Certainly, there were easier places in India than Rajasthan for the Asian Development Bank (ADB) to advance its mission of urban development in the late 1990s. At the time, Rajasthan was confronting development conditions that still exist in many Indian cities today: less than ideal rates of in-migration, population growth, infrastructure deficits, and rising social inequality. Despite these challenges, the development of cities and economic growth are interdependent, so the issues that challenge urban growth or livability needed to be figured out.

A water-scarce landscape. Rajasthan is the largest state in the country, covering 10% of India’s total land area, and accounting for 5% of its population, but with only about 1% of the country’s surface water resources and 1.7% of the country’s groundwater.¹ Studies have shown that Rajasthan experiences some of the greatest climate sensitivity in the country, having the highest incidence of drought and a low adaptive capacity. The 20th century saw 48 drought years of varying intensity, putting Rajasthan’s chance of a meteorological drought at 47%.

Relatively less urbanized. In place of Rajasthan’s famed, but fallen princely kingdoms, cities have risen—233 of them—wherever the climate, water resources, and soil fertility were most conducive. The most recent census (2011) counted 68.6 million people in Rajasthan, with 25% of them living in 193 urban centers. Between 2001 and 2011, the total population grew at a rate of 25%, and the population growth rate within the cities was 29%, compared with 19% in rural areas during the same decade. Though the urban growth rate has been strong, Rajasthan still remains less urbanized than other states.

Fast-growing urban sectors. Rajasthan is a natural corridor between the wealthy northern and western states of India, making it an important center for trade and commerce. Rajasthan’s cities contribute around 48% of the gross state domestic product, and are projected to contribute more than 60% by 2030.2 Also, the fast-growing economic sectors in Rajasthan are found mostly in the urban areas. However, the services sector, which includes the tourism industry (especially important for Rajasthan), contributes only about 44% of the gross state domestic product, below the national average of 54%.

Low social development indicators. Poverty rates have been falling across the state since 1993, most significantly since 2004. In 2004, when ADB investments were in the early years of their implementation, the statewide poverty rate was estimated at 34%. According to the 2011 census, the proportion of the population living below the poverty line was 16%; in the cities, it was 11%. The 2011 census recorded the slum population as 3% of the total population of Rajasthan, with the urban slum residents at 9.8% of the total urban population. Based on measures of per capita consumption expenditure, inequality held steady during 2004–2005 and 2009–2010, and Rajasthan’s rates of inequality were actually lower than in most other low-income states (footnote 4). Rajasthan still ranks low among the country’s poorest states, however, when it comes to social development indicators on health, education, and quality of life. Benefits provided under the National Food Security Act are distributed to 54% of Rajasthan’s urban population and to 69% of its rural population (footnote 4).

Infrastructure deficit. A study by the state government determined that the urban water supply alone in Rajasthan would need a capital investment of $4.5 billion between 2015 and 2030, for the rehabilitation and augmentation of various urban water schemes. To put this figure into perspective, ADB’s investments in the state topped $1 billion after 20 years—and that is less than one-fourth of what the state government said it needed for just 2015–2030. The required capital investment is far beyond what urban local bodies (ULBs) can afford or mobilize. The private sector is cautiously entering new public infrastructure spaces outside of telecommunications, transportation, aviation, and energy. Public–private partnerships are largely limited to operation and maintenance (O&M) contracts or, to a far less degree, temporary ownership, while a company recovers its investment. The potential for both financing and private sector entry is diminished by problems with municipal management and regulations. Political term limits do not align with long-term investment strategies and development horizons. State governments and ULBs are reluctant to levy user charges, so few public services come with any real price tag for users or revenue streams for utilities. Other key sources of revenue—such as property taxes; publicly owned assets (e.g., land); and fees for licenses—remain underutilized.

ADB support. ADB’s current urban development strategy for livable cities was decades away from being articulated when the Rajasthan Urban Infrastructure Development Program (RUIDP) was just getting off the ground. The Government of India was also still focused on rural development. The pivot came quickly, though, and urban development as an engine of economic growth has been a recognized strategy of the Indian government since the first articulation of the concept in its Tenth Five-Year Plan, 2002–2007.

---

5 The Indian government gauges inequalities using the Gini coefficient method for measuring the distribution of wealth, as indicated by per capita consumption expenditure. The Rajasthan Task Force on Elimination of Poverty noted in a 2015 report that consumption inequality underestimates poverty, and that a better indicator of poverty rates is household income.
7 The Government of Rajasthan estimated that the state’s urban water supply system would need a capital investment of $4.5 billion over three phases: phase 1 (2015–2020): $1.5 billion; phase 2 (2021–2025): $1.7 billion; and phase 3 (2026–2030): $1.3 billion. Of ADB’s nearly $1 billion investment in Rajasthan’s urban areas, about 30% has been spent on water supplies.
Urban desert in Rajasthan. The far western Thar Desert border town of Jaisalmer is an iconic example of Rajasthan’s arid urban landscapes. Jaisalmer’s ancient relics may beckon tourists, but its urban sprawl reflects the city’s anxious quest for modernity and economic growth.
The government put monetary muscle behind the strategy with a number of programs, such as the Jawaharlal Nehru National Urban Renewal Mission and its subcomponent, the Urban Infrastructure Development Scheme for Small and Medium Towns. The Government of Rajasthan identified the expansion and development of key urban infrastructure and services as a priority for achieving the state’s development goals. Water supply, sewerage, and drainage were urban infrastructure priorities.

In Rajasthan’s harsh economic landscape, ADB planted its flag in the sand in 1998, when it initiated RUIDP with a loan of $250 million, to be invested in six divisional headquarter cities. RUIDP was ADB’s second large-scale urban program in India, after the successful completion of a program in the state of Karnataka; and there was a city-level effort getting underway at the time in Kolkata. The ADB–RUIDP partnership is now preparing for the fourth phase of the project, having already invested nearly $1 billion in 27 cities to promote the well-being of 10 million people in Rajasthan over 20 years. ADB invested $250 million to improve access to quality municipal services throughout the state and to make the utilization of the state’s scarce water resources more efficient. Phase 4 began implementation in late 2020. During that phase, water supply and sanitation infrastructure investments will focus on secondary towns, and there will be further support for the implementation of the state’s reform agenda and for statewide capacity building. The partnership has not been without its challenges, but RUIDP’s decisive leadership, swift corrective actions, and assimilation of lessons learned have demonstrated the viability of institution-focused urban development and project management.

SOLUTIONS

The solutions, lessons, and experiences that RUIDP has garnered are summarized here as good practices for other municipalities to consider. The guidelines cover the stages of the project management cycle: selection and design, preparation and implementation, and monitoring and evaluation. Many of the good practices are based on capacity building and lessons learned that were incorporated into the design and implementation of subsequent investment phases. The guidance provided during the preparation and implementation stage was organized according to the standard aspects of project management: organizational arrangements and principles, financial management, procurement, and implementation.
For Improved Selection and Design of Projects

**Spreading the impact across urban sectors.** At the beginning, the infrastructure and capacity baselines for most cities were so limited that improving just the water supply system and services alone would not have improved the long-term economic prospects of these cities. Phase 1 of RUIDP had the most ambitious scope of works, including urban heritage rehabilitation, hospitals, fire stations, and slum developments, along with typical multisector urban programs, which are usually a mix of water supply, sanitation, drainage, solid waste management, and roads. Not every sector experienced major impacts from the project, but government officials said that some works (such as heritage restoration and hospital renovations) built tremendous public goodwill toward RUIDP.

**Investment in a long-term partnership.** ADB and the state government understood from the beginning that developing Rajasthan’s cities into competitive, equitable, and environmentally livable places would not be a sprint across an 8-year project time line. Urban development in Rajasthan would take decades. ADB and the state government charted a strategic course; built new training grounds; put only the best professionals in the race; and called for new rules, regulations, and systems that would be implemented over time, as capacity developed.

**Emphasis on public sector management.** The financial sustainability of projects is routinely threatened by weak public management systems. Having accumulated nearly 15 years of experience in many sectors, ADB and the state government embarked on reforms. A $250 million program loan provided the state government with the resources to study its options for managing cities; sustaining infrastructure; and finding other sources of capital for urban development, particularly for O&M expenses. The reform program addressed three areas of public sector management: institutional strengthening, improvements in urban governance, and capacity building.

**Not assuming consensus, instead building it.** As desperate as cities are for infrastructure, RUIDP learned in phase 1 that it can be difficult to convince ULBs that infrastructure is worth taking out a loan for. The development of major urban infrastructure in poorly outfitted places can take up to a decade to complete, once all of the capacity gaps, complications in procurement, and contractor delays are considered. For elected officials, their stars rise and fall on many things, and a botched or belabored water project would be a big risk. RUIDP’s fervent approach to public consultations and its mainstreaming of communications, awareness, and public participation into its engineering operations have helped build consensus in favor of the projects.

**Giving everyone a voice in project selection.** Each stakeholder group brings unique perspectives and values, and this has helped designers to package city investments that are more relevant, in demand, and transformative. The government stakeholders are essential for identifying the hurdles and roadblocks that can arise with a particular proposed project, such as the clearances required and other local policies. Public representatives and citizens are key for generating public awareness; understanding the citizens’ perceptions of needs and their expectations; and for identifying opportunities for their participation in the design, implementation, and monitoring of projects.
Hospital waiting room in Jaipur. ADB invested in patient receiving and waiting areas, as well as in operation theaters and intensive care wards at hospitals in Jaipur, Ajmer, Kota, and Udaipur. The investments, implemented by RUIDP, catalyzed additional renovations and services at the hospitals.
Public consultations have proven to be a very practical way for RUIDP to prepare for slum development work, and empower local women in the process. Through these consultations, women have found opportunities to influence the design of slum improvements, express their interest in skills training, mobilize the community to ensure a smooth implementation, and promote a higher awareness among the residents of what will be expected of them as paying customers of water and wastewater services. Involving the community from the design to the monitoring stage is a customer-focused approach that gives the public more confidence in the utility services.

For Improved Preparation and Implementation

Requiring improved organizational arrangements. ADB and the state government decided to establish an autonomous, sustainable corporation that would oversee urban development projects and programs in Rajasthan. In a move that was a bit shortsighted, the institution was given the name of the first phase of the ADB investment initiative, the “Rajasthan Urban Infrastructure Development Project” (RUIDP), but it has since outgrown that name, having evolved into a well-known project for overall urban development, not just infrastructure.

RUIDP has the advantage of autonomy, with independent funding sources (though mostly still from ADB) and the freedom to hire staff, organize itself, handle procurement, and manage its project investments. As in any typical project office, RUIDP’s core staff (not consultants, contractors, etc.) are seconded from relevant government departments and agencies, but the difference is that RUIDP’s recruits are subject to a stringent vetting process to ensure that only those with the greatest technical or managerial experience or potential are accepted; there are no political appointments, and no one is recruited based on seniority. RUIDP staff are often retained for long tenures (sometimes more than a decade), and they answer only to RUIDP, with no responsibility to their original departments or agencies. Moreover, RUIDP is exempt from most standard government procedures, so it is freer to adopt international good practices. All day-to-day financial, management, and technical decisions are the responsibility of the project director, and are generally not subject to external government protocols.

Elite leadership on a full-time basis. RUIDP is always led by a dedicated project director from the elite Indian Administrative Service (IAS). The short tenure of 2 years is the trade-off for assigning bureaucrats from the IAS to the post on a full-time basis. During RUIDP’s early formative years, project directors carefully oversaw and guarded the functions and responsibilities of the organization. The discipline enforced by IAS officers has resulted in an institutional culture resembling that of a modern corporation, which is typically characterized by a strong work ethic.

The best and brightest staff on a full-time basis. When it comes to recruitment, RUIDP prioritizes work ethic over specialization, seniority, and especially academic or political pedigree. RUIDP has gathered and replenished its staff with junior, mid-level, and senior professionals, creating a leadership pipeline through which professionals can advance their careers within the institution. Planning for the succession of senior staff is critical for sustaining RUIDP’s success.
Let needs and lessons determine use of consultants, instead of standards. RUIDP has accumulated vast experience in managing consultants over a period of 20 years, and has changed the way it works with consultants based on the lessons learned during the project phases. Owing to RUIDP’s lack of technical capacity during phase 1, international experts were appointed as project management consultants (PMCs). Guided by ADB and the PMCs, RUIDP improved its internal capacities during phase 1, and it appointed national consultants for phase 2: one PMC and three design supervision consultants (DSCs). RUIDP experienced the constraints of having two different sets of consultants (PMC and DSCs). The main constraints included a lack of coordination and sharing of responsibility between the PMC and DSCs, causing several delays and hindering the completion of projects. In phase 3, RUIDP combined the PMC and DSC roles, appointing consultants who specialized in both project management and design supervision, and who were wholly responsible for both the design and implementation of the works. Because phase 3 includes specialized projects such as distribution systems in district metered areas and 24/7 water supplies, international consultants were selected for this combined role. In phase 4, RUIDP and ULBs will hire consultants to prepare the detailed project reports before the actual signing of the loan. This will help RUIDP utilize the entire loan period for project implementation. As the project towns in RUIDP phase 4 will be smaller, there will be a need to improve the capacities of the ULBs.

Program- and project-level management. RUIDP operates at both the program and project levels, demonstrating strong leadership, complex stakeholder coordination, technical expertise, implementation prowess, and professional managerial skills. RUIDP functions as a statewide entity in addition to its role in city-level project management. At the program (i.e., state) level, it encompasses a constellation of cities, simultaneously implementing multisector urban development packages that deliver. RUIDP operates as a project management unit, and is headquartered in Jaipur, with a network of project implementation units (PIUs) in the cities where its urban development projects are located. The city-based PIUs facilitate and supervise the design, implementation, and monitoring of local works. A flexible approach to staff mobility between the state headquarters and the PIUs has been one of the secrets of RUIDP’s success.
For Improved Financial Management

To simplify and expedite payments, RUIDP adopted ADB’s financial disbursement systems at the program and project levels, which involve three categories: advance payments, reimbursements to the executing agency, and direct payments to the contractors. The good practices supported by this process are described in this section.

Mobilization advances linked to actual progress. Contractors have been known to divert mobilization advances (i.e., advance payments to cover initial expenditures) to unrelated projects, or to allocate only part of the advances to relevant project activities. Recovering the advances from contractors that mishandle funds in this manner can be cumbersome due to weak contractual compliance provisions. RUIDP now includes specific provisions in design–build–operate contracts concerning advance payments. The disbursement of mobilization advances is now linked to progress milestones, and is done in annual installments not exceeding 10% of the annual cost of the design–build plan; it is also limited to a 5% maximum of the overall design-and-build cost. To retrieve advance payments, RUIDP deducts 10% of each interim payment certificate. The recovery commences after 6 months of payments, and the entire amount is recovered in 18 months. In some cases, contract provisions authorize the recovery of the entire amount once 80% of the design-and-build work is completed or the stipulated period for the design-and-build work is over, whichever comes first.

Easily cashable security deposits. To protect RUIDP from contractor defaults, RUIDP uses a nationalized bank to secure guarantees and quickly cash security deposits. Cashing contractor securities used to involve a difficult process of coordination with banks and courts in the other cities. While RUIDP would be securing the permissions to cash the bank securities, a defaulting contractor would find relief in court, causing RUIDP financial damage. In a few cases, RUIDP had to forbid the security because of these issues. Now, RUIDP demands that securities be cashable only in the project city. The exact contract language, endorsed by ADB, states that securities should be “issued by a reputable bank located in the Employer’s country, which may include scheduled banks or nationalized banks, or by a foreign reputable bank outside the Employer’s country, through a correspondent bank located in the Employer’s country, which may include banks in Jaipur, to make it enforceable.”

Bonuses for early completion. Bonuses for finishing work early are unusual, though ADB and the state government allow them. RUIDP began using bonuses in phase 3 to incentivize the early completion of work, especially for difficult task sets such as water distribution systems, sewerage collection systems, and rehabilitation works. The bonus is equal to the same rate a contractor would have been penalized for each day of delay in completing the work; the total bonus amount is limited to 5% of the total cost of the specific task. As evidence of the effectiveness of bonuses, RUIDP can count on the work being completed early.
For Improved Procurement Management

All prefeasibility work completed before contracts awarded. To avoid time and cost overruns, RUIDP begins advance work immediately after the conceptualization of any subproject, and completes all prefeasibility work before awarding contracts, including geographical and topographical surveys, all clearances and approvals, and land acquisition. Line agencies are important in assessing and securing land for subprojects. Securing land-use permits for government-owned land is often more expeditious than purchasing public or private land. In any case, land assessment should be based on a 30-year need. Any clearances for land use should be secured prior to the contract award, in order to avoid implementation delays.

Guidelines for work scheduling included in bid documents. With much of the prefeasibility work completed, next comes the bidding process. The tenders can and should include meticulous guidelines on the preparation of bids, with realistic implementation schedules and costs, an accounting for climatic conditions, and a consideration of the sequential nature of multisector or bundled contracts. The PIU head and DSC experts validate the completion schedule based on the tender specifications.

Bids packaged together. RUIDP avoids multiple small contracts by using market surveys and best practices to package multiple contracts for tendering. This reduces the risks related to time, cost, inconsistent quality, and cumbersome contract management. For example, RUIDP packages water supply and sewerage works into a single contract for a whole city.

Long-term operation and maintenance embedded in contracts. During the earlier phases, RUIDP handed over the completed project works to the concerned line departments for O&M. But the lack of technical capacity within the ULBs and line departments resulted in poor maintenance of the new infrastructure, so the expected results were not achieved. RUIDP now embeds long-term O&M (usually 10 years) in its construction contracts. This practice incentivizes quality construction by the contractor, who must operate and maintain the assets it has built. The contracted O&M also provides stability in the system and ensures service delivery prior to any handover to the government.

The contractors are prevented from quoting more for design and less for O&M by RUIDP’s practice of setting a minimum cost for O&M, generally 10% to 20% of the total design-and-build cost. But RUIDP does allow adjustments in the O&M fees in case of any imbalances. As the ULBs and line departments become more familiar with a contractor’s O&M over the 10-year period, the capacity of their own staffs will improve.

Performance-based contracting. RUIDP has adopted performance-based payments for design, construction, and O&M work. The most important and relevant indicators for the performance of a contract have been identified for each sector. For example, with the design–build (construction) phase contract payments involving a water supply project, RUIDP typically follows the payment structure whereby 50% of the payment is made once the contractor has supplied the pipe or sewer lines; 30% after the contractor has laid and joined the pipes, tested the system, and restored the construction-affected areas; and the 20% balance after the contractor has commissioned the system and met other identified performance indicators.
For O&M-phase contract payments, RUIDP uses a structure based on a fixed payment of 70% within 7 days of meeting the identified key performance indicators, and the 30% balance paid within 28 days of meeting the identified indicators. RUIDP structures the contract to allow the percentage of payment needed to ensure continued operations in the event the contractor fails with regard to a few performance indicators.

The adoption of these payment terms has helped RUIDP address the frequent problem of contractor reluctance to lay and join pipes because most of the payment (70%) had already been made, leaving little incentive to do more. Contractors rarely commissioned the systems on time, so road reconstruction typically dragged on, causing prolonged public inconvenience and aggravation. Linking payments to commissioning, road restoration, and actual system performance has ensured timely project schedules and a high quality of work.

**Detailed pre-bid meetings.** RUIDP sends an invitation to bid to all potential bidders, and uses a well-structured, detailed approach to pre-bid meetings and correspondence. Interested bidders are invited to an initial meeting that presents the project scope, structure, contract scope, procedure for bid submission, qualifications, contract conditions, bid document provisions, etc. And RUIDP arranges detailed and multiple site visits for prospective bidders.

RUIDP also takes proactive measures to resolve issues regarding the qualification and selection of bidders and vendors. While it must follow the official process for the qualification of bidders and vendors, RUIDP prepares the evaluation and qualification criteria after extensive due diligence and market surveys, in order to strike a judicious balance between adequate competition and proper selection of qualified bidders and vendors. The state government, executing agency, or local authorities need experience and relevant expertise to prepare the evaluation and qualification criteria for the selection of the most suitable contractors.

**Standardizing tender and bid evaluations.** Initially, the state government formed committees within RUIDP to evaluate bids. Each committee member evaluated the documents at different stages and in a different manner. This was a labor-intensive and time-consuming process. Learning from this experience, RUIDP streamlined and standardized its bid evaluation practices to institutionalize them and make them consistent. The hallmark of the process is now the creation of specific, time-defined action plans for evaluating the bids for each tender.

**The use of e-tendering for transparency and contractor confidence.** RUIDP uses electronic tendering or e-tendering to assure contractors of the transparency and credibility of its bid evaluations. An e-governance system is also used in international competitive bidding to make the processes easier for both national and international bidders.

**Building and maintaining a database.** RUIDP maintains a database of more than 200 contractors, consultants, and key experts who have worked on important projects and are in good standing. The database includes performance evaluations and recommendations, and serves as a reference for future engagements. Negative performance evaluations may lead to a consultant being blacklisted. The database also keeps track of the projects that the consultants and experts are working on to avoid simultaneous projects or to determine when a no-objection certificate is needed.
For Improved Implementation

Mainstreaming community concerns into the process. RUIDP’s tight-knit multidisciplinary teams are a legacy that is still clearly influencing the third phase. Experts in social development, gender, poverty, and communications have permanent seats on project teams, and are in high demand by contractors and engineers. Beginning with the design phase, the initial public consultations involve the Community Awareness and Participation Program (CAPP) staff along with the Public Health Engineering Department engineers, implementation engineers, consultants, and contractor representatives.

During the implementation phase, specialists from the CAPP, a part of RUIDP, are working for the city PIUs, facilitating communication between the engineering teams and the community to keep the projects moving smoothly. Nongovernment organizations are also contracted to help with community mobilization and awareness building.

Contractors have improved their own communication practices. Community orientation is a part of their official scope of work for RUIDP, but contractors have also voluntarily integrated CAPP processes into their other projects, indicating RUIDP’s broader impact on standard practices. Before any construction work begins, contractors engage with community outreach teams, which are headed by a social expert and a nongovernment organization, to raise awareness in project communities about the scope of work, the quality standards to be expected, and the new or improved public services that will follow.

Communities have also been involved in the implementation, monitoring, and maintenance of their new water systems. For example, during phase 3 the residents have been involved, in a highly structured way, in the operation of the new 24/7 water supply systems in their district metered areas. Many poor communities run a community-based monitoring system, which consists of 3–5 residents who report problems such as leakages, and who assist other community members in making their payments on time.

Monitoring contracts with web-based systems. RUIDP uses Primavera software to automate its contract management and to monitor all works at the program level across multiple cities and sites. The web-based system provides real-time, multiuser monitoring and alerts that guide decision-making on corrective actions. This tool monitors each project and easily compares progress across cities. It also checks the live status of contracts and makes contract management more convenient. The system results in greater transparency with regard to progress, and saves time.

Frequent contract review meetings. In the early years of the investment program, an RUIDP project director institutionalized contract review meetings held every 2 weeks, attended on-site by contractors, consultants, and engineers. Attendance was mandatory, but these meetings helped to bridge the gaps that were frequently found among these three groups.

Only high-quality construction materials. RUIDP has adopted higher-quality materials over the years, and has used the following stringent criteria when reviewing proposed construction materials:

- superior quality, well proven, and suitable for fast construction and long-term performance;
- double wall-corrugated polyethylene pipes (long length) in sewers, instead of reinforced concrete;
• precast reinforced-concrete manholes or polyethylene manholes, instead of on-site construction of brick manholes;
• ductile iron manhole covers, instead of reinforced-concrete manhole covers;
• high-density polyethylene pipes for water distribution networks, and house service connections with fusion-welded saddle pipes, instead of polyvinyl-chloride or asbestos-cement pipes;
• high-standard water meters tested by the Fluid Control Research Institute;
• bulk flow meters; and
• a supervisory control and data acquisition (SCADA)-enabled water-supply management system.

Reduced delays from resubmissions of designs and drawings. By the start of phase 3, RUIDP had already replaced mobilization, preconstruction activities, and advance payments with service improvement programs (SIPs) for smoother project delivery and savings. SIPs may prove valuable for additional investments as well. Contractors are required to prepare a detailed SIP, which involves visiting the project sites; collecting data and creating maps; conducting surveys (e.g., topographic); preparing designs and bills of quantities; identifying impediments; shifting utilities; and listing the required consents and permissions, potential roadblocks, etc. The design and implementation of the plans take 4–5 months, and these can be split into sub-activities with clear milestones and penalties, as well as incentives for completing work early. Contractors must finalize all their designs, drawings, and scope of work at the beginning. They can also submit their proposals for value engineering at the beginning, a preferable alternative to the common propensity of contractors to repeatedly submit new designs and drawings over the entire contract period, a practice that results in unnecessary project delays.

Road excavation minimized and road restoration expedited. RUIDP closely monitors the road restorations in all of its infrastructure projects. The program requires contractors to restore roads within 10 days, and the total uncovered length of road cannot exceed 5 kilometers at a time. Construction activities are sequenced to minimize road excavations. And, where feasible, mechanical cutters and trenchless drilling are used. About 10% of the proposed sewer lines were laid via trenchless drilling, most often where

• lanes are as wide as 5 meters and sewer depth is more than 3.5 meters,
• traffic density is high along important roads and junctions,
• traffic diversion to other streets is not feasible, and
• there are national highway–railroad crossings.

If a contractor falls behind on road restoration, RUIDP places a moratorium on future construction activities, and no new work can proceed until the restoration has been completed.

Customized capacity building. Rather than relying on typical training formats that are used for every audience, RUIDP customizes its training events and materials, with the inclusion of project-specific and site-specific topics and issues. It also supported the creation of a policy on human resource development for cities. A major feature of this policy was the establishment of the Centre for Urban Development in Rajasthan (“Rajasthan Shahari Vikas Kendra”), at the Rajasthan State Institute of Public Administration. The center is the state’s mechanism for providing continuous training and education for the various stakeholder groups involved in the urban sector. Rajasthan is the first state in India to develop and approve a human resource development plan specifically for urban governance, and it is one of the few states to have a training institution solely for urban governance.
Neutral multiplatform grievance mechanisms. To prove that public relations has a genuine value for governance, the ADB–RUIDP investments have included the establishment of long-term consumer relations centers in the project cities. RUIDP also offers the public a variety of ways to report project-related concerns, and provides faster and more transparent feedback. Technology has made much of this possible, with the development of mobile apps that allow citizens to submit complaints from their mobile devices (including photos) and to monitor the status of their complaints. The steps involved in addressing a complaint are clearly visible within the app, along with any responses and notices of resolution by RUIDP. The public may also submit complaints or concerns at RUIDP’s headquarters in Jaipur or at any one of the PIU offices. RUIDP recommends engaging a neutral third party to receive and follow one’s concerns through the complaint redress process, to ensure accountability and prevent bias. The public should also be told when they can expect responses to their complaints or requests for information.

For Improved Monitoring and Evaluation

RUIDP owes its good track record of efficient operations to its systems of quality assurance and quality control of materials and equipment, work procedures, and final outputs. Its guidelines are defined by a monitoring-and-evaluation setup that enables stakeholders to compare the pre-project conditions of a city or town to the impact of the completed project. In some cases, the communities can participate in monitoring and contribute to the sustainability of a project.

Quality assurance and control by third parties. RUIDP relies on third-party quality assurance and quality control teams to monitor procedures, equipment, materials, and final output. Multiple sets of eyes on the subprojects—internally, externally, and at various management levels—ensure that any irregularities are identified early and corrected quickly. To keep all parties mindful of quality, RUIDP issues project management circulars to raise awareness about expected quality, and streamlines procedures for quality control.

Accredited quality auditors. RUIDP engages third-party quality auditors to inspect all materials and manufacturing units before the materials and units are dispatched to the work sites. RUIDP provides the inspectors with a list of all materials and equipment likely to be procured by the contractor, descriptions of the scope of work and scope of inspection, and the design specifications. The bid documents determine the scope of inspection. Specialized firms with accreditation from the National Accreditation Board for Testing and Calibration Laboratories have been engaged for each kind of project.

The inspection agency is fully responsible for the quality assurance of all the materials. It confirms its assurance by embossing its identification seal on all materials it inspects and the inspection note.

If any defects are found in the materials after their receipt, the PIU informs the inspecting agency and contractor about the details of the defects, and schedules a joint inspection. If the defective material bears the inspection seal, RUIDP initiates an action against the third-party inspection agency, in accordance with the contract agreement.

The appointed quality auditors also inspect the project sites monthly and validate the quality of the work executed. Payments to the contractor are linked to the quality of the work being done.
**Frequent on-site visits to closely monitor work.** The team leader, a DSC, in consultation with the PIUs in all the project cities and towns, assigns support engineers to all the subprojects, sending them to their respective project cities or towns to oversee their assigned packages. Each engineer works closely with the officer in charge of the local PIU. Together, they monitor the quality of the contractor’s work and the milestone time line. Their close on-site monitoring also helps ensure timely payments to the contractors.

The PIU head and DSC also visit project sites regularly during construction to ensure full compliance with the quality assurance and quality control manual; technical specifications; and other important technical, financial, and administrative parameters.

**Accredited firms implementing exit protocols.** RUIDP was the first to engage firms accredited by the National Accreditation Board for Certificate Bodies as quality auditors in Rajasthan. The auditors review all inspection reports, monthly test results, and verification of materials the contractor is using on-site. After all the audits are completed, the assets are handed over to the line departments.

The “as-built” drawings are important records of the salient features and locations of the new assets (e.g., sewerage networks, pipeline networks, water tanks, sewage treatment plants, water treatment plants, drains, bridges). The PIU ensures that the contractor prepares the as-built drawings throughout the execution of the project, as detailed in the contract agreement. The contractor submits these drawing for the completed parts with each running bill during project execution. The contractor then submits the final detailed as-built drawings with the final bill after completing the work, in order to secure the “taking-over certificate,” which is also detailed in the contract agreement.

A complete record of the final packages is necessary for closing the contracts and the project. RUIDP submits the documentation to the line agencies and the executing agency upon the official handover, also in e-file format as an official hard copy for permanent record keeping.
Lessons learned and applied in later phases. RUIDP works at both the program and project levels, beginning with the broad definition of the scope of the program and then the specific design work in the cities where the program is being implemented. Throughout the three investment phases thus far, RUIDP has used regular internal and external review meetings as a key mechanism for discussing issues related to contract progress, payment, approvals, etc., and for recording good practices and lessons learned, which are circulated to the PIUs so they can learn from each other. For example, contracts are reviewed together by RUIDP, contractors, and consultants at the project management unit level each month, and at the PIU level every 2 weeks. Each PIU also holds regular coordination meetings with all of the municipal line agencies to raise, resolve, and record issues; these meetings have proven to be critical for improving future design and management. And then there are the ADB review missions for resolving issues and sharing valuable information.

The accumulation of experiences and insights through the phases has worked as follows:

Phase 1. RUIDP phase 1 began in 2000 with an outlay of $360 million, which was the first huge investment in Rajasthan’s urban sector. With the objective of providing integrated quality infrastructure in six large cities in the state, multiple-sector projects were selected, including those concerning water supply and management, wastewater management, solid waste management, urban drainage, emergency medical services, social infrastructure, slum improvement, and infrastructure for cultural heritage sites. Given how thinly the investment was spread across the sectors in the cities, the impact of the projects was very limited, with only partial improvements.

Phase 2. Drawing from the lessons learned during phase 1, RUIDP phase 2 began in 2009 with an outlay of $390 million. The focus was on improving the infrastructure in 15 selected cities to a level of visible impact. Given the needs of the cities in 2009, improvements in the bulk water facilities were considered. Phase 2 also undertook projects in other sectors, such as sewerage, solid waste, drainage, urban transport, heritage sites, and firefighting. Based on the experiences of phase 1, efforts were made to limit the contracts to one per sector, but 100 contracts had to be awarded to cover the required development works in the 15 project cities. Multiple contracts were awarded for similar types of work, a practice that led to severe delays, and the inter-phasing of completed works was a major concern. In many cases, the completed works were also not commissioned because various linked works had not been completed. During this phase, RUIDP also observed the capacity gaps of the ULBs when it came to operating the completed assets.

Phase 3. RUIDP phase 3 began in 2015 and is still underway, incorporating the lessons of phases 1 and 2. To improve the infrastructure and develop the capacities of institutions and the workforce, ADB and RUIDP came up with two loans for this phase: a project loan for the improvement of infrastructure in six cities, with an outlay of $250 million, and a program loan with an outlay of another $250 million, to support policy reforms and consolidate institutional development and governance improvement in the project cities. Based on earlier experiences, phase 3 is focusing on only two sectors, water supply and sewerage. With regard to water, the goal is to make supplies available 24/7, with complete coverage of each city; this entails improvements in the water distribution system and a reduction in nonrevenue water. Regarding sewerage, RUIDP aims to have 100% network coverage, along with adequate treatment systems.
Urban heritage restoration. Jaipur’s Ajmer Gate is among the 18 heritage sites restored during phase 1 of the RUIDP, which contributed to Rajasthan’s tourism assets, thereby helping to attract tourists and create related service jobs.
For more effective implementation without any hindrances, RUIDP came up with a single long-term management contract for each city—performance-based and strong on O&M—for both water supplies and sewerage. The contractor appointed in each city is responsible for both the construction of water and sewerage systems and the operation of those systems for 10 years. This provision has ensured the quality of the project works in each city.

**Phase 4.** With an outlay of $428.5 million, RUIDP will be incorporating the lessons learned over the prior three phases. A single contract will be awarded for each project town for both the water supply and sewerage works. To minimize the inconvenience to the public, the water and sewerage works will be implemented simultaneously.

**RESULTS**

RUIDP is an elaborate case study in how to design, implement, and manage livable cities. India as well as its neighbors in South Asia and in Asia as a whole need this case study more than ever as urban planners and decision-makers look to the future. RUIDP’s results demonstrate

- **economic competitiveness**—increased through investments in priority infrastructure (especially water supply and sanitation); urban services; and capacity building for more efficient living, commuting, working, and conduct of business;
- **environmental sustainability and resilience**—strengthened through investments that have improved urban environments, such as sewerage and drainage systems and solid waste management, as well as resilient infrastructure design, urban planning, and disaster reduction and preparedness for more adaptable, climate-ready cities;
- **equity and inclusion**—improved by upgrading community-based infrastructure and by officially connecting informal users to the main systems, thereby converting them into paying customers of urban services; also by improving access to health services; rehabilitating community assets (e.g., ponds, heritage sites, and parks); and involving marginalized groups in planning, implementation, and monitoring;
- **enabling environment**—created via the institutional development and capacity building under RUIDP, the ULBs, line agencies, executing agencies, etc., and through policy reforms and stronger urban governance, with more integrated planning and financial sustainability; and
- **engagement**—practiced by mainstreaming and mandating consultations, awareness raising, and public participation as a standard operating procedure of RUIDP throughout the project cycle, successfully demonstrating the value of these measures to contractors and engineers, who now often encourage such engagement in their non-RUIDP projects.

The following figure summarizes the four phases of RUIDP, showing the sizes of their total investments, scopes of work, benefits, and impacts on people and communities (projected in the case of phase 4 and the project total).
Brief Overview of the Rajasthan Urban Infrastructure Development Project, 1998–2020

**Phase 1**
1998–2009
- **Cost:** $362 million
- **ADB:** $250 million
  - **GOR:** $112 million
  - **URBAN COVERAGE:** Six of the state’s largest cities (7 million people total)
  - **BENEFICIARIES:** 7 million, including 100,000 slum residents

**Phase 2**
2007–2017
- **Cost:** $390 million
- **ADB:** $273 million
  - **GOR:** $117 million
  - **URBAN COVERAGE:** 15 medium-sized urban district headquarters
  - **BENEFICIARIES:** 1.6 million, including 200,000 slum residents

**Phase 3**
2015–2021
- **Cost:** $612 million
- **ADB:** $500 million
  - **GOR:** $110 million
  - **BMGF:** $2 million
  - **URBAN COVERAGE:** Entire state benefited from nine sector policy reforms; six towns plus seven more towns through program loan funds, all of them urban district headquarters (100,000+ populations)
  - **BENEFICIARIES:** 1.5 million (excluding beneficiaries of the policy reforms)

**Phase 4**
2020–2025
- **Cost:** $428.5 million
- **ADB:** $300 million
  - **GOR:** $128.5 million
  - **URBAN COVERAGE:** 14 initial towns (populations of 20,000–100,000); the GOR has identified 42 towns for financing (for a total beneficiary population of about 2.5 million)
  - **BENEFICIARIES:** 1 million

**Total**
1998–2025
- **Cost:** $1.8 billion
- **ADB:** $1.3 billion
  - **GOR:** $467.5 million
  - **Other:** $2 million
  - **URBAN COVERAGE:** 6 large cities, 15 medium-sized cities, 13 towns, 14 secondary towns
  - **BENEFICIARIES:** More than 11.1 million people

**BENEFITS**

- **INCREASED ECONOMIC COMPETITIVENESS**
  - Improved water supply
  - Improved roads and bridges
  - Restored cultural heritage

- **INCREASED SOCIAL EQUITY**
  - Upgraded slums
  - New and upgraded hospitals
  - New fire stations and emergency response vehicles

- **ENVIRONMENT**
  - Improved wastewater management
  - Improved solid waste management
  - Improved urban drainage

- **ENABLING**
  - Capacity development
  - Nine policy reforms


* a The total here is slightly higher than the sum of the component figures due to rounding.

Source: Authors.
The partnership between the Asian Development Bank (ADB) and the Rajasthan Urban Infrastructure Development Project (RUIDP) is preparing for the fourth phase of the project, which has invested nearly $1 billion in 27 cities to promote the well-being of 10 million people in Rajasthan for over 20 years. The institution that ADB and the state government established to lead the investment project is now among the country’s best government corporations. RUIDP is a career maker for up-and-coming engineers, specialists, and contractors, as well as for seasoned professionals. RUIDP’s experts, systems, and practices have created what ADB staff have dubbed “a development ecosystem.”

The multisector investment package has brought widespread, transformational, and catalytic change to systems and cities. The project is an elaborate case study in how to design, implement, and manage urban development projects. India as well as its neighbors in South Asia and in Asia as a whole need this case study more than ever as urban planners and decision-makers look to the future. RUIDP results demonstrate the principles of ADB’s concept of livable cities.

For further reading:


Keywords: Urban development, livable cities, RUIDP, Rajasthan, India

For further information:

Manoj Sharma (msharma@adb.org) is chief of the Urban sector Group, Sustainable Development and Climate Change Department, ADB. He has been the project team leader of ADB-financed urban development projects in Rajasthan. Previously, he was with the Urban Development and Water Division, South Asia Department, ADB.

Vivian Castro-Wooldridge (vcastro@adb.org) is senior urban development specialist, Urban Development and Water Division, South Asia Department, ADB.

Pushkar Srivastava (psrivastava@adb.org) is project management specialist, Bangladesh Resident Mission, ADB.

Notes:

“$” refers to United States dollars.
All photographs, unless otherwise credited, were taken by Amit Verma.
In 2011, the Government of India approved the name change of the State of Orissa to Odisha. This document reflects this change. However, when reference is made to policies that predate the name change, the formal name Orissa is retained.