent project, given the small scale of the water supply and sanitation investments financed in rural areas and small towns.

3.28 Financial Management. No major problems were reported in respect of financial management, although there were delays in financial reporting, due to high turnover by government financial staff and the existing institutional arrangements at the Ministry. Audit reports were also delayed owing to the existing processes of Peru's General Controller. There were no reports of qualified audit findings.

3.29 Procurement. Project procurement went well for the most part. Procurement reviews carried out by an "independent" expert included several recommendations for improving

procurement management that were adopted during project implementation. There are no reports of misprocurement.

Achievement of the Objectives

3.30 Efficacy is reviewed here by parsing the project objective into its principal and supporting elements and assessing the achievements under each one:

- Principal objective: To increase the sustainable use of water supply and sanitation facilities in rural areas and small towns.
- Supporting objective (i): To improve hygiene practices.
- Supporting objective (ii): To improve training in operation and maintenance.

3.31 As per standard practice for projects with revised objectives and/or key performance targets, efficacy is formally reviewed here for two separate periods of the project: Period 1 prior to the May 5, 2006 restructuring when the original project performance targets were in force and 10 percent of the loan was disbursed; and Period 2 after the restructuring when the project's sharply truncated performance targets came into force and 90 percent of the Loan was disbursed. Although very little was achieved in Period 1 its impact upon the overall assessment of the project here is very small as it accounted for only 10 percent of the total project disbursements.

3.32 IEG's mission to Peru conducted six focus group discussions – two each in three locations in three different regions/ districts – to get a sense of how the physical and institutional outcomes from the project have been sustained, and to understand the important issues faced by the municipalities, JASS and beneficiaries in this regard. The focus group locations were selected from among the set of treatment districts/villages used in the impact evaluation carried out in 2012, with preference give to locations with higher number of beneficiaries and project investments in water and sanitation facilities; ready availability of technical record of investments; and relatively easy access. The locations were Curamori and Las Lomas (Piura Region); Cangallo (Ayacucho Region), and Canta- Santa Rosa de Quives (Lima Region). The mission met with members of the local water and sanitation management boards (JASS) to learn about the financial, management and technical issues faced by them in providing regular services, and visited the water supply facilities in the three locations to observe their state of operation. Interviews were conducted with technicians from the district municipalities responsible for providing technical assistance to the JASSs. The findings from the focus groups and other discussions are presented under the relevant objectives in following paras. A more detailed account of the focus groups discussions is in Appendix D.

Principal objective: To increase the sustainable use of water supply and sanitation facilities in rural areas and small towns. Rated **modest** (assessed against original outcome target - *Negligible*; against revised outcome target - *Modest*):

3.33 Water Supply. The project helped an additional 211,323 people access improved water supply services against an original appraisal target of 685,000 and a restructured target of 256,400 (82 percent). The project constructed 78 new water supply systems and rehabilitated 282 existing systems and provided 34,299 household water connections in 380

rural communities across the country. An impact evaluation⁹ that included 860 interviews of households in 43 locations in eight departments in 2005 (baseline) and the 2014 (end-line) found significant increases access to continuous water sources by completion: from 37 percent to 100 percent where new systems were built, and from 83 percent to 90 percent where existing systems were rehabilitated, though this finding was not statistically significant.

3.34 Sanitation. The project helped an additional 180,607 people access improved sanitation services against an original appraisal target of 616,500 and a restructuring target of 242,700 (74 percent). The project provided 27,818 hygienic sanitation facilities in 380 rural communities across the country. The impact evaluation also found a significant difference in the increased use of sanitation facilities over 2005-2014: 59 percent in project localities against 16-36 percent in unassisted localities. The survey did not confirm that the sanitation facilities actually used were indeed hygienic.

3.35 Overall, access to improved water sources in the areas where PRONASAR implemented their sub-projects was much higher, 78 percent in 2005, compared to the national rural access figure, which was 33 percent.

3.36 Increasing sustained use of water supply facilities. There was a marked increase in the percentage of communities with systems that are functioning without serious problems from 2005 to 2014 in intervention areas, showing increased sustainability. The percentage of localities with systems that are functioning without serious problems increased by 69 percent between 2005 and 2014 in intervention areas compared to 27 percent in non-intervention areas, showing increased sustainability of the WSS facilities as a result of PRONASAR. In addition, systems provide continuous water services through household water connection for at least 12 hours per day in 73 percent of the communities. Furthermore, the endline study shows statistically significant results on the households' use of improved water sources for consumption and cooking. Where PRONASAR financed new systems, the increase was much higher than where it financed rehabilitated systems: respectively 61 percent and 8 percent increase in intervention areas, compared to 27 percent and 6.6 percent in non-intervention areas.

3.37 Increasing sustained use of sanitation facilities. A smaller but also significant increase of 11 percentage points can be observed in the impact of the PRONASAR in the increased use of hygienic sanitation in its intervention areas compared to those that did not benefit from the Project. There was a dramatic increase in the percentage of men, women, and children over three years of age who used latrines in the intervention areas compared to non-intervention areas. For both new and rehabilitated systems financed by the project, this percentage increase was 59 percent between 2005 and 2014, a significant difference from the non-intervention areas where the latrine usage rate only increased by 16 percent for new systems and 36 percent for new systems in the same time period.

3.38 The mission's site visits in the areas where focus group discussion were held confirmed that the project completed the multiuse washing installations as planned and the

⁹ The consulting firm based in Peru, SASE Consultores, carried out the studies in both years.

beneficiaries expressed satisfaction with the drinking water facility works implemented, except in the case of Ayacucho, where mention was made that one zone receives water on an irregular and highly limited basis, due to a technical problem. Respondents from Curamori and Trapiche showed greater satisfaction with drinking water services compared to Pampacruz where there are frequent interruptions in the lower zones. The water supply is generally of good quality, and is treated with chlorine. The majority of the sanitation installations are currently in operation and use. The population frequently performed the cleaning and disinfection of their bathrooms or latrines. In Trapiche, several beneficiaries had upgraded their shower, toilet and sink facilities.

3.39 In respect of payment for services, there is a high delinquency rate in the project areas of Trapiche and Pampacruz, even though the users themselves set the rates, which are quite low at Cangallo at 1 sole, and Trapiche, 5 soles (3 soles water and 2 soles sewerage), per month. In Curamori, the project has installed a micro-metering system per cubic meter, and the payments currently allow for basic operation and maintenance. However, delinquency appears to be on the rise due to the relatively higher rates (20-25 soles per month (US\$ 6.35 – 7.94), on average).

Supporting objective (i): To improve hygiene practices. Rated **negligible** (assessed against original outcome target - *Negligible*; against revised outcome target - *Negligible*)

3.40 The project did not have a significant impact on household health and hygiene practices. The evolution of the following indicators over the 2005 - 2014 period showed no significant differences between communities assisted by the project and similar (control) communities that received no assistance: (i) children under five with diarrhea in the past 15 days; and (ii) percentage of mothers with adequate hand washing practices. Improvements were recorded for both indicators, but they could not be attributed to the project as they were as much in evidence in communities not assisted by the project as in the project communities themselves.

3.41 The lack of impact on behavior change can possibly be attributed to the lack of intensity and frequency of the behavior change intervention. There is a need to further link the water and sanitation sector to the education and health sectors to maximize the effectiveness of interventions. The endline data shows that there is already an increase in collaboration between the water and sanitation and education sectors: there was a 42.1 percent increase (from 10.53 percent in 20015 to 52.63 percent in 2014 in the percentage of district municipalities who collaborated with the Ministry of Education in terms of cash, manual labor or other activities related to water and sanitation, in the past year.

3.42 The focus group discussions indicated only isolated cases of gastrointestinal diseases, and most participants including men and women report adequate hygiene and hand washing practices. While this could be partly attributed to the project's efforts, there is greater availability and use of primary health care centers apart from others, for diarrheic diseases, both in for children under the age of five and in senior citizens and adults, although there is still a culture of self-medication. Women respondents exhibited greater awareness and responsibility for hygienic habits and sanitary conditions for the latrines and bathrooms installed by the project. Almost all women respondents reported regular handwashing

relation to cooking and sanitary activities, and appear to insist on similar behavior from their families including children. In addition to the extension activities sponsored by the project, the respondents gained from information and activities in schools provided by the Ministry of Health.

Supporting objective (ii): to improve training in operation and maintenance. Rated **negligible** (assessed against original outcome target - *Negligible*; against revised outcome target - *Negligible*)

3.43 A pilot assessment of ten systems visited by the project management unit found that none of them generated sufficient revenues to fully cover operational and maintenance costs. Seven of the ten systems provided service for more than 16 hours per day by completion-- although comparable baseline or target values for this indicator are not available. Only one of the ten used metering to measure individual customers' consumption.

Strengthening local communities' capacity to manage services

3.44 At the community level, the responsibility for water and sanitation services rests with the Community Water and Sanitation Services Association (JASS). A JASS is composed of volunteers who do not receive any compensation for their work. It is legally constituted as the Social Management Committee and is registered at the municipality. Members of a JASS are expected to be rotated every two years. The Municipality is one of the few institutions that provide support, although in a very limited capacity, mainly in terms of training and technical assistance for the JASSs.

3.45 At project completion it was reported that the project helped strengthen local communities to manage, operate and maintain their water and sanitation service. A 38 percentage point increase was noted in the percentage of JASS that were trained in managing, operating, and maintaining their water and sanitation services; a 33 percentage point increase in the percentage of JASS with a complete and fully-functioning equipment; and a 46 percentage point increase in the percentage of JASS trained in the daily chlorination. However, the percentage point increase (25 percent) of systems in which daily chlorination is done was lower. There was also dramatic reduction of 67 percentage points in the percentage of JASS that know the method of calculating family contributions to operations & maintenance costs.

3.46 However, feedback to the mission from government officials, independent consultants, and respondents in focus group discussions suggests that in practice, municipalities provide limited support to the JASSs beyond sporadic training or financial assistance. There is a lack of monitoring and supervision of the JASS performance by the municipalities and Ministry of Housing, Water and Sanitation. An official went so far as to suggest that the exact number of JASS is not known to the administration, though it is estimated to be around 90,000. The government's PNSR program has yet to develop an effective strategy to meet the need for ongoing financial and technical support for its projects and sub-projects, as well as those implemented under PRONASAR. The government clarifies that in the last quarter of 2014, a stimulus plan was prepared jointly by the Ministry of Economy and Finance and the Ministry of Development and Social Inclusion for local

governments comprising not only capacity-building but also granting funds to subnational governments for maintaining works within their jurisdiction.

3.47 The focus groups discussions confirm that a JASS is composed of volunteers with no remuneration, and typically with limited or no resources to build managerial and administrative capacities. A lack of permanent water operational staff (operators) that maintain water service infrastructure facilities, and a lack of resources to hire such persons is a further handicap for JASS, as evident in the focus group’s interactions in Cangallo-Ayacucho. There is a frequent turnover of members and abandonment of duties in the JASSs. In the case of Trapiche, improvements were implemented in the sewerage system with the help of the municipality, but this appears to be a rare case that was made possible by the personal intervention and access of JASS members. In addition, it was noted that the administrative knowledge and project files were not transferred to the new JASS members. Financial and accounting files are not kept adequately. For instance, the JASS in Trapiche was aware of tools developed for this purpose by the project, but they were not used.

Strengthening municipal--district and provincial--level capacity to plan and oversee water and sanitation services to rural communities in a sustainable and cost effective way

3.48 The key indicators related to capacity building of local governments were not favorable as reported at project completion. The impact survey showed that the percentage of municipalities that have incorporated and carry out their planning, supervision, monitoring, and evaluation functions in water and sanitation services in rural communities had decreased from 42 percent in 2005 to 32 in 2014. Another indicator that shows the effect (or lack thereof) of the project on district municipalities is the percentage of municipalities with at least one person who knows the management activities of the JASSs. The baseline figure was 16 percent and this did not increase in the end-line, raising questions about the long-term involvement of the local governments in the water and sanitation services in the intervention areas. Feedback to the mission from JASS members and from municipal staff confirms these findings.

3.49 One of the key instruments for decentralization under PRONASAR was the “mesa de concertación” outlined in the PAD, a consultation “space” for the prioritization of development projects in the districts. However, the endline data from the impact valuation shows that the percentage of districts with a “mesa de concertación” or similar mechanism decreased from 47 percent to 42 percent.

Supporting the National Sanitation Directorate and the Vice-Ministry of Sanitation in the normative and policy role

3.50 This objective was partially achieved and the intermediate results were partially achieved. The strategy of a key policy document, the National Sanitation Plan (2006-2011), developed during President Alan Garcia’s term were similar to the strategy and policy proposed by PRONASAR towards the beginning of the last decade (2000). There was some progress in sector development with the creation of the National Sanitation Directorate and the Vice Ministry of Sanitation by the time the Project was approved in 2002 as well as the development of a ten-year strategic plan (2002-2011) adopting policies that aligned greatly

with PRONASAR, such as community participation, private sector participation, and acceptance of an enhanced role of district municipalities for the provision of WSS.

3.51 Improving sustainable management of WSS facilities in small towns through the establishment of Specialized Operators and training on operation and maintenance. This objective was not achieved and none of the five intermediate results targets were achieved. Almost three years after the small towns component of the project closed, the UGP carried out an assessment of the pilot project and found that none of the ten systems visited had operational revenues greater than or equal to 110 percent of operational expenditure, seven out of the ten systems provided continuous service for more than 16 hours a day and only one city out of 10 continued using micro-metering in billing its customers.

Efficiency

3.52 Rated **negligible** (assessed against original outcome target - *Negligible*; against revised outcome target - *Negligible*)

3.53 At appraisal, the project had planned to benefit 750,000 people for US\$80 million. By completion, actual spending had risen to US\$121.5 million benefitting only 250,000 people. The appraisal promise of a project cost of US\$107 per beneficiary had risen nearly fivefold to US\$486 per beneficiary. Added to that, project implementation itself was far less efficient than originally proposed; it took eleven years, nearly double the six years originally scheduled for what would have been a much larger operation.

3.54 At appraisal a sample of seven sub-projects yielded an estimated an average ERR of 71percent and the "average" and an average NPV of US\$10,940. It was not clear if the sub-projects were representative of the total set of sub-projects. Costs in this analysis included capital investment and recurrent operations and maintenance, plus (unspecified) institutional development and community development costs. The analysis counted direct user benefits to include time and other savings from avoiding individual water treatment, as the need to boil water, for example. The appraisal cost-benefit analysis also counted the willingness to pay for increased water consumption and (unspecified) health benefits. The appraisal sample would have served 5,751 beneficiaries, 0.9 percent of the (originally) intended total of 650,750, and presumably a similar proportion of cost. However the individual ERRs for the projects varied as much as between 8.1 percent to an improbable 1,200 percent. Also, a detailed cost-benefit analysis of 36 "potentially eligible" sub projects yielded an average NPV per sub-project of US\$161,894 and average ERR of 17 percent.

3.55 At completion, a cost-benefit analysis was made based on results from nine subprojects that were not necessarily representative (out of 366 sub-projects financed under this operation) covering 13 communities selected from among those that had taken part in the project's impact evaluation. The net present value (NPV) of each of the chosen subprojects, at a discount rate of 14 percent, was negative and their average economic rate of return (ERR) was 3 percent. These NPVs and ERRs clearly point to inefficient investments by this project. While the cost of the sampled projects was not available, the number of beneficiaries were about 2.2 percent of the total (5,566 out of 250,000).

Project Ratings

OUTCOME

3.56 As per standard practice for projects with revised objectives and/or key performance targets, relevance of objectives is formally reviewed here for two separate periods of the project: Period 1 prior to the May 5, 2006 restructuring when the original project performance targets were in force and 10.0 percent of the Loan was disbursed; and Period 2 after the May 5, 2006 restructuring when the project's sharply truncated performance targets came into force and 90.0 percent of the Loan was disbursed. Although very little was achieved in Period 1. Its impact upon the overall assessment of the project here is very small as it accounted for only 10 percent of the total project disbursements. The original objectives remained in force throughout implementation but the targets were changed significantly.

3.57 The overall development outcome is rated **unsatisfactory**. Relevance of the development objective is rated **substantial** before and after restructuring (which was essentially a significant reduction in project targets rather than a change in project intent). Relevance of the project design is rated **substantial** before and after restructuring. In terms of project achievements, the principal objective of increasing the sustainable use of water supply and sanitation facilities in rural areas and small towns is rated **negligible** before restructuring. The first supporting objective of improving hygiene practices is rated **negligible** before and after restructuring as an impact evaluation did not see any significant differences in such behavior vis-à-vis non-project control areas. The second supporting objective of “improving training in operations and maintenance” is also rated **negligible** before and after restructuring due to a general lack of any discernible cost recovery for operations and maintenance, continuing lack of capacity to manage the facilities, and lack of administrative and financial support to local governments and community organizations. Efficiency is rated **negligible** before and after restructuring. The appraisal promise of a cost of US\$107 per beneficiary rose nearly five-fold to US\$486 per beneficiary at project completion.

RISK TO DEVELOPMENT OUTCOME

3.58 The project development outcomes are subject to several risks. These relate to community participation, and various factors impacting community-based management of water and sanitation assets through JASS. Community participation has been uneven during the projects, and it is likely to further decrease as the economy improves overall, increasing the opportunity cost for beneficiaries to contribute free labor. The voluntary (rather than contractual) and unpaid nature of JASS membership does not offer any basic incentive for it to function in a cohesive a purposive manner. Lack of financial resources makes it difficult for JASS to conduct operations and maintenance in any meaningful way, without being able to pay for technically skilled persons, even if they were available. The low willingness to pay

and delinquency in payments observed in many cases further undermines the financial status of JASS. The municipalities do not play any significant role in supporting JASS financially or through technical assistance.

3.59 Overall, the process of decentralization has not been accompanied by appropriate capacity-building, responsibilities and accountability down the line from regional governments to district level entities to municipalities and further to JASS. Transfer of responsibilities should be to the level that yields positive externalities, accompanied by a certification of capacity. There appears to have been little systematic thought devoted to realizing economies of scale, which may drive the level of decentralization in different contexts. This model has been used for maintenance of rural roads in Peru.

3.60 As the implementation of this project has made evident, Peru is short of the private firms and NGOs needed to execute the project especially on the scale originally foreseen, but also to carry out the ongoing operations and maintenance of water supply and sanitation systems of the type delivered. Community participation worked to some extent during the project's truncated implementation, but as mentioned, above, this may not continue as labor's opportunity costs increase with rising incomes.

3.61 The lack of impact on behavior change can possibly be attributed to the lack of intensity and frequency of the behavior change intervention. There is a need to further link the water and sanitation sector to the education and health sectors to maximize the effectiveness of interventions.

3.62 There has been less attention to sanitation overall, as the responsibility water supply falls on the local government, but not necessarily for sanitation. At this point the government's focus seems to be on providing infrastructure, which is a strength of the municipality, but the arrangements for operations & maintenance, as discussed above, are not proportionately in place.

3.63 Overall, Risk to Development Outcome is rated **high**.

World Bank Performance

3.64 Quality at entry. The project preparation was carried out by a multi-disciplinary World Bank team and took into account prior World Bank experience in the area in other similar countries. However, there were several major shortcomings in ensuring quality at entry, which had serious consequences project implementation.

3.65 The estimates of unit costs were incomplete and inaccurate and turned out to be only 20-25 percent of the actual unit costs that were eventually incurred. The project paper for additional financing points out that some portion of the cost increase was due to changes in the implementation approach, but was also caused by inflation, and appreciation of the local currency by 20 percent against the US dollar from appraisal to completion. The underestimation of costs led setting beneficiary targets that proved to be over-ambitious.

3.66 The assessment at appraisal that "FONCONDES has shown the superiority of its model in getting systems built at low cost in a relatively short period of time" turned out to be exaggerated, when it became clear that it could not scale up its operations to match the project's needs. While this does not necessarily argue against the FONCODES model, there was inadequate appraisal of the availability and capacity of private firms and NGOs in Peru to implement the project's social and technical components. Prior NGO experiences in Peru had been localized and on a much smaller scale than what the project planned to achieve. The project design, which relied heavily upon private operators and NGOs to implement the new systems did not sufficiently take this into account.

3.67 There were other risks that were underestimated. The integration of physical investments with training in operations & maintenance, hygiene education and long-term follow-up proved to be more difficult than anticipated given the novelty of the approach to the Peru context, and the scope and depth of intervention needed in thousands of communities that the project hoped to benefit.

3.68 Quality at entry is rated **unsatisfactory**.

3.69 Quality of supervision. The World Bank conducted over 21 supervision missions over the project duration of eleven years, averaging approximately two per year. Performance ratings by supervision mission appear, at times, to have been unduly positive. Fully Satisfactory ratings were awarded for implementation progress during the project's first two years, 2002-2004, when only US\$1.4 million of a US\$50 million loan had been disbursed, instead of ten times that amount that should have been disbursed by that time. Project documentation during the subsequent 2004-2006 period was more realistic in noting "two years of unsatisfactory performance". . Although the World Bank team restructured the project to help move it forward, implementation did not pick up significantly beyond 2006. The complexity of the project, its lack of flexibility and reluctance to change existing work methods came in the way of resolving implementation problems. In retrospect, the World Bank supervision team may have missed opportunities to restructure the project in a more meaningful and effective way for the outcomes to be effectively achieved.

Quality of Supervision Rating is rated **moderately unsatisfactory**

Overall World Bank Performance Rating is rated **unsatisfactory**.¹⁰

Borrower Performance

3.70 Government Performance. Government support for and ownership of the project were uneven over the project duration. There were delays in budget allocations and project resources transfers owing to the lack of coordination between different Government ministries and agencies. Different sections of the government were not always aligned to the conceptual framework of the project. Specifically, the government retracted on the demand-

¹⁰ Following the harmonized IEG-OPCS guidelines, the lower of the Quality at Entry and supervision ratings is given to the overall World Bank performance rating in line with the development outcome rating.

driven approach when it designed the PNSR program to provide water and sanitation infrastructure on a 100 percent grant basis. No significant emphasis was placed on strengthening municipalities and communities in their efforts to provide and operate water and sanitation services. Project performance was also undermined by long delays in the appointment of key project staff by the government. On the positive side, however, the government paid in three times as much counterpart funding as was originally promised at appraisal.

3.71 Government Performance is rated **moderately unsatisfactory**.

3.72 Implementing Agency. FONCONDES was not able to adjust to the demand-driven and participatory approach adopted by the project, resulting in severe delays. Even after the PRONASAR project management unit took over the responsibilities for implementation, protracted processing of sub-projects mentioned in the previous section was made worse by delayed licensing so that individual sub-projects took on average 4.5 years to complete construction, three times the 1.5 years originally foreseen. A donor report found that, on average, it took more than two years for sub-projects with detailed technical designs finalized to start works. However, it is noted that the delay was partly due to the need to seek the no-objection of the World Bank in every case. Overall three reasons can be ascribed to the implementing agency's weak performance: (i) unduly centralized project team with insufficient local field presence; (ii) lack of coordination and participation of local level stakeholders; and (iii) inadequate M&E to monitor progress and provide feedback for mid-course corrections towards project objectives. The implementing agency was also handicapped due to the shortage of private firms and NGOs for designing and implementing sub-projects.

Implementing Agency Performance is rated **unsatisfactory**.

Overall Borrower Performance is rated **unsatisfactory**.

4. Lessons Learned

Lessons

A strong focus on project outcomes and adequate accountability mechanisms are key factors to the achievement of significant improvements in service provision. The project's design focused on performance and outcomes, and provided for a management contract between SEDAPAL and the line ministry with annual performance targets, with arrangements for institutional capacity development, performance-linked financial incentives, accompanied by effective monitoring.

Efforts to replicate successful experiences from other contexts must carefully take into account the receptivity of the implementing institutions and beneficiaries. The pilot effort to bring low-cost condominium networks to low-income peri-urban areas yielded limited results and was eventually discontinued due to insufficient social acceptance, the preference of beneficiaries for conventional networks, and the reluctance of SEDAPAL and contractors to depart from conventional network norms and methods. In retrospect, the

receptivity of both beneficiaries as well as SEDAPAL and the contractors was not adequately gauged.

Resource conservation techniques can yield quick benefits to liberate water resources for new clients. The project provides a successful example of the comprehensive and synchronized application of demand and supply management techniques to liberate water resources. These made it possible to simultaneously achieve improved coverage and continuity of service in what had been, before the project, a heavily constrained resource that was widely rationed. It also provides a powerful illustration of the potential magnitude of customer response by sending economic signals through the pricing of water.

Project design needs to address gaps and weaknesses in sector institutions and governance identified during project preparation, failing which the risk to achieving project outcomes and timely implementation is much increased. In this project, the World Bank made an adequate diagnosis of the sector institutions, but failed to make significant provisions to deal with them, thus affecting project implementation.

The modalities of cost-sharing and community participation need to be adapted to the local context and supplementary resources made available as needed. Many municipalities did not have significant budgetary resources to participate in the project. In addition, over time, rural communities became less inclined to contribute free labor or local materials as other economic opportunities opened up. This affected contractor interest and affected overall project progress. In such situations, alternative means should be sought to fill the resource gap.

Community participation in planning and operations underpins sustainability, but adequate training support, financial incentives, and contractual arrangements are necessary for continued and effective participation. The community water and sanitation services associations (JASS) are seen as key to the operations and maintenance of rural water and sanitation facilities. In practice they have generally not been effective and there is a lot of turnover, due to insufficient capacity and financial resources. It appears that well-organized and trained people may assume the management, operation and maintenance of rural facilities, but to ensure sustainability there needs to be provision for training, a contractual arrangement of accountability, and compensation.

Behavioral change for improved water and sanitation-related hygiene requires ongoing engagement with the community, and collaboration with health and education sectors. The effort to change and sustain hygiene-related behavior needs to go much beyond sporadic visits to communities by extension staff during the project. It is important to reinforce the messages after the project; doing this requires a multi-sectoral approach that includes not only the health and education sectors but also the private sector, to the extent possible. Continuous training of frontline workers and delivery of such training through local governments appears to be key to this effort.

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APPENDIX A. Basic Data Sheet

LIMA WATER REHABILITATION AND MANAGEMENT PROJECT (IBRD-38110)

Key Project Data (amounts in US\$ million)

	Appraisal estimate	Actual or current estimate	Actual as % of appraisal estimate
Total project costs	306.2	311.8	102
Loan amount	150.0	170.0	113
Cofinancing	156.2	141.8	91
Cancellation			

Cumulative Estimated and Actual Disbursements

	<i>FY95</i>	<i>FY96</i>	<i>FY97</i>	<i>FY98</i>	<i>FY99</i>	<i>FY00</i>	<i>FY01</i>	<i>FY02</i>	<i>FY03</i>	<i>FY04</i>	<i>FY08</i>
Appraisal estimate (US\$M)	26.5	33.9	64.7	105.1	141.4	147.4	150.0	150.0	150.0	150.0	150.0
Actual (US\$M)	0.0	4.0	8.1	20.7	85.7	113.2	131.5	140.8	149.5	150.0	149.7
Actual as % of appraisal	0	11.8	12.5	19.6	60.6	76.7	87.6	93.8	99.6	100	99.8
Date of final disbursement: January 2009											

Project Dates

	Original	Actual
Initiating memorandum		
Negotiations		09/23/1994
Board approval		11/22/1994
Signing		02/02/1995
Effectiveness	08/31/1995	08/31/1995
Closing date	06/30/2001	03/31/2009

Staff Inputs (staff weeks)

Stage of Project Cycle	Staff Time and Cost (World Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		

Stage of Project Cycle	Staff Time and Cost (World Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
FY92	16	89.4
FY93	28	163.56
FY94	69	398.98
FY95	16	91.14
FY03	3	16.42
Total:	132	759.50
Supervision/ICR		
FY95	9	50.36
FY96	6	31.95
FY97	10	59.85
FY98	8	48.16
FY99	10	59.59
FY00	19	46.32
FY01	12	56.96
FY02	10	61.67
FY03	13	83.79
FY04	20	119.78
FY05	13	101.79
FY06	15	73.83
FY07	9	77.03
FY08	20	94.81
FY09		
Total:	174	965.89

Mission Data

Stage of Project Cycle	Staff Time and Cost (World Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY92	16	89.4
FY93	28	163.56
FY94	69	398.98
FY95	16	91.14
FY03	3	16.42
Total:	132	759.50

Stage of Project Cycle	Staff Time and Cost (World Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Supervision/ICR		
FY95	9	50.36
FY96	6	31.95
FY97	10	59.85
FY98	8	48.16
FY99	10	59.59
FY00	19	46.32
FY01	12	56.96
FY02	10	61.67
FY03	13	83.79
FY04	20	119.78
FY05	13	101.79
FY06	15	73.83
FY07	9	77.03
FY08	20	94.81
FY09		
Total:	174	965.89

Other Project Data

Borrower/Executing Agency:

Follow-on Operations

<i>Operation</i>	<i>Credit no.</i>	<i>Amount (US\$ million)</i>	<i>Board date</i>
Optimization of Lima Water and Sewerage	IBRD-80250	64.9	04/07/2011

NATIONAL RURAL WATER SUPPLY AND SANITATION PROJECT (IBRD-7142; IBRD-7978)

Key Project Data (amounts in US\$ million)

	Appraisal estimate	Actual or current estimate	Actual as % of appraisal estimate
Total project costs			
Loan amount	50.0		
Cofinancing	30.0		
Cancellation			

Cumulative Estimated and Actual Disbursements

	<i>FY03</i>	<i>FY04</i>	<i>FY05</i>	<i>FY06</i>	<i>FY07</i>	<i>FY08</i>	<i>FY09</i>	<i>FY10</i>	<i>FY11</i>	<i>FY12</i>	<i>FY13</i>	<i>FY14</i>
Appraisal estimate (US\$M)	4.0	11.5	25.0	38.5	48.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Actual (US\$M)	.5	1.3	3.1	7.8	10.8	18.7	25.0	31.5	37.9	48.1	74.3	74.8
Actual as % of appraisal	12.5	11.3	12.4	20.2	22.5	37.4	50.0	63.0	75.8	96.2	148.6	149.6
Date of final disbursement: June 2011												

Project Dates

	Original	Actual
Board Approval		08/29/2002
Signing		09/13/2002
Effectiveness		03/12/2003
Closing date	12/31/2008	06/30/2013

Staff Inputs (staff weeks)

Stage of Project Cycle	Staff Time and Cost (World Bank Budget Only)	
	No. of staff weeks	USD (including travel and consultant costs)
Lending		
FY00	8.65	37,430.91
FY01	9.80	71,324.28
FY02	39.33	297,165.41
FY03	10.12	45,939.69
FY04	1.45	262.08
FY07	0	11.26
Total:	69.35	452,122.37
Supervision/ICR		
FY03	14.75	71,201.82
FY04	23.29	86,338.58
FY05	24.90	104,397.78
FY06	34.07	135,201.52
FY07	44.72	162,689.99
FY08	30.11	109,836.44
FY09	35.59	170,287.76
FY10	29.32	117,795.47
FY11	23.51	88,516.78
FY12	26.71	135,931.39

FY13	24.90	99.032.14
FY14	9.68	38,367.55
Total:	321.55	1,084,633.69

Mission Data

Names	Title	Unit
Lending		
Supervision/ICR		
Christophe Prevost	Sr. Water and Sanitation Specialist	LCSWS
Lizmara Kirchner	Sr. Water and Sanitation Specialist	LCSWS
Ana Lucía Jimenez Nieto	Financial Management Specialist	LCSFM
Jean-Jacques Verdeaux	Sr. Procurement Specialist	LCSPT
Sandra Arzubiaga	Communications Officer	LCREA
Blanca Lopez Alascio	Consultant	LCSWS
Selene del Rocio La Vera	Procurement Specialist	LCSPT
Omar Guido Concepcion	Extended Term Consultant	LCSDU
Raul Tolmos	Environmental Specialist	LCSEN
Pamela Sofia Duran Vinueza	Team Assistant	LCSWS

APPENDIX B. List of Persons Met

PPAR Mission to Peru – List of People Met

Mr. Jorge Guibo, Ministry of Economy and Finance

Mr. Víctor Manuel Sevilla Gildemeister, Director Ejecutivo, Ministry of Housing, Construction and Sanitation

Mr. Fernando Momly Hada, Presidente Consejo Directivo, SUNASS

Mr. Alberto Rojas Morote, Gerente General, SUNASS

SEDAPAL

Mr. Ing. Humberto Chavarry Arancibia, Gerente de Proyectos y Obras, SEDAPAL

Ms. María Teresa Ciudad Eulogio, Gerente de Finanzas, SEDAPAL

Ing. Danilo Vergara, Ing. Juan Moreno, Ing. Arturo Parra, Ing. Yuri Sánchez- Team Of EDE (SCADA Systems - Plan- and Networks) and (Information and Communication Technologies)ETIC

Ing. David Chong, Ing. Miguel Vega and Yuri Sánchez – Team of Business management and micromasurement (EGCM)

Ing. Liliana Gamarra, Ing. Yuri Sánchez – Team of Control and Reduction of Leakage (Sectorization topic)

Ing. Ana Mendoza, Ing. Teobaldo Llanos, Ing. Plácido Aguirre Alata – Project Explanation

Mr. Adalberto Huamán, Ms. Maritza Guillén, Mr. Juan Calderón – Financial aspects of the project and the company

Civil Society / Research Institution

Ms. Mariana Alegre Escorza, Coordinadora General, Lima Cómo Vamos

Mr. Juanjo Arrué, Coordinador de Proyectos Perú y Latinoamérica, Community Design Group

Mr. José Luis Escaffi, Gerente General, AC PUBLICA

Mr. V. Raúl Guerrero De los Ríos, Consultor Asociado, SASE Consultores

Mr. Javier Escobal, GRADE

JICA

Mr. Kengo AKAMINE, Representante Residente Asistente, Sectorista Senior

Other

Mr. Alfredo Mannucci del Rio, Gerente de Proyecto Adjunto, Nippon Koei LAC Co., Ltd

Mr. Jaime Salcedo Lobaton, Ingeniero Sanitario, Consultor

Mr. Victor Javier Acosta Sotomayor, Sociólogo

World Bank

Mr. Alberto Rodríguez, Country Director, World Bank

Mr. Christophe Prevost, Senior Water and Sanitation Specialist and Task Team Leader, World Bank

Mr. Miguel Vargas-Ramirez, Senior Water and Sanitation Specialist and Task Team Leader, World Bank

Mr. Oliver Braedt, Program Leader, World Bank

Ms. Iris Marmanillo, Especialista Sénior en Agua y Saneamiento, World Bank

Mr. Gustavo Perochena, Economista Sénior, World Bank

Mr. Fernando Julio Laca Barrera, Extended Term Consultant, World Bank

APPENDIX C. The ‘Condominial’ Approach

The effort to connect people in low-income peri-urban neighborhoods included the implementation of the “condominial” approach – a low-cost sewerage network technology used most successfully in Brazil to reduce significantly investment costs and service tariffs by up to 40 percent through the joint connection by blocks rather than more traditional and more expensive individual connections. (See Box 1). However this approach required significant community cooperation, and responsibility for maintenance. Specific figures of households connected through condominial networks were not made available to the mission, and may not be available. However, it is clear that this number is very small compared to conventional network connections. After making a strong and commendable effort, the condominial approach was essentially discontinued.

Despite this, the condominial experiment warranted a deeper examination to draw lessons for future efforts of this kind, and the mission met with retired engineers that were involved in developing the condominial systems in Lima’s peri-urban areas as well as social promoters that worked with the beneficiary communities. The mission also visited a peri-urban community in District Ventanilla-Cono Norte which has a functioning condominial system.

The World Bank sponsored study tours to Brazil and Bolivia for Peruvian officials to learn from their experience in this regard. The condominial effort began as a small pilot operation in peri-urban area in Lima in a sandy and rocky area. With the World Bank’s encouragement, condominial system pilots were attempted for lot sizes of 700 to 1000 and the feasibility of the technology under these conditions was proved.

The mission learnt from various respondents that the implementing agency staff and social science promoters began the condominial effort by consulting with community leaders and with families, especially with housewives, providing them with blueprints and features of the condominial network. The leader were initially skeptical as to whether SEDAPAL would carry out these plans. There was also suspicion from the presence of heavy land-working machinery, especially since many families had migrated from mining areas and had negative associations with such equipment. Because the condominial system involved digging under the houses, the residents felt they were being singled out, and asked officials whether they would do be allowed to do anything similar in richer neighborhoods. Also, the condominial network uses a smaller diameter pipe and the residents felt they were being shortchanged compared to middle-class and richer neighborhoods. However some breakthroughs were made as in the Ventanilla settlement.

Condominial systems in this area were built during 2010-2011. Since many households did not have a proper land title, clearance was obtained for installing the gear with an initial possession title that would be later converted into a property title. After the network connections were made, the beneficiaries initially installed artisanal products at US\$5 for toilet and US\$3-4 for a sink, but gradually switched to better quality products.

The mission met with the local citizen’s representative for water and sanitation recognized by the municipality, for an area covering covering 15-20 blocks. The representative explained that the area was mainly sandy with a rocky under surface. Prior to the condominial

networks, water was transported by trucks. About 745 homes in the representative's area were provided with condominial water and sanitation. All of these homes have functioning water supply, lavatories, and bathrooms. Initially there was opposition to the condominial system from local residents because nearby localities had a conventional water and sanitation system. There is now water supply for 20 hours a day, though homes situated at higher levels get water for lesser durations. The water is metered and charged at 1.05 soles for consumption below 20 cum, and 1.40 soles for consumption of greater than 20 cubic meters. In contrast, water trucks charge 3.75 soles/cubic meter. However, the representative secretary feels that going forward, new homes would prefer the conventional system. The representative said that water-borne illnesses had reduced since the arrival of the condominial networks.

While the experience in the Ventanilla settlement is favorable, this does not appear to be so in other locations. The mission could not obtain a full inventory of the state of the condominial connections that had been made under the project. Due to a variety of factors, the condominial experiment did not take off in Lima. There were cases where contractors left without completing the last stage of connections to the households. Several households chose to keep the tap outside the home rather than have it installed inside their home. Thus, several households did not complete the required construction work within their house. However, it was the reluctance of the households to cooperate in dealing with clogs in the 'grease-trap' that caused the process to unravel.¹¹ Feedback from contractors from workshops organized after the project suggests that the contractors consider that the civil works for condominial systems were more complex than for conventional systems, not only because the system was new (the first experience in Peru), but also because of the difficult and complex topographical conditions where civil works were executed. The condominial approach was adopted by the Agua para todos program that began in 2006, but this did not last long because the Agua para todos ran into corruption allegations and was discontinued.

Overall, the execution of condominial works faced difficulties related to (i) lack of legal properties deeds for some of the beneficiaries, (ii) high entry costs incurred by the beneficiaries, and (iii) diminished project credibility given the time lag between the development of workshops and the execution of the works for project beneficiaries. In retrospect, it appears that SEDAPAL did not have sufficient ownership of the condominial approach, and finally decided to go with conventional system after 2013 for peri-urban areas.

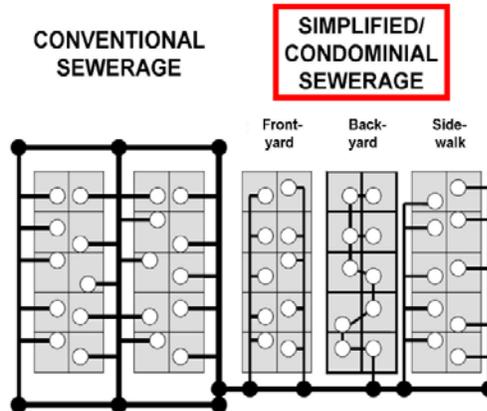
¹¹ This is not a constraint in the poor urban areas of northeastern Brazil, where the condominial technique was originally developed. In those areas, houses are typically built at the front of the plot, while the kitchens and especially bathrooms are usually built in the backyard, sometimes quite far from the main house. Hence the construction of the sewer connecting the backyards was an excellent technical solution in its original context, allowing the pipes to follow the line of minimum distance between the bathrooms. A conventional solution, moreover, would have ruined the pavements of almost all the houses. This technique therefore had a positive impact on the communities where it was first introduced, and it still influences how sewage services are implemented in poor areas of northeastern Brazil. (Earthea. Nance 2012: *Engineers and Communities: Transforming Sanitation in Contemporary Brazil*. Lanham: Lexington Books)

Box 1. Condominial networks

Whereas conventional systems essentially provide services to each housing unit, condominial systems deliver services to each housing block or any group of dwellings that could be termed a neighborhood unit or “condominium.” This is similar to the concept of providing a single connection to an apartment building, except that in this case the condominium is physically horizontal and institutionally informal. As a result of this novel concept, the public network no longer needs to run through every plot of land or to be present in every street, but merely to provide a single connection point to each city block. Therefore, the required length of the network is considerably shorter than that of a conventional system. It needs about half the length for sewerage and about a quarter of the length for water service.

The household connections characteristic of conventional systems running perpendicular to the network are replaced by condominial branches running parallel to the blocks.

Condominial branches for sewerage can be located in the most convenient part of the block (under sidewalks, front yards or backyards), while in the case of water they are generally located under sidewalks to allow for individual metering. This design permits the adaptation of the network to local topographic conditions and different urbanization patterns.



Source: Melo, Jose Carlos. 2005. The Experience of Condominial Water and Sewerage Systems in Brazil: Case Studies from Brasilia, Salvador and Parauapebas. World Bank, Washington D.C.

Figure: KfW Water Symposium 2009

APPENDIX D. Summary of Focus Group Discussions

The mission conducted a total of six focus group workshops in three locations in three different regions/ districts. The focus group locations were picked from among the set of treatment districts/villages used in the impact evaluation carried out in 2012, with preference give to locations with higher number of beneficiaries and project investments in W&S facilities; ready availability of technical record of investments; and relatively easy access. The locations were Curamori and Las Lomas (Piura Region); Cangallo (Ayacucho Region), and Canta- Santa Rosa de Quives (Lima Region)

Each focus group included of 8-10 participants with representation from young adults to senior citizens, taking care to include women of child-bearing age, pregnant mothers, and mothers with children under five years of age.

<i>Location</i>	<i>Province/Department</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>
Pampa Cruz	- Ayacucho	13	10	23
Trapiche	Santa Rosa de Quives - Lima	5	5	10
Curamori	Piura - Piura	8	13	21
<i>Three Projects</i>		<i>26</i>	<i>28</i>	<i>54</i>

The team met with members of the local water and sanitation management boards (JAAS) to learn about the financial, management and technical issues faced by them in providing regular services, and visited the water supply facilities in the three locations to observe their state of operation. Interviews were conducted with technicians from the district municipalities responsible for providing technical assistance to the JAASs as part of the National Rural Sanitation Program (PNSR), which is currently responsible for monitoring the works of the PRONASAR.

The areas of analysis and the target topics of the interviews conducted in the focus groups were as follows:

- **Health and Hygiene:** Presence of gastrointestinal diseases in children under the age of 5; Hygiene and hand washing practices.
- **Water Supply:** Origin and type of water supply installation; Satisfaction level; Duration of service and sufficient quantity; Interruption of the water service; Payment capacity; Water quality and treatment; Beneficiary participation; Institutional support.
- **Sanitation:** Origin and type of hygienic service; Satisfaction level; Use and maintenance; Payment capacity; Institutional support; Suggestions for improvement.

Health and Hygiene

- a) Presence and Treatment of Gastrointestinal Diseases in Children under the Age of 5
Of the 60 interviewees, only isolated cases were mentioned, with only one case involving a child under the age of five. It was mentioned that better preventive behavior and healthcare exist among the inhabitants benefited. Although use is still made of home

remedies, the tendency to visit the health post or medical center for more severe cases appears to be rising.

- b) Hygiene and Hand washing Practices: Most participants including men and women report adequate hygiene and hand washing practices, and that the water and rural sanitation project has aided in this achievement. Many participants recalled visits by social workers during the project period. Nevertheless, the use of soap is still irregular and not widespread. This was particularly observed in the case of Pampacruz (Ayacucho) and Trapiche (Lima). Health training seemed to particularly well received by the women. Disposal of infants' stools by throwing in the fields or garbage dumps is still prevalent in Pampacruz (Ayacucho) and Trapiche (Lima), contrary to safe disposal suggested by extension workers.

Water Supply

Among the problems identified in the workshops with the focus groups are the following:

- a) Origin and Type of Water Supply Installation: It was verified that project completed the multiuse washing installations as planned for the three projects sites. The participants expressed their satisfaction with the drinking water facility works implemented, except in the case of Ayacucho, where mention was made that one zone receives water on an irregular and highly limited basis. This is believed to be the result of a technical problem, in which the diameter of the pipe is too narrow.
- b) Service Duration and Sufficient Quantity: Overall, respondents from Curamori and Trapiche showed greater satisfaction with drinking water services compared to Pampacruz. In the case of Curamori and Pampacruz, respondents confirmed continuity of the water services every day, although some restrictions in quantity or continuity have been observed at night and certain times during the morning. In Pampacruz, on the other hand, there are frequent interruptions in the lower zones.
- c) Water Quality and Treatment
- The water supply is of good quality, and is treated with chlorine. The population regularly boils this water for consumption.
 - Maintenance of the water facilities, many of which are over five years old now, is continually at risk because of insufficient resources worsened by a poor culture for payment for water services.
 - In the case of Trapiche it was noted that residents dispose off old clothes in the sewerage system installed, generating increase in operating costs and in other, some families are wasting the water for lack of maintenance of the BUS.
- d) Payment Capacity
- There is a high delinquency rate in the project areas of Trapiche and Pampacruz, even though the users themselves set the rates, which are quite low at Cangallo s/. 1 sol, Trapiche S/. 5 soles (3 soles water and 2 soles sewerage), per month. In Curamori, the project has installed a micro-metering system per cubic meter, and the payments

currently allow for basic operation and maintenance. However, delinquency appears to be on the rise here, too, due to the relatively higher rates (20-25 soles per month (US\$ 6.35 – 7.94), on average).

e) Institutional Support

JAASSs in the three project areas are dependent on user fees, supplemented on an occasional and irregular basis by NGOs or cooperation agencies or other social projects. Support from District Municipalities through the newly created Technical Assistance Officers is limited to training and advisory for the provision of operating and maintenance services. While the Municipalities can support with investment activities (as was the case with Trapiche for the expansion of a reservoir), they generally have no financial resources available for repair and improvement works.

A JASS is composed of volunteers with no remuneration, and limited or no resources to build managerial and administrative capacities. There is frequent turnover of members and abandonment of duties in the JASSs. They lack the resources to build these capacities, and the members are all volunteers who receive no economic recompense. This situation leads to the abandonment of duties and a high turnover among the people involved in the JAASSs. The Municipalities provide very limited support to the JASSs beyond limited and sporadic training or technical assistance,

The PNSR has not yet developed an effective strategy to meet demands for investment support in the projects of the PRONASAR that have been operating for more than five years.

Sanitation

a) Origin and Health Service Type

PRONASAR has installed pour-flush type toilets with two percolation pits and a bathroom in beneficiary households in the three project areas. In the case of Trapiche and Curamori, there are housing units with connections to the sewerage system that were installed by the Techo Propio Program and the Municipality, respectively. The majority of the sanitation installations are currently in operation and use. The population frequently performed the cleaning and disinfection of their bathrooms or latrines.

b) Satisfaction Level

Generally speaking, the population acknowledges the comfort and convenience offered by the type of latrine installed by PRONASAR. In the case of Trapiche, the new sewerage system is welcomed by the respondents. In the other two projects (Curamori and Pampacruz), beneficiaries were worried about the health impacts of maintaining and use of latrines.

c) Payment Capacity

Generally speaking, payment is not made for the sanitation service, or else it is included in the payment for water consumption, except in the case of Trapiche, where two different payments are made, although the payment for sewerage is extremely low.

d) Institutional Support

The Municipality is one of the few institutions that provide support, although in a very limited capacity, mainly in terms of training and technical assistance for the JASSs. In the case of Trapiche, improvements were implemented in the sewerage system.

DIFFERENT PERCEPTIONS OF THE FOCUS GROUPS BY GENDER

Health and Hygiene

- Women respondents exhibited greater awareness and responsibility for hygienic habits and sanitary conditions for the latrines and bathrooms installed by the project. Almost all women respondents reported regular handwashing relation to cooking and sanitary activities, and appear to insist on similar behavior from their families including children. In addition to the extension activities sponsored by the project, the respondents gained from information and activities in schools provided by the Ministry of Health.
- No significant concerns on incidence of diarrhea were reported by the respondents. While this could be partly attributed to the project's efforts, there is greater availability and use of primary health care centers apart from others, for diarrheic diseases, both in for children under the age of five and in senior citizens and adults, although there is still a culture of self-medication.

a) Service Duration and Sufficient Quantity

- Certain complaints were noted, especially among women, with regard to the continuity and pressure of the drinking water services. They stated that the water pressure drops at night and in the morning, a situation that was particularly noted in Curamori and Pampacruz.

b) Beneficiary Participation

- Feedback suggests that women were more active during fundraising and activities to obtain resources to buy inputs, exhibiting greater leadership in social oversight tasks. There appears to be greater incidence of women serving as treasurers of JASSs, while the physical works and the management of the JASSs was invariably men.

Institutional Organization and Management

At the community level, the responsibility for water and sanitation services rests with the Community Water and Sanitation Services Association (JASS). A JASS is composed of volunteers who do not receive any compensation for their work. It is legally constituted as the Social Management Committee and is registered at the municipality. Members of a JASS are expected to be rotated every two years.

JASS members have low administrative and technical capacity to manage the project facilities. In addition, and it was noted that the administrative knowledge and project files were not transferred to the new JASS members. Financial and accounting files are not kept adequately.

For instance, Trapiche project has such tools developed by PRONASAR but they were not transferred to the new JASS administration.

There is a lack of monitoring and supervision of the JASS performance by the municipalities and Ministry of Housing, Water and Sanitation (MVCS). An official went so far as to suggest that the exact number of JASS is not known to the administration. Selection of new members without further training. Lack of permanent water operational staff (operators) that maintain water service infrastructure facility, found in Cangallo-Ayacucho and level of delinquency in payments.

There was some informality observed in the functioning of the JASS since the members did not keep adequately administrative documents such as the meeting acts, users registration, operational plan, book inventory of tools and materials, and a payment collection report, including the list of people behind payments, etc. Cura Mori has an office within the municipality but the files were not shown. These data have been verbally communicated. Although PRONASAR provided these tools and training, it is assumed that JASS accountability could be deteriorated through time.

In the case of Cura Mori Project, it was mentioned that they are considering the allocation of a monthly payment to the JASS members for assuming responsibilities to manage and preserve the investment assets.

It is worth mentioning that the JASSs have a legal framework governing its functioning and operation. The JASS responsibilities are defined in article 72 of the Regulations of the General Sanitation Law, which states that the Water Boards Associations (JASS) are responsible for providing water and sanitation services and for maintaining the infrastructure with the support of the respective municipality. However, this obligation is not yet implemented in accordance with the field visits. Also, the new Modernization Act for Water and Sanitation Services states that JAAS facilities must be integrated, if possible with the Water and Sanitation Services Municipal Companies (EPS municipal).

Definitively, there is a need to revise and develop a specific legal framework for the JASS, in other words, improve the Article 72 of the Regulations of the General Sanitation LAW Under this specific legal framework, the JASS could legally open a bank account, keep files and documents, processing decrees for protecting their watersheds or wellspring, institute legal proceedings, and apply coercive measures to reduce late payments or arrears, among others. This functions and responsibilities will improve the management of the project facilities by JASS.

Financial Sustainability of JASS

The financial aspect is the main factor for the sustainability of water and sanitation services offered by JASS. On the one hand, there is the lack of culture of the users for paying a fee, who consider water resources as a right rather than a public service, especially in a very poor environment as the rural areas. The medium and low (even symbolic) default rates do not even cover operating costs and less maintenance. This collection rates could have a high to medium impact risks to the sustainability of the water services offered by PRONASAR.

Indeed, the three visited projects are vulnerable to such financial issues.

In the case of Cruz Pampa (Ayacucho) the payment delinquency rate is 90 percent, while the monthly fee per household is just S/. 1.00 (US\$ 0.32) resulting in an average revenue to the JASS of S/. 10.00 (US\$3.17). In this case, the financial situation clearly poor; the limited resources are used mainly for the purchase of chlorine. Needless to say there are interruption or failures of water supply to some households (especially in the lower area of the installed facility) due to a lack of resources even for an operator on call. JASS members said they did not have the capacity or resources to solve the technical problems to change valves and pipes. Disinfection (chlorination) is carried out every three months; this generates a risk to population health due to the low water quality.

In the case of Trapiche Santa Rosa de Quives (Lima), the collection delinquency ratio is 40 percent. The family fee is S/. 2.5 per cubic meter (US\$0.79) on average and the average revenue of the JASS is S/. 400.00 (US\$ 126.98) per month. The households have water meters installed. The JASS can cover operating costs (electricity, personnel operating cost, chemical inputs) and limited maintenance but it does not allow the JASS to cover the major corrective repairs and maintenance (replacement of valves, etc.) for which they have to seek support from the district municipality. Despite the limited resources, this JASS has a temporary operator who is paid on a daily basis or by task though it not clear if this is supplemented by individual contributions when urgent repairs are needed; the focus group respondents confirmed that they are satisfied with the operation of the W&S facility, and the quality and continuity of the water supply. It is worth noted that the beneficiary population is considered as medium poor income population with greater work opportunities so the population can pay higher fee rates.

In Cura Mori (Piura), unlike the two previous cases, the delinquency rate is just 10 percent. The family fee is S/. 10 (US\$ 3.17) and the Central JASS average income is greater than S/. 6,500 (US\$ 1,905) and able to cover its operating costs, maintenance, repairs including savings to meet. It has a permanent operator, who is paid on a monthly basis around s/. 600 (US\$ 190.5). Thus, the quality of the water facility is good and there is continuity of the water supply to the residents of the district.

Finally, in both cases with high delinquency, there is a need to remedy and to raise awareness activities to generate payments and to change the culture in the rural population. Building capacity at the JASS or at municipalities is necessary. In this sense, if the JASS can not cover their costs of operation and maintenance, and not able to invest in major repairs, then, in the future or medium term, it will generate a deterioration of not only the project facility but also a deterioration of the quality of services. In general, all these factors are real risks faced by JASS and cannot be ignored by the authorities of the MVCS and specifically PNSR staff, which manage the rural sanitation sector in the country.

In addition, there is no mechanism for monitoring and quality control of W&S services, although during the field visits there were a representative or staff of the corresponding Municipality. Some of them were well informed, but others were not.

Finally, it is essential that the PNSR should develop an Information System for monitoring the projects financed by PRONASAR and at least a basic information data or reports on the services provided by JASS, to then, the municipalities could adjust their intervention demands and focus on improving the W&S services.

Role of Municipalities and JASS Support

During the field visits, IEG team and the consultant team met with members of the JASS together with the representatives of municipalities. Table 8 shows some key indicators by visited projects and its relation between the JASS and the corresponding municipality. A summary of the table follows:

- The municipalities have at least one person responsible for the technical area, in the case of Cruz Pampa Project; the Municipality of Cangallo (Ayacucho) has a person in charge of ATM person. The draft Trapiche, the District Municipality of Santa Rosa de Quives (Lima) has three people. In Cura Mori (Piura) project the district municipality has two.
- In all three cases, the municipalities made the recognition and registration of the JASS.
- In planning, they have been advanced to support several actions: in the case of Pampa Cruz project the municipality has made some extensions of the drinking water through NGOs, in the Trapiche ATM project has improved the reservoir Water (10 m³) and the network of drains. Cura Mori in the project has been carried out and inventory needs.
- In all cases municipalities have co-funded 20 percent of the costs with the PRONASAR.
- In terms of assistance and supervision, the Cangallo Ayacucho JASS has not received any support from the municipality staff; just in case some Trapiche a training course was held to operators and sporadic supervision visits. In the case of Cura Mori, the municipality only provides an office space for JASS collections of users fees.
- The ATM units have recently installed and there is a need to have specialized personnel and regular monitoring to JASS and registering the project facilities and assess the state of the operation and maintenance of project investments.
- Health education campaigns are carried out by the health sector, and no further action by the ATM.
- No municipality has a real diagnosis of existing water and sanitation infrastructure financed by PRONASAR nor an inventory of investment needs. There is no database of the investment facilities at the municipal level or at the MVCS.

The ATM at the municipal level still have many limitations to meet the needs of the JASS, particularly in terms of financial resources and technical training. But it must be recognized that it is an important development that should be consolidated, expanded and improved.

The MVCS through PNSR do not have a mechanism of supervision and monitoring of the ATM and a complementary financing mechanism for small investments for operation and maintenance that cannot be covered by the JASS due to limited resources such as the case of Ayacucho whose population can be considered extremely poor.

SUSTAINABILITY ISSUES

In order to have sustained water and sanitation services at the rural communities there are some measures that need to be taken into account and these are: (i) physical investments or systems being properly in operation (outputs), (ii) financial arrangements for operation and maintenance (intermediate outcome), (iii) institutional framework and capacity at MVCS and Municipal levels to monitor and evaluate performance of W&S services facilities at rural community level, and (iv) sustained water and sanitation services in the rural areas through JASS management.

Physical Infrastructure Investments for W&S service projects. The physical sustainability of the project investments depends not only on the level of revenues or cost recovery for operations and maintenance, but also on other factors such as the technical and institutional capacity and incentives by the JASS members in order to carry out proper operation and maintenance. Furthermore, long-term financial sustainability depends on whether the institutional arrangements for implementing cost recovery or collecting fees are sound and responsive to local conditions. The JASSs need to contract either permanently or part-time operators who are paid for their services out of income revenues, and cost recovery rules. As mentioned before, the JASSs are experiencing difficulties in covering cost for operations and maintenance, as the tariffs are typically set too low, especially in Cangallo-Ayacucho, the poorest area of the visited projects. Definitively, the JASSs need more training and supervision from the municipalities and continue support from the MVCS. In rural areas, the beneficiary communities will not be able to operate and maintain their W&S services facilities if they do not collect sufficient revenues on a monthly basis.

Post-investment. Municipalities were supposed to play the role of external oversight of W&S projects. With the creation of ATM at the Municipality level, there is an opportunity that the MVCS or PNSR could provide technical assistant and resources for those rural communities with very low-income for key operation and maintenance activities, materials and parts and for training technical operators within the community.

Institutional framework and Technical Capacity at JASS. The JASSs are working under an uncertain legal and institutional framework. There is a need to continue with JASSs assessment after post investment of the projects implemented by PRONASAR to then, develop a new decree that could improve JASSs management, otherwise, the W&S projects will be at risk due to the poor administration performance.

APPENDIX E. Borrower Comments



"DECENIO DE LAS PERSONAS CON DISCAPACIDAD EN EL PERÚ"
"AÑO DE LA CONSOLIDACIÓN DEL MAR DE GRAU"

Lima, 17 JUN 2016

OFICIO N° 581 -2016-EF/52.04

Señor
MIDORI MAKINO
Gerente
Unidad de Desarrollo Sostenible
Banco Mundial
Av. Alvarez Calderon N° 185-7mo. piso
San Isidro
Presente.-



Asunto : Proyecto de Rehabilitación y Manejo de Agua Potable en Lima y Programa Nacional de Agua y Saneamiento Rural

Ref. : Carta del Banco Mundial de fecha 07.06.2016

Tengo el agrado de dirigirme a usted con relación al documento de la referencia, mediante el cual el Banco Mundial remite el borrador "Reporte de Performance" de los proyectos arriba indicados, los mismos que fueron financiados por el Banco Mundial; y solicita que se proporcione comentarios sobre los logros y lecciones aprendidas con la implementación de los proyectos, a más tardar al final del día 20 de junio de 2016.

Al respecto, informo a usted que este Ministerio ha solicitado a SEDAPAL y al Ministerio de Vivienda, Construcción y Saneamiento atender el pedido del Banco Mundial, toda vez que dichas entidades tuvieron la responsabilidad de ejecutar los citados proyectos. Lo que hago de su conocimiento para las acciones que estime pertinente.

Hago propicia la ocasión para expresarle los sentimientos de mi especial consideración y estima personal.

Atentamente,

CARLOS AUGUSTO BLANCO CÁCERES
Director General
Dirección General de Endeudamiento y Tesoro Público

From: Victor Sevilla [<mailto:vsevilla@vivienda.gob.pe>]
Sent: Friday, June 24, 2016 1:52 PM
To: Midori Makino <mmakino@worldbank.org>
Cc: rjammi@worldbank.org; Juan Haro Muñoz <jharo@vivienda.gob.pe>
Subject: Comentarios PPAR PRONASAR PE

Estimada Srta Midori Makino,

Adjunto al presente los comentarios que han merecido el borrador del documento del asunto. De considerarlo como pertinente podríamos dar la versión en inglés quedando a sus órdenes.

Cordialmente;



Srta
 Midori Makino

Gerente Unidad de Desarrollo Sostenible

Asunto: Comentarios Borrador del Reporte de Evaluación de Desempeño (PPAR). National Rural Water Supply and Sanitation Project (PRONASAR)

Pág. 25, Ítem 3.19. Resulta inexacta la afirmación de que FONCODES iba a tener un nuevo rol. Se debe tener en cuenta que FONCODES a esa fecha, 2004, había ya acumulado suficiente experiencia en trabajar por demanda y movilizándolo a las comunidades, experiencia adquirida con el modelo de Núcleos Ejecutores. Los Núcleos ejecutores, se añade, tenían que aportar con mano de obra no calificada. En conclusión no tiene asidero la afirmación vertida por el evaluador. FONCODES venía desempeñando ese rol desde 1991.

Pág 25, Ítem 3.20. Se estima que lo vertido en este ítem requiere un análisis más profundo. En principio, los proyectos sin ejecutar al cierre del contrato no han sido dejados de lado, siguen siendo atendidos por el MVCS a través del Programa Nacional de Saneamiento Rural (PNSR) y han sido adecuados a las exigencias del Sistema Nacional de Inversión Pública mediante la revisión de su viabilidad como conglomerado.

Afirma en el reporte “*que el PNSR motivó a que los alcaldes decidieran no continuar*” es discutible pues el PNSR en el 2012 identificó las localidades más pobres con poblaciones entre 200 y 2,000 habitantes del medio rural y que excluía a aquellas localidades en la cartera del entonces PRONASAR. La causa para ese desistimiento de los Alcaldes podría más bien deberse a la falta de capacidad financiera u otras prioridades.

Pág 26, Ítem 3.23. El ítem demanda una aclaración. Cuando el autor del reporte dice que los pobladores aspiran a un sistema de disposición de excretas como el de las ciudades, esto supone sistemas de alcantarillado lo cual induce al lector a concordar con la falsa conclusión de que las fuentes de agua no tendrían caudal suficiente para atender la demanda de la población. Es probado que sistemas de alcantarillado no son adecuados para localidades pequeñas típicas del medio rural pues entre otros, para que funcionen adecuadamente requieren de un uso más intensivo de agua que

no se da en el medio rural, mas no así con sistemas de arrastre hidráulico familiar. Finalmente, a partir de la experiencia recogida por el PNSR, no se tienen perfiles de proyecto declarados no viables por caudal insuficiente de la fuente de agua, lo que invita a señalar que no es del todo exacto que una limitante sea la fuente de agua.

Pág 30, Item 3.41. Lo afirmado en este ítem es contradictorio lo dicho en el ítem 3.34 de la página 28.

Pág. 31, Item 3.44. Es inexacto que el PNSR no tenga una estrategia para darle soporte a las Municipalidades, JASS y Direcciones Regionales de Vivienda. En el último trimestre del 2014 se inició conjuntamente con el Ministerio de Economía y Finanzas y el Ministerio de Desarrollo e Inclusión Social el plan de estímulos a Gobiernos Locales que comprende no sólo el fortalecimiento de capacidades sino el otorgamiento de fondos a los gobiernos subnacionales para que implementen el rol que les corresponde en agua y saneamiento siendo uno de esos el mantenimiento de la obras de su jurisdicción.

Pág. 35, Item 3.64. Estimo que el parecer del Banco hacia FONCODES fue adecuado si tenemos en cuenta que el número de proyectos implementados entre 1991 y 2002 fue superior a los 37,000 y al comparar el número de proyectos que esa entidad tenía en el 2004 se observará que se había tenido una notable y significativa disminución con respecto a otros años del periodo citado. La causa no está en la entidad ni modelo que propugnaba la entidad, FONCODES, sino en otra. Considero que la afirmación vertida por el evaluador no es correcta y merece un mayor análisis antes de concluir.