



TAPPING INTO THE OPERATIONS KNOWLEDGE

GAPS, OPPORTUNITIES, AND OPTIONS FOR ENHANCING
CROSS-PROJECT LEARNING AT ADB

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Tel +63 2 632 4444; Fax +63 2 636 2444
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Contents

Figures, Tables, and Boxes	iv
Foreword	v
Acknowledgments	vii
Abbreviations	viii
I. Background	1
II. Purpose	2
III. Methodology and Options	3
IV. Knowledge Cycle and Project Cycle	6
A. Knowledge Cycle	6
B. Project Cycle	7
V. Recommendations	9
A. Options for Improving Knowledge Generation	9
B. Options for Improving Knowledge Intermediation	9
C. Options for Improving Knowledge Use	10
Annexes	
1. List of Staff Interviewed	13
2. Good Practices in Cross-Project Learning	15
3. Gaps and Opportunities	22
4. Guidelines on Documenting Project-Level Knowledge	27
5. Tips on Identifying Project-Level Knowledge	31
6. Interview Questions for Writing a Knowledge Product	34
7. Template for a Project-Level Knowledge Product	36
8. Sample Knowledge Product in the Energy Sector	38
9. Sample Knowledge Product in the Transport Sector	44

Figures, Tables, and Boxes

Figures

1	Knowledge Intermediation as Programmatic Linkage of Knowledge Generation to Knowledge Use	7
2	Knowledge Generation and Knowledge Use in the ADB Project Cycle	8
A2.1	Knowledge from the Operations Cycle	15
A2.2	Closing the Learning Loop	16
A2.3	Closing the Learning Loop among Implementers	18
A8.1	Energy Efficiency Multi-Project Finance Program Structure	41

Tables

1	Options for Enhancing Cross-Project Learning	4
2	Options as Grouped by Knowledge Cycle and Project Cycle	11

Boxes

1	Cross-Project Learning	2
A2.1	Project Preparation Workshop	17
A2.2	Policy to Close the Learning Loop	18
A2.3	Loan Project Award Program	19
A2.4	Communication among Executing and Implementing Agencies	19
A3.1	Solution Exchange Model	24

Foreword

Knowledge increases the capacity for effective action. The Asian Development Bank (ADB), in the course of its development projects, generates a wealth of practical knowledge that can help improve the development effectiveness of its operations. There is a need at ADB to better capture and share the knowledge generated throughout the project cycle for the benefit of future projects, which can potentially replicate or adapt that knowledge to local contexts.

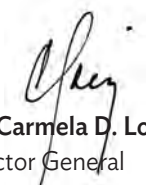
The exercise of capturing and sharing knowledge from one project for reuse in another project is referred to as “cross-project learning.” It entails systematically linking the knowledge generated to how such knowledge is used. This process also allows the knowledge cycle (generation, capture, storage, share, and use) to be coupled with the project cycle (preparation, approval, implementation, and completion/evaluation), thus reconciling the knowledge management functions of ADB as a “knowledge bank” and the project management functions of ADB as a development finance institution.

Based on the analysis of the ADB knowledge cycle and project cycle, this study seeks to identify gaps and opportunities in cross-project learning and offers ideas for further enhancement. Various options are collected, clustered, ranked in terms of potential benefit and cost, and categorized with respect to the different stages in the knowledge cycle and how they relate to those in the project cycle. The recommended options include both new and existing good but seemingly isolated practices that could be scaled up across ADB and among its developing member countries.

As one of the options with higher benefit-to-cost values, documenting project-level knowledge plays an important role in enhancing cross-project learning at ADB. This material provides tips and guidelines for identifying and documenting project-level knowledge, and also proposes interview questions and a template for writing a project-level knowledge product. Sample knowledge products which were developed in partnership with the Energy and Transport Sector Groups are also provided in the annexes.

Our hope is that the various options suggested here will provide food for thought and serve as reference to project designers and implementers. Regional departments, resident missions, and other concerned ADB units, particularly the newly appointed technical advisors of the sector and thematic groups, may find some of the options to be worthy

inputs for developing systems and procedures to capture the knowledge embedded in ADB operations, as required by the Strategy 2020 Midterm Review Action Plan, and may consider adopting any of them as suits their needs, to enhance cross-project learning.



Ma. Carmela D. Locsin

Director General

Sustainable Development and Climate Change Department

Asian Development Bank

Acknowledgments

This study was initiated and carried out under R-CDTA 8392: Provision of Knowledge Products and Services to Developing Member Countries through Systematic Knowledge Sharing, supported by the People's Republic of China Regional Cooperation and Poverty Reduction Fund. The purpose of the study was to find a methodology to systematically enhance cross-project learning at ADB.

The ADB study team was led by Dongxiang Li and composed of Christina Dueñas and Serafin Talisayon as members. The 33 options for enhancing cross-project learning collected in this study were a result of the analysis of the ADB knowledge cycle and project cycle, interviews across various units at ADB headquarters, resident missions, and developing member countries, as well as reviews of ADB's strategies, directions, policies, and procedures related to project and knowledge management.

The following ADB staff provided valuable insights to this study: Joven Balbosa, Shishir Belbase, Ashok Bhargava, Gambhir Bhatta, Cecilia Caparas, Ma. Minerva Carmona, Sophia Castillo-Plaza, Chenglong Chu, Yue Fei, Marco Gatti, Rehan Kausar, David Kruger, Wolfgang Kubitzki, Tika Limbu, Agnes Navera, Ma. Luisa Panlilio, Manmohan Parkash, Ko Sakamoto, David Sobel, Leonardus Sondjaja, Ahsan Tayyab, Oleg Tonkonojenkov, Patrick Vermeij, Ma. Theresa Villareal, Saleha Waseem, Yongping Zhai, Jiangfeng Zhang, Aiming Zhou, and Yaozhou Zhou.

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Dongxiang Li

Advisor

Economic Research and Regional Cooperation Department
Asian Development Bank

Abbreviations

ADB	Asian Development Bank
CAPE	country assistance program evaluation
COBP	country operations business plan
CPS	country partnership strategy
CWRD	Central and West Asia Department
DMC	developing member country
EA	executing agency
EVIS	Evaluation Information System
HQ	headquarters
IA	implementing agency
IED	Independent Evaluation Department
KP	knowledge product
MRM	management review meeting
OAIS-IR	Information Resources Section of the Office of Administrative Services Institutional Services Division
PARD	Pacific Department
PAU	project administration unit
PCR	project completion report
PHCO	Philippines Country Office
PMU	project management unit
PPTA	project or program preparatory technical assistance
RD	regional department
RM	resident mission
RRP	report and recommendation of the President
SAPE	sector assistance program evaluation
SARD	South Asia Department
SERD	Southeast Asia Department
SRM	staff review meeting
STG	sector and thematic groups
TA	technical assistance
TOR	terms of reference

I. Background

At the Asian Development Bank (ADB), we recognize that knowledge plays an increasingly important role in achieving development effectiveness. As the largest regional development bank in Asia and the Pacific mandated to provide development assistance to its developing member countries (DMCs), ADB has accumulated a wealth of knowledge from its development projects over the last 5 decades—covering loans, grants, guarantees, and equity investments, which can be referred to as operations knowledge or project-level knowledge. However, despite a greater focus on knowledge and knowledge solutions since the early 2000s, the knowledge embedded in ADB operations is still not being optimally captured and shared, nor is it efficiently flowing back into operations for reuse. This is due to a number of constraining factors such as lack of staff time, incentives, and systematic approaches.

The Knowledge Management Directions and Action Plan (2013–2015)¹ advocated that the ADB operations cycle in a DMC should be the principal context and basis for planning and implementing ADB’s knowledge solutions. In line with this, ADB in 2013 approved a regional technical assistance project entitled “Provision of Knowledge Products and Services to Developing Member Countries through Systematic Knowledge Sharing” (RETA-8392) to, among others, study how the design and implementation of current and future projects can be enriched by systematically extracting, sharing, and reusing knowledge from ADB’s past and ongoing project operations. The value of this study was reinforced when the Strategy 2020 Midterm Review Action Plan,² approved in July 2014, called for developing “systems and procedures to capture embedded knowledge on ADB projects and advisory work.”³

¹ ADB. 2013. *Knowledge Management Directions and Action Plan (2013–2015): Supporting “Finance ++” at the Asian Development Bank*. Manila.

² ADB. 2014. *Midterm Review of Strategy 2020: Action Plan*. Manila. p. 10.

³ Embedded knowledge refers to knowledge that is locked in processes, products, culture, routines, artifacts, or structures. It consists of tacit or undocumented knowledge among those who perform the processes and routines, plus explicit or documented knowledge describing some of the processes, products, or structures.

II. Purpose

The aim of this study is to improve the development effectiveness of ADB projects by promoting learning from past and ongoing projects and from the tacit knowledge and experiences of ADB professionals. We need to harness such knowledge and encourage its use to enhance project design and implementation. The process of transferring knowledge from one project to another for reuse is called **cross-project learning** (Box 1).

Box 1: Cross-Project Learning

The generic term “knowledge sharing” does not capture the specific intent of capturing useful knowledge generated during ADB project operations and sharing it with those who can beneficially reuse it.

Hence, the study team has introduced the term “cross-project learning” to highlight three aspects:

- (i) focus is on project-level knowledge,
- (ii) intended beneficiaries are those who will design and implement future similar projects, and
- (iii) value is created not by knowledge sharing per se but only when the shared knowledge is in fact reused by the receiver.

Project-level knowledge is generated in ADB projects, but largely spread around and embedded in various project documents, data banks, websites, and the heads of the people who design and implement the projects. This knowledge, if optimally identified, captured, shared, and applied, will be helpful in improving the design and implementation of future projects. It includes, but is not limited to, innovative approaches, good practices, lessons learned (there is a special value in showcasing failed projects in that the same mistakes can be avoided), and ways to tackle challenges. It may cover every stage of the ADB project cycle (e.g., project design, preparation, implementation, completion, and evaluation) and/or every aspect of ADB projects (e.g., technical, financial, social, safeguards, and project management).

In this study, we focus on identifying good practices and gaps and on exploring opportunities for enhancing cross-project learning and development effectiveness of ADB projects. The study highlights project-level knowledge and anchors its analysis on the knowledge cycle as well as the project cycle.

III. Methodology and Options

To identify gaps and missed opportunities for improving cross-project learning, the study team conducted interviews across various units at ADB headquarters and in resident missions with those involved in various phases of the ADB project cycle (Annex 1), as well as consultations with executing agencies and government officials in the People's Republic of China and the Philippines. Literature and project document reviews were also carried out. During the interviews and consultations, we collected a number of existing good but isolated practices (Annex 2), which could be more widely disseminated throughout ADB or among DMCs. In addition, the study team also identified new options for further improvement of cross-project learning based on its analysis of gaps and opportunities in the knowledge cycle and project cycle (Annex 3).

The various options for enhancing cross-project learning—whether isolated good practices or new suggestions from the interviewees and the study team—are pooled together in Table 1. In total, 33 options were collected by the study team, and the source of each option was identified: good practice within headquarters, good practice in a regional department or resident mission (RD/RM), suggestion by a sector and thematic groups (STG) member, suggestion by an interviewee, or finding by the study team. The study team grouped the options into 18 related clusters and scored and ranked them in terms of benefit-to-cost ratio. The ranking was computed by dividing the potential benefit score by the sum of the five cost items:

- (i) potential benefit:
 - (a) low (5)
 - (b) medium (10)
 - (c) high (15)

and

- (ii) cost items (on a scale of 0–3, added to give a maximum of 15):
 - (a) setup and maintenance costs
 - (b) additional staff time to operate
 - (c) dependency on other ADB units
 - (d) setup time or lead time
 - (e) change in existing policy or procedure

Table 1: Options for Enhancing Cross-Project Learning

Rank	Options	Potential Benefit	Cost Items	Benefit-to-Cost Ratio	Source
1	During project design, consult lessons learned section of PCRs in past related projects	15	3.0	5.00	Good practice in RD/RM
	Promote wider use of EVIS during project design stage				Good practice at HQ; finding by study team
	Include relevant lessons learned from other donor institutions in development coordination, which is part of RRP and project concept templates				Finding by study team
	Encourage prior research on lessons learned and best practices as part of due diligence in project concepts, PPTA proposals, and RRP				Finding by study team
	Avail of OAIS-IR bibliographic research service in preparation of concept papers, project papers, and PPTAs				Finding by study team
2	Define and provide simple guidelines, tips, and templates for KPs to capture useful project practices	15	4.0	3.75	Finding by study team
	Add in TOR of consultants to projects, if applicable, to document useful project practices				Finding by study team
3	Encourage RMs to give awards for “best performing project”	15	5.0	3.00	Good practice in RD/RM
4	Improve quality of lessons learned section in PCRs by having experienced project staff write it instead of external consultants	15	6.0	2.50	Finding by study team
	Prepare and adopt guidelines for writing lessons learned section in PCRs				Finding by study team
	Have more KPs and project websites conveying lessons learned from successful projects				Good practice in RD/RM
	Encourage inclusion of appendixes or links to KPs in the lessons learned section of PCRs				Suggestion by STG member
5	Encourage RMs to convene project showcase workshop during program/portfolio review meetings among EAs/IAs	15	7.0	2.14	Good practice in RD/RM
	Encourage RMs to hold project preparation workshops and project implementation administration workshops among EAs/IAs of new projects				Good practice in RD/RM
6	Promote inter-RD participation in SRMs/MRMs	15	7.0	2.14	Finding by study team
	Pilot or experiment inclusion of experts from other RDs in project teams and missions				
7	Set up an award for “best peer review” by STG members or RD staff	15	7.5	2.00	Suggestion by interviewee
	Provide incentives to peer reviewers				Suggestion by interviewee
	Add STG participation as a criterion in personnel performance review				Suggestion by STG member

continued on next page

Table 1 continued

Rank	Options	Potential Benefit	Cost Items	Benefit-to-Cost Ratio	Source
8	Translate KPs into local language for better local utilization Encourage more good practice KPs, especially those that respond to DMC demand or to needs of prospective readers; design KPs to be more user oriented or user responsive Produce KPs with a local partner for better usability	15	7.5	2.00	Suggestion by interviewee Good practice in RD/RM; Finding by study team Suggestion by STG member
9	Encourage project team leaders to produce project KPs by introducing an award for “best project KP”	15	8.0	1.88	Finding by study team
10	Add production and reuse of KPs as a criterion in project evaluation	15	8.0	1.88	Finding by study team
11	Add a new criterion to include more countries in sector assessment, which is part of RRP and project concept templates	10	7.0	1.43	Finding by study team
12	Create a searchable expertise directory in each STG that allows identification of project-oriented subexpertise	10	8.0	1.25	Suggestion by STG member
13	Include project managers and portfolio managers in the Operations Network and set up an e-group among them to facilitate cross-project knowledge sharing	10	8.0	1.25	Good practice at HQ; Finding by study team
14	Create “knowledge development TA” (KDTA) as a new type of TA to undertake thorough review of past project learning relevant to the project pipeline of a DMC Support RMs in producing a country knowledge strategy and plan in support of knowledge requirements of the CPS and COBP	10	9.0	1.00	Suggestion by interviewee Good practice in RD/RM
15	Develop a procedure for transferring critical country/operations knowledge from staff leaving RMs/RDs	5	5.0	1.00	Suggestion by interviewee
16	Formulate standard tags or keywords in project document metadata oriented to needs of project designers and implementers	5	5.0	1.00	Finding by study team
17	Set up a help desk at HQ to answer project-level or operational questions from DMCs	5	5.0	1.00	Finding by study team
18	Use Google search engine in eStar and myADB	5	5.0	1.00	Suggestion by STG member

COBP = country operations business plan, CPS = country partnership strategy, DMC = developing member country, EA = executing agency, EVIS = Evaluation Information System, HQ = headquarters, IA = implementing agency, KP = knowledge product, MRM = management review meeting, OAIS-IR = Information Resources Section of the Office of Administrative Services Institutional Services Division, PCR = project completion report, PPTA = project preparatory technical assistance, RD = regional department, RM = resident mission, RRP = report and recommendation of the President, SRM = staff review meeting, STG = sector and thematic groups, TA = technical assistance, TOR = terms of reference.

Note: Clusters are alternately shaded for easier reading.

Source: ADB task team.

IV. Knowledge Cycle and Project Cycle

The term “knowledge” appears often in documents and discourse in development institutions. A wide variety of its meaning has emerged in the literature. According to leading knowledge management gurus, the word “knowledge” has a narrower meaning than that commonly understood: knowledge increases capacity for effective action. A common source of confusion is the distinction between knowledge and information. Among most knowledge management practitioners, being actionable is what distinguishes knowledge from information. While information is “know what,” knowledge is “know how.” Knowledge is about “what works” while information is about “what is.”⁴ Hence, the objective of knowledge management is to enable effective action.

A. Knowledge Cycle

To identify gaps and opportunities for enhancing cross-project learning, the three stages of the knowledge cycle were examined:

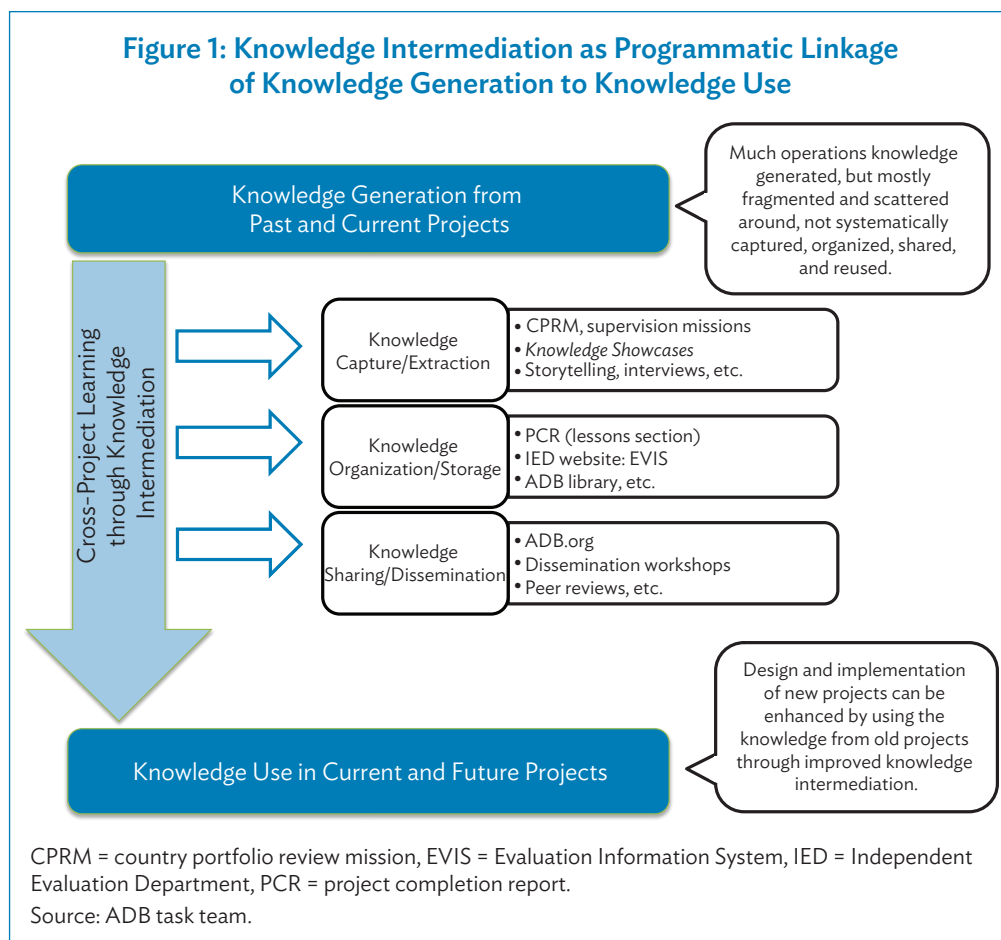
- (i) **Knowledge generation:** an organization or individual observes and validates what worked and what did not work from its experiences
- (ii) **Knowledge intermediation:** the intermediate stage between knowledge generation and knowledge use, which broadly covers knowledge identification, capture and extraction, organization and storage, retrieval and sharing, and/or dissemination, among others, as well as policies or processes that deliberately link knowledge generation to knowledge use
- (iii) **Knowledge use:** an organization or individual applies the knowledge it grasped

Knowledge generation and knowledge use are often done by different individuals or organizational units. Knowledge generated will not be used automatically. It can and does happen that knowledge generated ends up never being used, or there is no way to connect a user who needs knowledge to the right knowledge located somewhere else or known to somebody else. Cross-project learning is more likely to happen if policies, procedures, and systems are in place for linking knowledge generation to knowledge use. Such policies, procedures, and systems for programmatic linkages constitute knowledge intermediation.

The term “knowledge intermediation” was introduced by the study team to stress the importance of the intermediate steps that bridge knowledge generation and knowledge use. By adopting better knowledge intermediation, the design and implementation of

⁴ Asian Productivity Organization. 2008. *Knowledge Management in Asia: Experience and Lessons*. Tokyo.

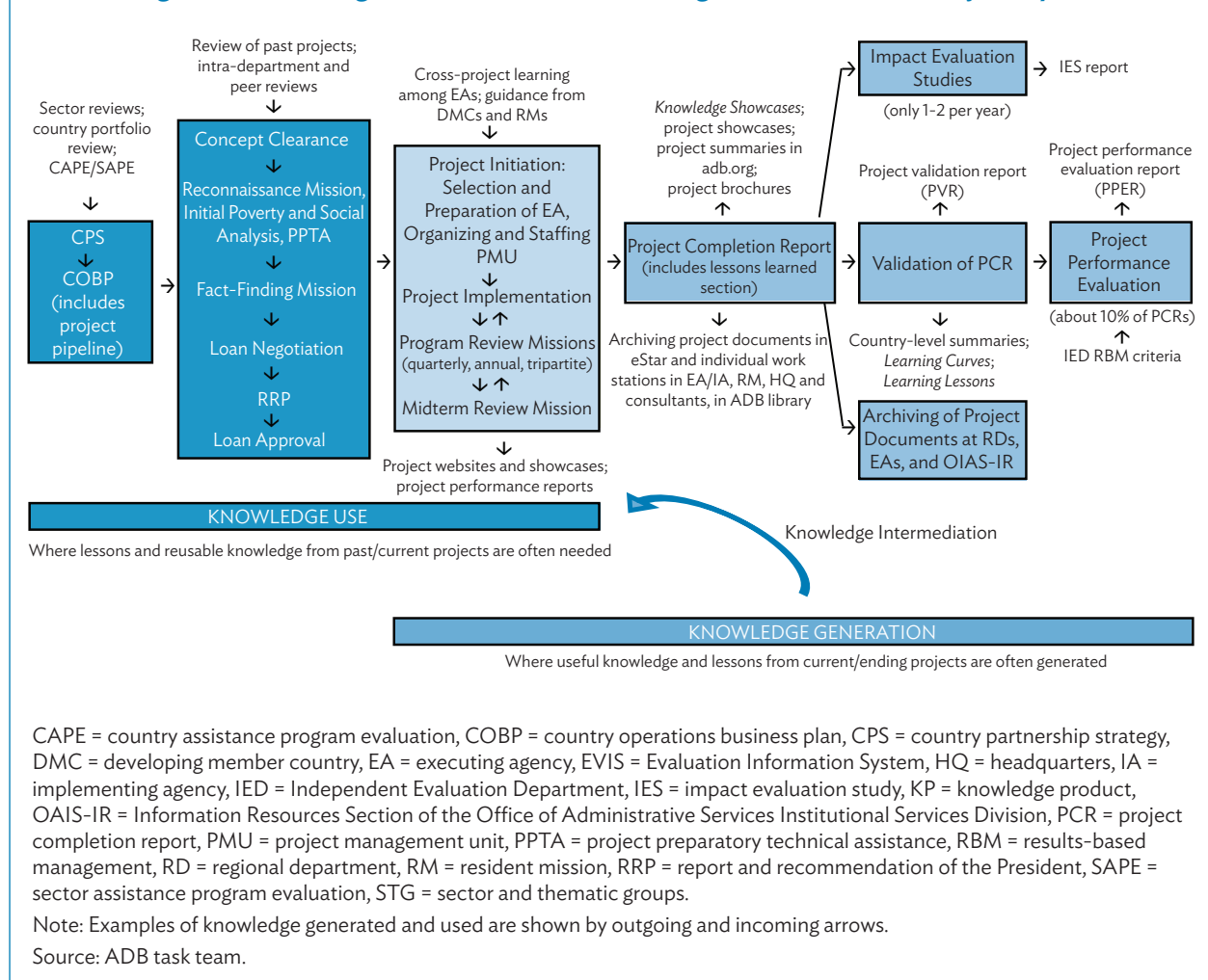
new projects can be improved by the knowledge from previous projects. Knowledge intermediation ensures that the intermediate steps in the knowledge cycle are performed in a manner that facilitates or serves knowledge use (Figure 1). Knowledge intermediation can take place directly through knowledge exchange or sharing among ongoing projects. It also encompasses the policies and procedural mechanisms that link knowledge generation and users' actual knowledge needs.



B. Project Cycle

Knowledge generation and knowledge use are linked to the ADB project cycle (Figure 2). While they can and do occur at every stage of the project cycle, knowledge generation transpires mostly during the latter stages of project implementation and evaluation. This is when project managers and staff gain tacit knowledge of what does and what does not work well in actual practice through observation and validation. It is also when good practices, lessons learned, innovations, and other knowledge from projects can be generated. In contrast, knowledge use appears mostly during the start of the project cycle during project preparation and design. The use or reuse of knowledge from past projects is generally useful

Figure 2: Knowledge Generation and Knowledge Use in the ADB Project Cycle



in the earlier stages for identification of projects for the country project pipeline, project design and preparation, and implementation.

Cross-project learning links the knowledge cycle to the project cycle and narrows the dichotomy between the knowledge management functions of a “knowledge bank” and the project management functions of a development financing institution. Within the ADB knowledge cycle and project cycle, we can observe both gaps and opportunities for how to better extract knowledge and better reuse it to improve future projects. However, many of these opportunities are not being optimally utilized currently. A more detailed analysis of the gaps and opportunities is in Annex 3.

V. Recommendations

Based on the analysis in section IV and annexes 2 and 3, the various options for enhancing cross-project learning in Table 1 can be fitted into different stages of the knowledge cycle and project cycle. The options, particularly those with higher benefit-to-cost values, can be further explored as inputs for developing systems and procedures to capture the knowledge embedded in ADB operations, as required by the Midterm Review Action Plan.

The study team found the following options (where related options are clustered) in the knowledge cycle, if widely accepted and practiced, to be substantially helpful for further enhancing cross-project learning at ADB:

A. Options for Improving Knowledge Generation

- (i) Provide simple guidelines, tips, and a template for identifying and documenting knowledge products derived from project design and operations and applicable to future projects.
- (ii) Improve quality of lessons learned section in project completion reports to be written by experienced staff (instead of external consultants); provide simple writing guidelines.
- (iii) Add in project consultant terms of reference an assignment to write up knowledge products and research on relevant knowledge in other DMCs or by other development partners.
- (iv) Encourage project team leaders to produce knowledge products arising during project operations by introducing an award for “best knowledge product” from projects.

B. Options for Improving Knowledge Intermediation

- (v) Design and administer awards for “best performing project,” have more knowledge products and project websites conveying lessons learned from successful projects, and translate knowledge products into major clients’ languages.

- (vi) Encourage RDs/RMs to convene new project preparation workshops, project implementation administration workshops, and project showcase workshops in DMCs.
- (vii) Add generation and reuse of knowledge products as a criterion in project evaluation; support RMs in producing a country knowledge strategy and plan in support of the knowledge requirements of the CPS and COBP.
- (viii) Encourage project managers and country-level portfolio managers to share workable solutions to project-level problems through the Operations Network.

C. Options for Improving Knowledge Use

- (ix) Promote wider use of the Evaluation Information System (EVIS) during project design and add as part of due diligence in project concepts, project preparatory technical assistance (PPTA) proposals, and reports and recommendations of the President (RRPs).
- (x) Set up an award for “best peer review” by STG members or regional department staff; provide incentives to peer reviewers; add a criterion on STG participation in the annual performance evaluation exercise.
- (xi) Encourage prior research on lessons learned and best practices as part of due diligence in project concepts, PPTA proposals, and RRs, such as using the Information Resources Section of the Office of Administrative Services Institutional Services Division (OAS-IR) bibliographic research service as a standard step.
- (xii) Promote cross-departmental participation in staff review meetings (SRMs) and/or management review meetings (MRMs), as well as project processing and supervision missions.

Among the 33 options, some can be decided or adopted at the level of project managers or administrators, while others can be adopted at the level of portfolio managers in resident missions or DMCs. Options related to the change of policies, systems, or procedures require decisions at higher levels in ADB. The options are provided as food for thought, for information and reference only, not meant to be mandatory ADB requirements at this stage. However, regional departments, resident missions, and other concerned ADB units, including STG, may consider adopting any of these options as suits their needs. It is expected that the newly appointed technical advisors of STG will be positioned to play great roles in advocating and implementing the recommended options.

For the option regarding the capture and documentation of project-level knowledge, the task team proposed simple guidelines (Annex 4), tips (Annex 5), interview questions (Annex 6), a template (Annex 7), and sample knowledge products (Annexes 8 and 9) for readers' easy reference.

It is also insightful to visualize the options with higher benefit-to-cost ratios along both the knowledge cycle and the project cycle (Table 2, Panels A and B). Although the options are grouped under different stages of the knowledge cycle and project cycle, many of the options are interrelated and cross-cutting.

Table 2: Options as Grouped by Knowledge Cycle and Project Cycle

A. Grouped by Knowledge Cycle

Phases in the Knowledge Cycle					
Options	Generation	Intermediation			Use/Reuse
		Capture/Extraction	Organization/ Storage/Retrieval	Sharing/ Dissemination	
Cross-cutting options	<ul style="list-style-type: none">• Set up an award for “best peer review” by STG members or RD staff• Provide incentives to peer reviewers• Add a criterion on STG participation in personnel performance review• Encourage project team leaders to produce project KPs by introducing an award for “best project KP”• Support RMs in producing a country knowledge strategy and plan in support of knowledge requirements of the CPS and COBP• Develop a procedure for transferring critical country/operations knowledge from staff leaving RMs/RDs				
Phase-specific options	<ul style="list-style-type: none">• Define and provide simple guidelines, tips, and templates for KPs to capture useful project practices• Improve quality of lessons learned section in PCRs by having experienced project staff write it instead of external consultants• Prepare and adopt guidelines for writing lessons learned section in PCRs• Encourage inclusion of appendixes or links to KPs in the lessons learned section of PCRs	<ul style="list-style-type: none">• Add in TOR of consultants to projects if applicable to document useful project practices• Add production and reuse of KPs as a criterion in project evaluation• Include relevant lessons learned from other donor institutions in development coordination, which is part of RRP and project concept templates• Add a new criterion to include more countries in sector assessment, which is part of RRP and project concept templates	<ul style="list-style-type: none">• Encourage prior research on lessons learned and best practices as part of due diligence in project concepts, PPTA proposals, and RRP• Avail of OAIS-IR bibliographic research service in preparation of concept papers, project papers, and PPTAs• Create a searchable expertise directory in each STG that allows identification of project-oriented subexpertise• Formulate standard tags or keywords in project document metadata oriented to needs of project designers and implementers	<ul style="list-style-type: none">• Have more KPs and project websites conveying lessons learned from successful projects• Encourage RMs to convene project showcase workshops during program/portfolio review meetings among EAs/IAs• Encourage RMs to hold project preparation workshops and project implementation administration workshops among EAs/IAs of new projects• Promote inter-RD participation in SRMs/MRMs; pilot or experiment inclusion of experts from other RDs in project teams and missions	<ul style="list-style-type: none">• During project design, consult lessons learned section of PCRs in past related projects• Promote wide use of EVIS during project design stage• Translate KPs into local language for better local utilization• Encourage more good practice KPs, especially those that respond to DMC demand or to needs of prospective readers; design KPs to be more user oriented or user responsive• Produce KPs with a local partner for better usability

COBP = country operations business plan, CPS = country partnership strategy, DMC = developing member country, EA = executing agency, EVIS = Evaluation Information System, IA = implementing agency, KP = knowledge product, KPS = knowledge product or service, MRM = management review meeting, OAIS-IR = Information Resources Section of the Office of Administrative Services Institutional Services Division, PCR = project completion report, PPTA = project preparatory technical assistance, RD = regional department, RM = resident mission, RRP = report and recommendation of the President, SRM = staff review meeting, STG = sector and thematic groups, TOR = terms of reference.

Source: ADB task team.

B. Grouped by Project Cycle

Options	Phases in the Project Cycle			
	CPS/Project Selection/ Design	Project Preparation/ Approval	Project Implementation	Project Completion/ Evaluation
Cross-cutting options	<ul style="list-style-type: none"> • Provide incentives to peer reviewers • Set up an award for “best peer review” by STG members or RD staff • Add a criterion on STG participation in personnel performance review • Encourage more good practice KPs, especially those that respond to DMC demand or to needs of prospective readers; design KPs to be more user oriented or user responsive • Encourage project team leaders to produce project KPs by introducing an award for “best project KP” • Develop a procedure for transferring critical country/operations knowledge from staff leaving RMs/RDs 			
Phase-specific options	<ul style="list-style-type: none"> • During project design, consult lessons learned section of PCRs in past related projects • Promote wide use of EVIS during project design stage • Avail of OAIS-IR bibliographic research service in preparation of concept papers, project papers, and PPTAs • Encourage prior research on lessons learned and best practices as part of due diligence in project concepts, PPTA proposals, and RRP • Support RMs in producing a country knowledge strategy and plan in support of knowledge requirements of the CPS and COBP 	<ul style="list-style-type: none"> • Include relevant lessons learned from other donor institutions in development coordination, which is part of RRP and project concept templates • Encourage RMs to hold project preparation workshops and project implementation administration workshops among EAs/IAs of new projects • Promote inter-RD participation in SRMs/MRMs; pilot or experiment inclusion of experts from other RDs in project teams and missions • Add a new criterion to include more countries in sector assessment, which is part of RRP and project concept templates 	<ul style="list-style-type: none"> • Encourage RMs to give awards for “best performing project” • Encourage RMs to convene project showcase workshops during program/portfolio review meetings among EAs/IAs • Include project managers and portfolio managers in the Operations Network and set up an e-group among them to facilitate cross-project knowledge sharing 	<ul style="list-style-type: none"> • Improve quality of lessons learned section in PCRs by having experienced project staff write it instead of external consultants • Prepare and adopt guidelines for writing of lessons learned section in PCRs • Encourage inclusion of appendixes or links to KPs in the lessons learned section of PCRs • Add production and reuse of KPs as a criterion in project evaluation

CPS = country partnership strategy, DMC = developing member country, EVIS = Evaluation Information System, KP = knowledge product, KPS = knowledge product or service, MRM = management review meeting, OAIS-IR = Information Resources Section of the Office of Administrative Services Institutional Services Division, PCR = project completion report, PPTA = project preparatory technical assistance, RD = regional department, RRP = report and recommendation of the President, SRM = staff review meeting, STG = sector and thematic groups, TOR = terms of reference.

Source: ADB task team.

ANNEX 1

List of Staff Interviewed

The study team interviewed the following individuals to collect their ideas on how to improve cross-project learning:

Bangladesh Resident Mission

- Oleg Tonkonojenkov

Department of External Relations

- David Kruger

East Asia Department

- Ashok Bhargava
- Ma. Luisa Panlilio
- David Sobel
- Ma. Theresa Villareal
- Yaozhou Zhou

Independent Evaluation Department

- Marco Gatti

India Resident Mission

- Leonardus Sondjaja

Indonesia Resident Mission

- Wolfgang Kubitzki

Nepal Resident Mission

- Tika Limbu

Office of Administrative Services, Institutional Services Division, Information Resources Section

- Ma. Minerva Carmona
- Sophia Castillo-Plaza

Office of Information Systems and Technology

- Shishir Belbase
- Patrick Vermeij

Operations Services and Financial Management Department

- Manmohan Parkash

People's Republic of China Resident Mission

- Chenglong Chu

Philippines Country Office

- Joven Balbosa
- Agnes Navera

Sustainable Development and Climate Change Department¹

- Robert Hood (staff consultant)
- Ko Sakamoto
- Jiangfeng Zhang
- Aiming Zhou

South Asia Department

- Gambhir Bhatta
- Cecilia Caparas
- Yue Fei
- Saleha Waseem
- Yongping Zhai

Southeast Asia Department

- Rehan Kausar

Sri Lanka Resident Mission

- Ahsan Tayyab

¹ The ADB President approved the renaming and organizational realignment of the Regional and Sustainable Development Department to the Sustainable Development and Climate Change Department on 1 June 2015.

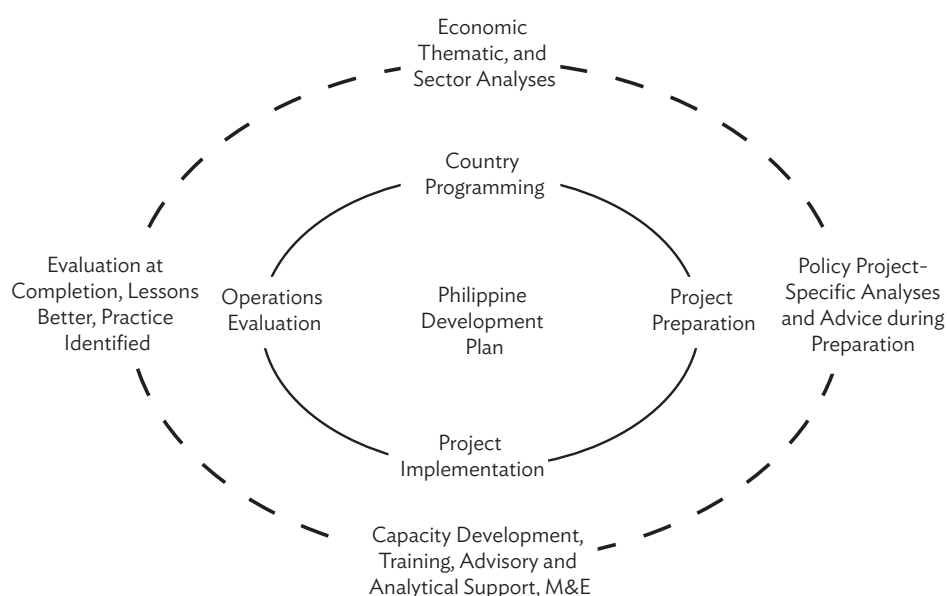
ANNEX 2

Good Practices in Cross-Project Learning

Cross-project learning occurs throughout the Asian Development Bank (ADB) project cycle. Sector and regional assessments, as well as country-level policies, development priorities, evaluations, and studies inform country programming decisions where the project pipeline is formulated and periodically reviewed jointly by ADB and the developing member country (DMC). Knowledge in the form of technical assistance and knowledge from past projects come in during project preparation and implementation. Finally, at the project completion and evaluation stages, lessons learned and good practices are documented for possible reuse in future or current projects (Figure A2.1). This annex reviews these processes to identify how cross-project learning is taking place.

The following observations were made on cross-project learning processes taking place at various stages of the project cycle:

Figure A2.1: Knowledge from the Operations Cycle



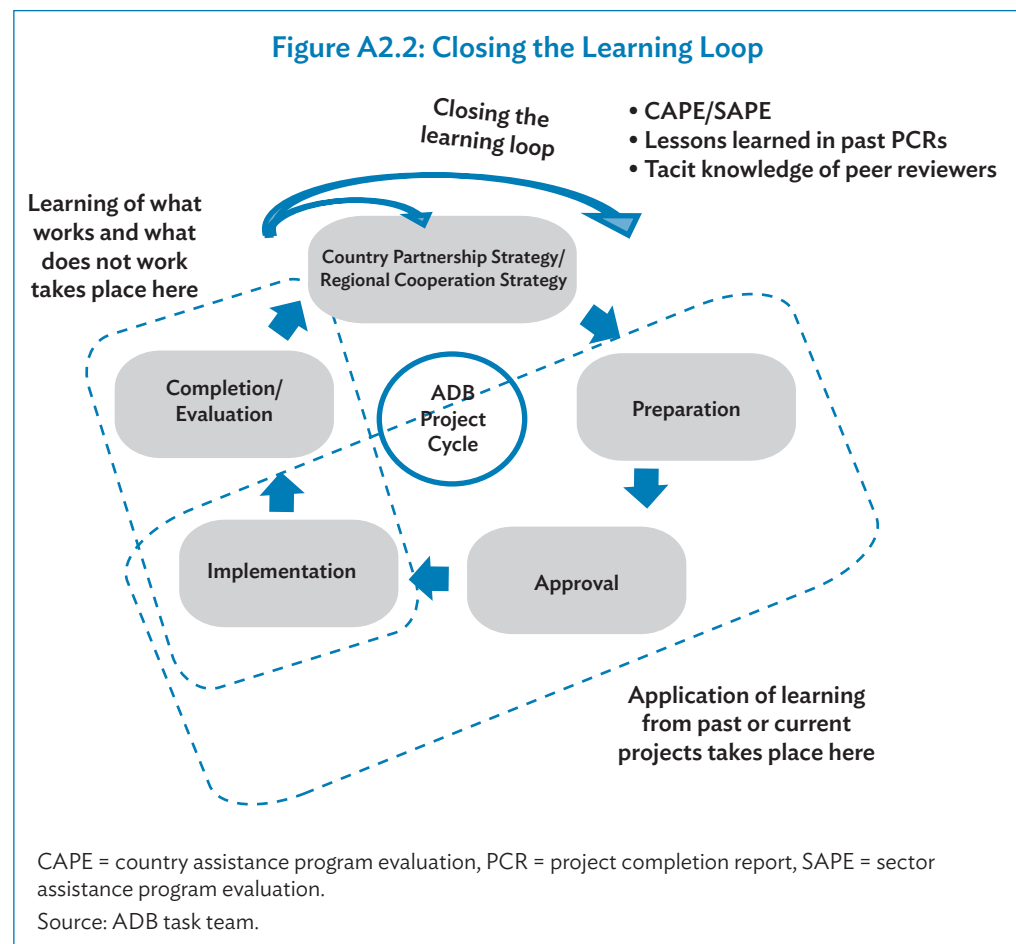
M&E = monitoring and evaluation.

Source: ADB. 2012. *Country Operations Business Plan: Philippines, 2013–2015*. Manila. Figure 1 in Supplementary Document: Country Knowledge Strategy and Plan, 2012–2015.

A. Project Identification: Country Partnership Strategy

Project identification and prioritization are done in the 3-year country operations business plan (COBP), which is guided by the 5-year country partnership strategy (CPS) between ADB and a DMC. Cross-project learning and periodic revision of the project pipeline in the COBP take place through various sector, thematic, and regional reviews and assessments as well as through the country assistance program evaluation (CAPE) and the sector assistance program evaluation (SAPE), both undertaken periodically by the Independent Evaluation Department (IED).

CAPE and SAPE can be viewed as a learning mechanism in two ways. They close the loop at the country level between learning from past projects and application of that learning in the selection of future projects (Figure A2.2). CAPE, as well as the initial poverty and social analysis (see next section), assist in formulating or updating a country project pipeline that is needs driven or responsive to local demands.



In the Central and West Asia Department (CWRD), Pacific Department (PARD), and Southeast Asia Department (SERD), selection and prioritization of projects are guided by the prior preparation of sector assessment, strategy, and road maps led by the resident missions; and CWRD consults, among others, lessons learned in project completion reports (PCRs). These practices similarly close the loop at the sector and project levels, respectively (Figure A2.2).² At the Philippines Country Office, a country knowledge strategy and plan accompanies the COBP. It describes the knowledge inputs needed for the country project pipeline, such as sector studies, project preparatory or capacity building technical assistance, and others.

B. Project Preparation and Approval

The main steps in this part of the project cycle are

- concept clearance and processing;
- reconnaissance mission, initial poverty and social analysis, and project or program preparatory technical assistance (PPTA);
- fact-finding mission;
- loan negotiation;
- preparation of the report and recommendation of the President (RRP); and
- loan approval.

The PPTA is an important mechanism for applying what was learned in the design of past or current similar projects, including from projects outside ADB through the engagement of external consultants. Cross-project learning in PPTAs is built into the requirement for research work on past projects and on best or most appropriate design solutions to local development problems. A less common device, for example, is the project preparation workshop at the People's Republic of China Resident Mission (Box A2.1).

Box A2.1: Project Preparation Workshop

Readiness and capacity of new executing agencies are among the success factors in loan projects. At the People's Republic of China Resident Mission where 10–15 new projects are added yearly to the pipeline, a project preparation workshop is convened to introduce new executing agencies to ADB policies, project procedures such as procurement and disbursement, and other knowledge critical to ensure a good start to a new project.

Significant cross-project learning and closing the learning loop (Box A2.2) occurs during peer review processes, which take place in many steps during this part of the project cycle. Peer reviewers are community of practice members and staff from within and outside regional departments. The quality of a peer review depends on the technical expertise of the peer reviewer as well as the breadth of his or her tacit knowledge and experiences about past projects.

² ADB. 2011. *Improving Project Outcomes*. Manila.

Box A2.2: Policy to Close the Learning Loop

The United States Army adopted a policy whereby the commander of an operations team must convene his or her team at the end of its operation to extract lessons learned and submit them to the Center for Army Lessons Learned (CALL). The second policy aims to *close the learning loop*: before starting any new operation, its commander must access CALL to find out what was learned in previous similar operations as input for planning his or her operation.

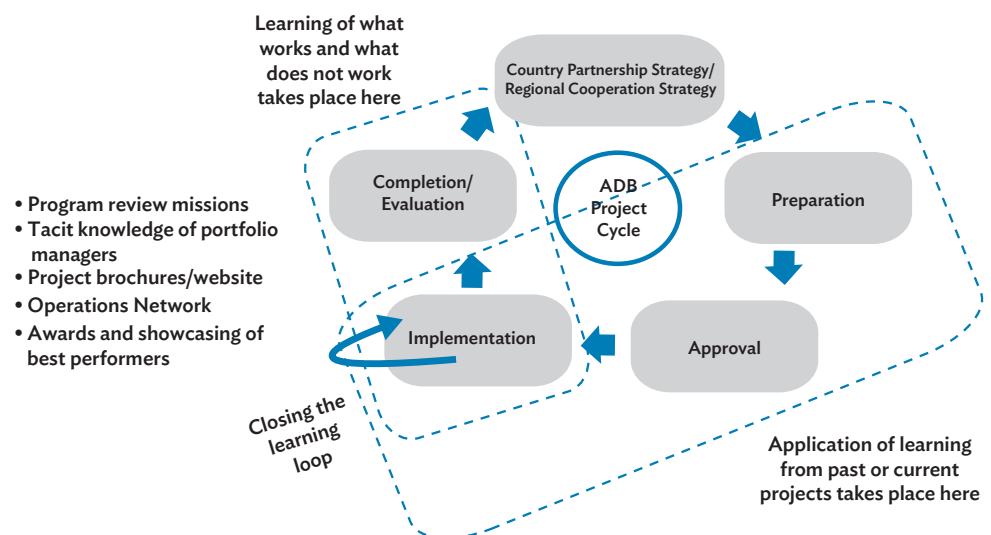
C. Project Implementation

Implementation is the primary responsibility of the executing or implementing agency to which the execution of the project or project component is delegated or outsourced. Other parties participate through oversight, technical advice, or capacity building: the government ministry to which the executing or implementing agency reports, the resident mission (in particular the sector or overall portfolio manager), the project officer or project administration unit (PAU) in the regional department, and the Operations Services and Financial Management Department (OSFMD).

Cross-project learning during the implementation stage takes place in different ways (Figure A2.3):

- Executing and implementing agencies and project management unit (PMU) leaders in a DMC meet regularly during quarterly, annual, or tripartite program review meetings convened by the resident mission. During these meetings, project

Figure A2.3: Closing the Learning Loop among Implementers



Source: ADB task team.

staff exchange solutions to administrative and technical problems with one another. In some DMCs, an exemplary project is showcased during some of the program review meetings.

- ADB staff whose job is to monitor or oversee several projects, such as the resident mission portfolio manager and PAU staff in regional departments, accumulate valuable tacit knowledge and experience that they reuse in other or later projects.
- Best performing projects were given awards and recognition, showcasing the details on what made the project exemplary or successful (for an example, see Box A2.3).

Box A2.3: Loan Project Award Program

Every 2 years, the People's Republic of China Resident Mission screens its loan projects according to a transparent set of performance criteria and a winner is selected for each sector. In 2013, nine projects were awarded.

Exemplary practices and special features are identified and shared through a publication.

Successful features include cooperation between farmers and businesspeople, innovative project management, effective use of consultants, a new philosophy of urban development, and environmental-social benefits.

- At OFSMD, ADB has set up an Operations Network as well as an OpsPedia in its enterprise portal myADB, and conducted training and seminar sessions on various skills and aspects of project administration and implementation (Box A2.4).

Box A2.4: Communication among Executing and Implementing Agencies

To facilitate *communication and sharing of knowledge* among executing and implementing agencies, the Operations Services and Financial Management Department (OSFMD) convened them in a face-to-face meeting, set up the Operations Network, and created a Facebook account for the group. An "Ask OFSMD" functionality on the intranet allows them to send queries on operations issues and problems.

- DMC ministries and regional departments have created project and program brochures and independent websites. For example, the Analytical and Capacity Development Partnership (ACDP) in the Indonesian education sector set up its own website.³ A regional initiative on promoting innovations in wastewater management among DMCs also set up a website for sharing knowledge and for collective learning among sanitation experts and practitioners.⁴

³ See the ACDP Indonesia website at <http://www.acdp-indonesia.org>

⁴ See Wastewater Innovations website at <http://wastewaterinfo.asia>

D. Project Completion and Evaluation

Substantial reusable project knowledge is generated at this stage, and also various project, sector, country, and regional level evaluations, assessments, or reviews. The learning loop is easier to close when the generator of knowledge is the same ADB unit as the re-user of knowledge, namely IED via the CAPE and SAPE mechanisms.

The PCR captures lessons learned during project closure in one of its document sections. In this case, the generator of lessons learned is different from the user, and hence due diligence on the part of the latter helps in closing the learning loop.⁵ The user can conveniently search for lessons learned relevant to his or her project through IED's Evaluation Information System (EVIS), where knowledge from the lessons learned sections in PCRs from hundreds of past projects is available to those who are charged with designing and implementing future similar projects. Lessons learned are searchable by category, including sector, project cycle stage, DMC, date of approval, theme, and report type.

ADB departments produce various forms of documentation of successful projects or project features, such as the *Knowledge Showcases* series by the Sustainable Development and Climate Change Department (SDCC) and the *Learning Curves* series by IED, as well as regional publications such as *Developing South Asia: Lessons and Insights* by SARD.⁶ Resident missions also publish their own documentation of lessons learned.⁷

E. Summary

Exemplary practices in cross-project learning can be summarized according to their stage in the project cycle. The earlier stages can be viewed as knowledge use because project preparation and design are best guided by lessons learned and knowledge generated by previous projects. The latter stages can be viewed as both knowledge use and knowledge generation when the project has proven what works well or what has resulted in success. These good practices do not appear to be widespread in ADB or DMCs. It would be beneficial to potential replicators if these good practices are duly identified.

1. Good Practices at Early Project Stages (mainly knowledge use)

- At CWRD, lessons learned in PCRs are considered for input during project design.
- The Philippines Country Office has pioneered the formulation of a country knowledge strategy and plan in support of the knowledge requirements of the COBP.

⁵ According to a study by the Strategy and Policy Department (SPD), CWRD during project selection “pays particular attention to lessons drawn in relevant country and sector assistance program evaluations, and technical assistance and project completion reports” (ADB 2011, see footnote 1).

⁶ ADB. 2013. *Developing South Asia: Lessons and Insights*. Manila. <http://www.adb.org/publications/developing-south-asia-lessons-and-insights>

⁷ For example, see H. Suliswanto and T. Russel. 2012. *Lessons Learned in Public-Private Alliances in the Vocational Education System in Indonesia*. Study report prepared for ADB.

- At the People's Republic of China Resident Mission, a project preparation workshop is convened every year where executing and implementing agencies, especially those handling ADB projects for the first time, are provided guidance on ADB policies and procedures.

2. Good Practices at Later Project Stages (both knowledge use and generation)

- In some resident missions, exemplary projects are showcased during program or portfolio review meetings.
- At the People's Republic of China Resident Mission, a loan project award program provides an opportunity to publicize exemplary project features or practices for the benefit of other ongoing projects.
- OFSMD has set up an Operations Network whereby managers and staff involved in project implementation can communicate with each other, exchange or share operations knowledge, or send queries to OFSMD on operational or administrative issues.
- Regional departments publish lessons learned from successful projects. Executing and implementing agencies also set up project websites to disseminate project information to a wider audience.
- IED has set up EVIS, which is a searchable database of lessons learned from past projects.
- Various good practice publications abound: *Knowledge Showcases* by SDCC, *Learning Curves* by IED, and other similar publications by regional departments.

ANNEX 3

Gaps and Opportunities

The following analysis of the gaps and opportunities embedded in the Asian Development Bank (ADB) knowledge cycle and project cycle is not exhaustive and merely presents the observations of the study team resulting from the interviews and consultations conducted.

A. Knowledge Use

1. Tapping Multiple Knowledge Sources for Project Design

While the review of past relevant projects is valuable for project preparatory technical assistance (PPTA), it has not been established as a required or standard business procedure. Past lessons are reflected in project concept papers and reports and recommendations of the President (RRPs) to some extent. Sector assessments focus on the knowledge of one particular developing member country (DMC), and development coordination usually lacks the lessons learned from other development partners and from other DMCs. Project missions draw members solely from one regional department, although it may be the case that another department has technical staff with the right expertise for the project. Interdepartmental participation in staff review meetings (SRMs) and/or management review meetings (MRMs) may be a good practice worth exploring.

Research about past projects relevant to the design of a new project is not part of standard due diligence procedures. Staff rarely avail themselves of the bibliographic research service of the Information Resources Section of the Office of Administrative Services Institutional Services Division (OAIS-IR) under the ADB Library, which archives records from past projects (see section B.1 of this annex). Leaving such a crucial research step dependent on the willingness and resourcefulness of mission leaders increases the probability of missing critical knowledge at the design stage. Currently, ADB has an Evaluation Information System (EVIS) containing lessons learned from past projects, though the system has not generated much traffic. The rational assumption is that if EVIS' content were relevant, using the system will help reuse knowledge from past projects in new projects being designed.

2. Strengthening the Peer Review Process

The peer review process, particularly during the project concept and design stages, allows cross-departmental and multisectoral contributions from members of the sector and thematic groups (STG). This is a crucial mechanism for harnessing the wealth of tacit

knowledge of technical staff in ADB. However, contributions to peer reviews are uneven for a variety of reasons, such as uneven tacit knowledge relevant to the project issues, uneven time availability, and uneven support from directors. Incentivizing the peer review process or mainstreaming it in the performance review system could address the time availability and management support issues. Furthermore, matching the peer reviewer and the project to be reviewed in a way that maximizes the use of tacit knowledge and project experience would significantly benefit from a STG directory of subspecialization, project experience, and country and/or language knowledge.

3. Maximizing the Knowledge of Resident Mission Staff

In the processes of formulating a country partnership strategy (CPS), selecting projects or revising a country project pipeline in a country operations business plan (COBP), undertaking the country portfolio review (CPR), and preparing the country assistance program evaluation (CAPE) and sector assistance program evaluation (SAPE), strong government commitment and ownership as well as close alignment with the national development strategy are critical. They rely heavily on good country-specific knowledge and good working relationships with the local bureaucracy—tacit knowledge held by experienced staff in the resident missions. Good country knowledge of experienced resident mission staff may be harnessed through the production of a “country knowledge strategy and plan” as input to the COBP. Such a process was piloted at the Philippines Country Office.

Another suggestion from a technical staff member in a regional department was to introduce a new type of technical assistance, knowledge development technical assistance (KDTA), for undertaking a thorough review of lessons learned from past projects relevant to a DMC project pipeline. Again, good country knowledge of resident mission staff comes into play. Unfortunately, this country knowledge is easily lost when resident mission country specialists leave ADB. An ADB-wide systematic procedure, not least of which in resident missions, would be desirable for transferring critical tacit country knowledge to replacement staff and for shortening their learning curves.

B. Knowledge Intermediation

During implementation, a project can generate learning for, and apply learning from, other projects. Cross-project learning is more likely to happen if policies, procedures, and systems are in place for linking knowledge generation to knowledge use. Knowledge capture, storage, and sharing must be done in a manner that anticipates or verifies, facilitates, and serves the use of knowledge. Policies, procedures, and systems for such programmatic linkages constitute knowledge intermediation.

1. Standardizing Archiving and/or Retrieval of Project Documents

OAIS-IR, which operates the ADB Library, is the ultimate archive of all project documents in both physical and digital formats. OAIS-IR publishes abstracts of noteworthy and

successful projects from ADB and elsewhere via iSummary that are organized by sector. This research service is available to internal ADB clients, but it is not well known within ADB; it receives only an average of 10 requests per month. The service can be programmatically linked to DMC, regional department, and STG activities during project design to enable more thorough use of information from past projects. The search engines in adb.org and myADB are not efficient in retrieving project information and knowledge useful for project design and implementation. One factor is the absence of standard tags or keywords specifically designed to retrieve project knowledge. Introducing such standard tags or keywords following project-oriented knowledge taxonomy will further facilitate search and reuse of knowledge from previous projects.

2. Sharing Tacit Project Knowledge for Reuse

Motivation or interest to share project-based knowledge is usually not inherent among executing and implementing agencies or project managers because the beneficiaries are future projects and knowledge capture and/or sharing constitute expenditure items from their perspective. ADB staff overseeing multiple projects (portfolio managers at ADB headquarters and resident missions, project administration unit [PAU] staff, and sector and division heads in regional departments), however, do have the built-in motivation to capture and reuse project knowledge because better performance of future projects is one of their management concerns. They also accumulate tacit knowledge of what works well in project design and implementation. This tacit knowledge is valuable for cross-project learning but will be lost once they leave ADB unless it is systematically documented. A simple way of documenting project practices and approaches proven to be workable, replicable, and beneficial should and could be developed and tested. The Operations Network set in the Operations Services and Financial Management Department (OSFMD) may provide a good mechanism for sharing valuable tacit knowledge, for shortening the learning curve of new portfolio managers, and generally for cross-project learning across regions and DMCs. A very cost-effective model for this kind of cooperation is the United Nations Development Programme (UNDP) Solution Exchange model¹ in India (Box A3.1). A solution exchange or simple e-group among project managers and country portfolio managers can be mutually beneficial for cross-project exchange and sharing of project knowledge, including solutions to commonly encountered project issues. The Operations Network of OSFMD could act as the vehicle for this e-group.

Box A3.1: Solution Exchange Model

A “solution exchange” community of practice is connected through an e-group. In the United Nations Development Programme India model, any community of practice member can post a query on an operational problem he or she has encountered. Another member who has actually experienced solving the problem successfully can offer his or her solution. The moderator then consolidates all replies into a solution document that is sent to the original member who submitted the query and it is also archived in a searchable database.

¹ The solution exchange model is problem driven or demand driven. The system is inexpensive to set up and operate. Moreover, it can quickly harness the cumulative years of project experiences of all its community members, and use it for mutual benefit by solving actual problems encountered by members. The model is so successful that UNDP has replicated and evolved the model in many other developing countries.

Face-to-face forms of knowledge intermediation are practiced at the People's Republic of China Resident Mission. It consists of knowledge sharing that takes place when project managers and project administrators meet face-to-face during periodic CPR missions, project implementation administration workshops, and project showcasing workshops. They also meet face-to-face during the simple ceremony honoring the winners of the award for "best performing project." These are direct forms of cross-project learning where tacit knowledge is shared and gained among project managers. This form complements the virtual modality set up by OSFMD.

3. Making Knowledge Products User Responsive

Knowledge capture from current and past successful projects are practiced in many ways, among others, project brochures and project websites distributed by the executing and implementing agencies; awareness raising materials; and project documents published on the ADB website. By and large, these knowledge products aim to generate interest or motivate toward replication but many do not actually show how to replicate the exemplary features of the project, and they tend to gloss over failures and the reasons for them.

A World Bank study indicates that 31% of knowledge products are unread and 87% are unused because they are mostly not demand driven.² The situation is similar in ADB; therefore, guidelines are needed for documenting project-level knowledge in a manner that is more responsive to users' needs and perspectives.

Knowledge capture and sharing initiatives are better guided by the knowledge needs of users. In cross-project learning, the priority users of a project knowledge product are those who need the knowledge for better project selection, project preparation (including design), or project implementation and evaluation. Users of project knowledge must be more actively involved in the identification and preparation of knowledge products so that such products are more user responsive. Project managers and team leaders are important users of project knowledge products and are hence also in the best position to generate such products given that they understand the needs and perspectives of other project managers. An award for "best project knowledge product" may motivate this important group to produce project knowledge products.

C. Knowledge Generation

1. Documenting Project Practices

Documentation of project knowledge facilitates cross-project learning if done appropriately. For this, the best format is one that is actionable or reusable. Examples of reusable forms of knowledge are manuals, guidelines, tool kits, and documentation of a process or formula. It is necessary to develop guidelines and templates for project knowledge products that facilitate replication.

² D. Doemeland and J. Trevino. 2014. *Which World Bank Reports Are Widely Read?* Policy Research Working Paper 6851. Washington, DC: World Bank.

There are many knowledge products about successful projects in ADB headquarters and resident missions. While they generate interest and motivate replication of good practices, they often do not specify the steps needed to replicate good practice. Unless the documentation of project processes is part of a consultant's terms of reference (TOR), the knowledge on good practices may be lost. The TOR of project consultants should incorporate what to document in projects and how to document them. Recording what did not work is also useful. As this may involve sensitivities among those actually involved in a project, one recommendation is to write about such events in a broad regional or sector review without identifying specific projects or to alter names and events in case studies.

2. Project Completion: Making Lessons Learned Reusable

A lessons learned section is often included in PCRs, in some integrated with the concluding section. The content and style of this section vary greatly across PCRs. Its usefulness for future projects can be further enhanced if lessons learned are worded in actionable or reusable forms. A guideline for writing more operational lessons learned sections can make this section more beneficial. For example, while government ownership has often been observed to be a success factor behind loan projects, how it is facilitated or developed in different country contexts needs to be specified.

3. Project Evaluation: Increasing Focus on Lessons and Less on Ratings

The Independent Evaluation Department (IED) performs validation of all PCRs and conducts project performance evaluation reviews on some projects. Validations, evaluations, and reviews by IED use nine criteria based on the results-based management framework. However, the generation of knowledge useful for future projects is not a criterion, thus missing an opportunity to ensure the generation of reusable project knowledge that directly benefits project designers, implementers, and beneficiaries.

The World Bank observed that project completion reports “are more oriented to accountability than lesson learning” and people tend to “look at the [project] ratings [and] not the lessons.”³ Partly to address this issue, the results agreement for the independent evaluation staff of the World Bank Group for fiscal year 2014 includes “a commitment to promote learning as well as accountability.”⁴

³ World Bank Group, Independent Evaluation Group. 2014. *Learning and Results in World Bank Operations: How the Bank Learns*. Washington, DC: International Bank for Reconstruction and Development and World Bank. p. 31.

⁴ Footnote 3, p. 91.

ANNEX 4

Guidelines on Documenting Project-Level Knowledge

In actual practice, many project managers generate and share knowledge about their project in various forms: project brochures, success stories, and project websites. If a project manager decides to adopt an improved way of developing project-level knowledge products, the following simple guidelines are proposed:

A. Project-Level Knowledge Product

A project-level knowledge product (or project KP) aims not only to inform, generate interest, and motivate toward replication of successful projects or exemplary project practices or approaches, but also to enable effective action by those who wish to replicate them. Good knowledge products include reusable or actionable knowledge, such as the following:

- (i) Innovative approaches, effective strategies, and success or facilitating factors (e.g., enabling national policy or standard, or a local government ordinance)
- (ii) Specific and workable features in project design, preparation, or implementation
- (iii) Design elements and project solutions that fit specific or local factors or contexts
- (iv) Tool kit, manual, activity flowchart, description of steps in a good or exemplary practice, practice guideline or action checklist, video or illustration of how an action is correctly performed, etc.
- (v) Work template
- (vi) Directories of experts, suppliers, technology providers, service providers, etc.
- (vii) Website, online solution, or software to perform a specific task or to support a project team
- (viii) Searchable online problem–solution database, checklist of project risks, etc.

These guidelines promote systematic but simple and practical actions to capture project knowledge into a knowledge product. The planned project KPs (i) focus on loan projects to public or private sectors, highlighting project-level knowledge; (ii) are written, whether printed or only made available online; and (iii) are designed for knowledge sharing, not for capacity building, mentoring, or providing policy advice.

B. Writing a Knowledge Product from a Project

Once the decision to document a project experience has been made (a proposed template for a project KP is in Annex 7), the following guidelines are suggested:

1. Identify the key replicable exemplary practices from the project. The lessons learned section of the project completion report (PCR) or a quick chat with the project officer at the Asian Development Bank (ADB) or executing or implementing agency project manager are good starting points. To direct the writer's focus to the wide range of possible replicable practices, the tips on spotting possible replicable and exemplary practices in Annex 5 can be of assistance.
2. Identify at least one knowledge contributor—someone directly involved in the project, knowledgeable about the practices being featured in the project KP, willing to provide additional information as needed, and able to review and help finalize the project KP.
3. Interview the knowledge contributor. Sample interview questions are in Annex 6.
4. Specify the tags or keywords describing the project KP to facilitate search and retrieval.
5. Have the project KP reviewed by the knowledge contributors and others involved in the project. Potential review criteria could be accuracy, actionability, and respect for sensitivities:
 - (i) Is the draft factual and accurate?
 - (ii) Are the steps easy to read, understand, and follow on the part of users who wish to replicate the steps?
 - (iii) Does the project KP respect any applicable cultural, religious, or bureaucratic sensitivities?
6. Pretest a draft project KP with potential users. The following guiding questions to the user are suggested:
 - (i) Did you pick up something actionable in the project KP?
 - (ii) In what ways can the draft project KP be clearer, more operational, or actionable with respect to replication or adaptation?
7. If the replicable practice involves a new technology or a complex methodology, request a technical specialist or a sector and thematic groups (STG) member to review and edit the draft, and to suggest manuals, documents, or links to web pages in the public domain that can be cited in the project KP. If the featured replicable practice involves a proprietary technology or tool, include the name and contact information of the owner of the intellectual property for the benefit of the interested user.

C. Additional Guidelines for Knowledge Products from Private Sector Projects

8. Request in advance and respect confidentiality limits of the implementing agency or private sector partner, such as those pertaining to
 - (i) financial data and information,
 - (ii) internal processes and systems of the partner, and
 - (iii) insights and information declared by the partner as “off the record.”
9. Use judgment in determining if a piece of information pushed by the partner borders on advertisement or promotion of the company and its products, with little or no relevance to the purpose of the project KP.
10. Respect intellectual property including copyright belonging to the partner:
 - (i) Cite internal company documents only with explicit permission.
 - (ii) Cite company documents used, even if these were openly available in the public domain.
11. Have the semifinal draft project KP reviewed by an authorized executive or staff and request a written or e-mail approval of the final draft.

D. Incorporating Query and Feedback Mechanisms and Translation

12. Add the name and e-mail and/or physical address of the knowledge contributor in case the reader wishes to ask questions, comment, or suggest changes for future editions.
13. The most user-responsive format for a KP is web-based text, which has the advantage of being amenable to revision and updating any time after initial publication. If the KP is available online, add an online feedback form to track uptake and to allow users to send comments and suggestions. Further, insert a discussion or forum functionality on the webpage.
14. Translate a knowledge product into the languages of major clients or potential replicators, which will help convert a less actionable knowledge product or service into a more actionable one.

E. Additional Entry in Terms of Reference of Project Consultants

15. Include in consultants' terms of reference the capture of knowledge generated, tested, or developed during the project and conversion of this knowledge into a project KP.
16. Include in project preparatory technical assistance consultants' terms of reference the capture of project knowledge generated, tested, or developed in similar projects in other developing member countries (through sector assessment) and by other development partners (through development coordination), and suggest how the knowledge can be reflected and incorporated in the design of the project.

F. Additional Guidelines in Writing the Lessons Learned Section in Project Completion Reports

17. Identify the key replicable exemplary practices, features, approaches, or tools from the project that may be useful or reusable for future similar projects.
18. Following the guidelines in section B of this annex, describe each practice in a separate document that can be an attachment or cited link in the PCR.

The above guidelines were pilot-tested with the Energy Sector Group and, as a result, the book *Knowledge and Power: Lessons from ADB Energy Projects*¹ has been published. The book comprises a sector overview and 15 case stories. The sector overview provides a context and background for the case stories, while the case stories focus on good practice and/or innovations that are replicable or exemplary. One case story from the energy book is provided as a sample knowledge product in Annex 8. The pilot test followed a sector approach, which sought to capture and share ADB-wide knowledge in the whole energy sector to overcome the silos across regional departments and developing member countries. The intended audiences of the book are those who are in a position to make the decision to adopt or adapt replicable or exemplary practices: STG members or regional department staff designing a project, ministry officials in DMCs, and managers or administrators of projects in executing and implementing agencies.

¹ ADB. 2015. *Knowledge and Power: Lessons from ADB Energy Projects*. Manila. <http://www.adb.org/publications/knowledge-and-power-lessons-adb-energy-projects>

ANNEX 5

Tips on Identifying Project-Level Knowledge

A project-level knowledge product may have one or more noteworthy practices that may pertain to one or more project stages and/or aspects. The following list, which is not meant to be exhaustive, covers a wide range of project angles, which aims to help the writer identify possible replicable and exemplary project practices.

A. By Project Cycle (Process)

1. Selection and Design Stage

- Innovative feature of project design
- Steps taken to contextualize the project to local needs and conditions
- Partnership arrangements with stakeholders in exploring project design options

2. Preparation Stage

- What worked well and what did not work in building the capacity of executing and implementing agencies
- Guidelines in selecting project managers and project team
- Good practices in project planning and organization

3. Implementation Stage

- Good practices in communications and community and/or public relations; effective approach in overcoming a problem or obstacle
- Guidelines, manuals, workflow diagrams, checklists, directories, and other actionable knowledge products to efficiently perform specific project actions
- Workable protocols for certain critical tasks (e.g., liaison with finance or planning ministries, auditor general's office, and executing and implementing agencies; early warning system on public or local community dissatisfaction)
- Other approaches that facilitate the project's completion on schedule, within budget, and to certain quality standards

4. Evaluation Stage: Along Strategy 2020 Drivers of Change (from Strategy and Policy Department Criteria)

- Improved aspects of private sector development or that attracted private sector participation, including public–private partnership (PPP)
- Strengthened governance and/or improved capacity
 - Institutionalization of a system, program, or standard
 - Programmatic transfer of a project function into a regular government agency function
 - Technical assistance in the formulation of enabling legislation
 - Training and turnover of project management to local government
 - Innovative but effective approach in developing national ownership
 - Creation of a national agency to mainstream an approach in all government programs (e.g., human rights-based approaches)
- Improved gender equality and empowerment of women
- Built or applied knowledge or innovative solutions
 - Production of reusable knowledge products to facilitate future project replication or scaling up (e.g., manuals and guidelines)
 - Inclusion in program and project preparatory technical assistance of thorough research on good or exemplary practices and lessons learned from previous similar ADB and other projects
- Strong and supportive partnerships fostered

B. By Project Aspect (Substance)

1. Technical and Engineering Design

- Innovative technical design, first-of-its-kind new technology, and significant improvement against traditional technology
- Use of cutting-edge or locally developed technology, system, or approach

2. Financing Arrangements

- Access to additional donor funds and private cofinanciers
- Innovative microfinance scheme, private sector participation and PPP mechanism, and mobilization of counterpart funds
- Access to alternative funding mechanisms (e.g., carbon finance)

3. Safeguard Mechanisms

- Effective design of environmental safeguards
- Effective and socially acceptable approach in relocation of communities
- Model covenants with indigenous communities or minority groups
- Improved gender equality and empowerment of women
- Grievance redress mechanisms

4. Financial and Procurement Management

- Innovative and efficient financial management arrangement
- Innovative and efficient disbursement procedures
- Innovative and efficient procurement procedures
- Component or link to a viable community enterprise
- Local or national annual budgetary support or subsidy for the project

5. Institutional Strengthening

- Effective approach in capacity building of local government or executing agency
- Replicability or upscaling built into project design and project institutional arrangements
- Training of community leaders in functional skills
- Inclusion of a training of trainers
- Identification and engagement of national or local champions
- Formal agreement with stakeholders critical to project sustainability
- Enactment of local or national enabling policy

6. Environmental Protection

- Innovative structure for local monitoring of environmental impacts
- Community participation in environmental impact assessment
- Exemplary approach to minimize, prevent, or mitigate climate change impacts
- Use of more efficient environment-friendly technology

ANNEX 6

Interview Questions for Writing a Knowledge Product

Before writing a project-level knowledge product, the writer needs to review all relevant project documents (such as the report and recommendation of the President and the project completion report) and interview the project officer at ADB and/or the project manager at the executing or implementing agency as knowledge contributors. When discussing with knowledge contributors the specific replicable features of their projects, one can start with the following:

1. General

- What are the significant and exemplary features or practices in the project worth replicating in other projects? Please describe and cite examples as needed.
- What publication or document, if any, best describes this feature?

2. Project Selection

- What was the rationale for this project?

3. Project Preparation and/or Planning

- What approaches and/or processes did you use during the project preparation and/or planning stage? Why were these chosen?
- What difficulties did you encounter during this stage?
- What tools did you use? What is the significance of these tools to the project?
- Who were the key players who participated during this stage and what were their roles?
- Were there any exemplary practices during this stage? Or any departures from the usual ways things are done?
- What are the lessons learned during this stage?

4. Design

- What approach and/or process did you use in conceptualizing the design?
- What are the significant features of the project design?

- What tools did you use and what were the steps you followed during the design stage?
- Who were the key players who participated during this stage and what were their roles?
- What are the lessons learned and highlights during this stage?

5. Project Implementation Stage

- How did you implement the project? What were the key steps in implementing the project?
- Did you encounter any difficulties? What were they and how did you overcome them?
- What tools did you use during project implementation? How did they facilitate implementation?
- Who were the key players during project implementation? What were their roles and contributions?
- What are the highlights of the project implementation? What are the exemplary steps, tools, approaches, partnerships, etc. used during project implementation?

6. Impact of the Project as a Whole

- What were the concrete results of the project? What are its contributions to the developing member countries?
- How did it concretely contribute to poverty reduction?
- Do you have any quotes from beneficiaries that we can publish? Do you have before-and-after pictures or statistics that show the benefits from the project that we can highlight? What other items do you wish to emphasize in the project?

ANNEX 7

Template for a Project-Level Knowledge Product

Documentation of project-level knowledge facilitates cross-project learning if the knowledge is in good or readable formats. A knowledge product is more useful to people wishing to learn from previous project successes if it describes one or more replicable and exemplary practices such as innovations, good practices, or lessons learned. It should inform, generate interest, and motivate specific readers to reuse the knowledge.

Knowledge products can take the form of a print-type publication, video, photo, or webpage, among many others. Web-based knowledge products facilitate continuous revision and reader feedback. This annex suggests a template for a print-type knowledge product, which can be uploaded online.

The logical flow of a project-level knowledge product could be as follows: Contexts → Solutions → Results → Lessons.

The following are some tips for structuring a knowledge product:

1. Title

- The official ADB project name, supplemented by a catchy title summarizing the most striking characteristics of the project

2. Summary of Key Messages

- Bulleted list of 3–4 key messages of the knowledge product, preferably one each from the main sections (e.g., context, solution, and result)
- Selling points of the knowledge product that can motivate readers to finish reading the remaining publication and replicate the exemplary practices

3. Beginning Box

- Fast facts or snapshot of the project such as approval date, completion date, loan amount, borrower, executing and/or implementing agency, geographic location, etc.

4. Contexts

- Background of the project
- Description of unique problems or specific development challenges facing the project

5. Solutions

- *Selection and design stages*: reasons why this project was selected; project design elements, and reasons why they were adopted given the local context
- *Preparation and implementation stages*: actions taken to address the challenges, both what worked well and what did not work and why; project adjustments taken and results; facilitating and hindering factors; unexpected events and actions taken

6. Results

- Benefits and impacts achieved or expected from the project
- Pictures, charts, or statistics before and after the project
- Quotations from beneficiaries to demonstrate impact of project results

7. Lessons and Experiences

- Innovations, good practices (experiences), or lessons learned from any stages of the project cycle, which may cover any aspect of the project (e.g., technical design, financing arrangement, financial management, safeguard, project organization and management, etc.)
- Knowledge derived from the project distilled, generalized, or theorized to some extent to be easily replicable in future similar projects

8. Length

- The preferred total length of the knowledge product is 5–6 pages (around 2,500–3,000 words), including pictures, figures, tables, graphs, and so on, which will make the knowledge product vivid, lively, and readable.

9. Ending Box

- Contact information of project officers who can provide further details of the project
- Further readings and related links
- List of keywords or tags that describe the content of the knowledge product and improve search engine optimization

ANNEX 8

Sample Knowledge Product in the Energy Sector

Energy Efficiency Multi-Project Financing in the People's Republic of China: Reducing Energy Consumption in a Rapidly Growing Economy

- Energy consumption in the People's Republic of China (PRC) is growing at an alarming rate, almost as fast as the country's economic growth.
- The PRC aims to address this rapid surge through energy efficiency measures. It sought the help of the Asian Development Bank (ADB) to jump-start energy efficiency projects.
- ADB introduced the concept of energy financing to the PRC through a program that provides banks partial credit guarantees and technical assistance for marketing and appraising private sector energy efficiency projects.
- The program partnered with a local commercial bank supported by technical expertise to promote energy efficiency. Workshops, training, and knowledge sharing are under way to improve the bank's capacity to identify and finance energy efficiency projects.

PROJECT SNAPSHOT

Program Approval Date: December 2007

Partial Credit Guarantee: Up to CNY800 million

Executing Agency: Commercial banks

Geographic Location: People's Republic of China

Type of Energy Project: Energy efficiency

Project Completion Date: Ongoing

Context

Energy consumption in the People's Republic of China (PRC) surged dramatically to 9.5% in 2001–2005, only slightly lower than growth in gross domestic product.¹ This accelerated pace created a strong demand for electricity. Per capita electricity consumption increased from 993 kilowatt-hours (kWh) in 2000 to 2,650 kWh in 2008.² This has serious ramifications for the country's economy and environment as serious health issues now

¹ ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Credit Guarantee to the People's Republic of China for the Energy Efficiency Multi-Project Financing Program*. November. Manila.

² ADB. 2010. *Project Administration Manual: Tianjin Integrated Gasification Combined Cycle Power Plant Project in the People's Republic of China*. May. Manila.

exist given the poor air quality resulting from burning coal for power generation and for district heating.

The government views energy efficiency as a major response to rapidly growing energy consumption. It issued policies for energy conservation, such as the Green Building Action Plan, which seeks to develop 1 billion square meters (m²) of new green building floor area by 2015, 14 times higher than the existing 69.5 million m² in 2012.³ Its 11th Five-Year Plan (2006–2011) prioritized energy conservation, high-efficiency, and energy security. It also issued the Medium and Long-Term Energy Conservation Plan, a conceptual road map for improving energy efficiency and promoting 10 types of energy efficiency projects. The plan identified the industry, transport, and building sectors as having the most potential for energy efficiency improvements. The government also revised the Energy Conservation Law and the comprehensive Energy Law (2008).⁴

However, energy efficiency projects still face several difficulties, primarily due to lack of financing and awareness. Local commercial banks are reluctant to lend funds to energy financing projects.



State-of-the-art LED lighting is developed in the laboratory of Guangdong Real Faith Lighting Company.

Photo credit: ADB Photo Library.

³ ADB. 2013. *Technical Assistance to the People's Republic of China for the Energy Efficiency Multi-Project Financing Program* (Financed by the Clean Energy Fund under the Clean Energy Financing Partnership Facility). October. Manila.

⁴ National People's Congress of the People's Republic of China. *Law of the People's Republic of China on Energy Conservation*. Database of Laws and Regulations. http://www.npc.gov.cn/englishnpc/Law/2009-02/20/content_1471608.htm (accessed 25 February 2015).

Energy efficiency remains an unfamiliar concept for many banks. It involves a wide range of technologies and strategies that banks perceive as risky. The banks' lack of training and information only aggravates the situation; they have not introduced or promoted any energy efficiency finance products. Even among senior management, awareness of energy financing is low, thus no resources have been provided for the introduction and implementation of energy financing schemes. In addition, banks believe that the highly technical nature of energy efficiency projects will increase the cost of due diligence. Therefore, proponents of energy efficiency projects encounter difficulty in availing loans. Even if they can borrow, the financing term is short or requires high collateral (footnote 1).

Thus, the Asian Development Bank (ADB) helped mobilize available domestic funds in the PRC through the Energy Efficiency Multi-Project Financing Program, which supports investment in energy efficiency and increases awareness among commercial banks and energy end users.

Solutions

An innovative program. The program involves ADB's partnership with selected banks, providing them with up to CNY800 million⁵ in partial credit guarantees (PCGs) to develop energy financing. ADB also engaged a private sector energy management company to provide technical assistance to its partner banks. The combined forces of the two partners ensured the availability of energy financing and technical competence in assessing energy efficiency projects.

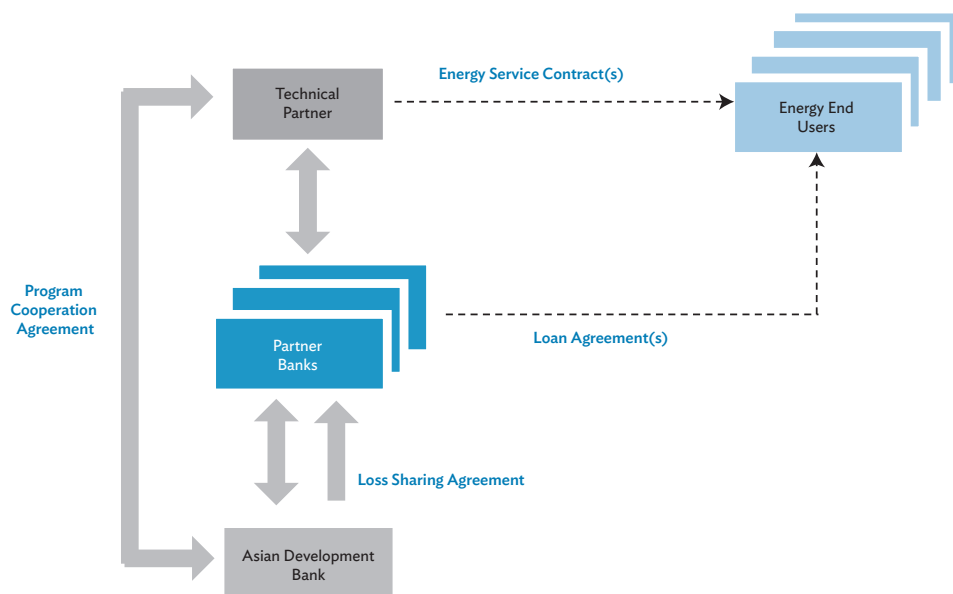
Project financing structure. Through the program, ADB will mobilize funds for energy efficiency projects by providing a PCG to each partner bank, sharing the credit risks associated with such types of projects. Partner banks will formulate agreements and frameworks that will provide borrowers and/or energy end users with increased access to finance for energy efficiency projects. Because many local banks lack technical skill in assessing such projects, the program will tap the technical skills of a private sector energy management company (Figure A8.1).

Clear and delineated roles. The technical partner offers comprehensive technical input to each energy efficiency project financed by a partner bank. It is responsible for sourcing projects for the partner bank, including marketing, energy audit, technical due diligence, setting the energy policy for end users, and equipment procurement. The partner bank is responsible for credit assessment, further due diligence, and loan approval.

Focus on a specific segment. ADB has long identified the PRC as a priority country with high potential for energy efficiency and clean energy investments. Through consultative meetings with stakeholders in the energy efficiency market, ADB learned that the PRC needs energy efficiency investments in a range of market segments with distinct credit characteristics and investment requirements. Given the country's limited experience in energy efficiency financing, the program initially focused on the energy efficiency of buildings to fast-track learning among banks. The huge market potential in this area

⁵ When the project was approved (December 2007), CNY1.00 was equivalent to \$0.13.

Figure A8.1: Energy Efficiency Multi-Project Finance Program Structure



Source: Untitled PowerPoint presentation provided by Aiming Zhou.

matches the interests and capacity of commercial banks. Since urban areas are responsible for about 75% of all energy use and GHG emissions worldwide, focusing on energy efficiency of buildings will considerably reduce energy consumption. With the PRC's rapid urbanization, energy-efficient buildings will have a large and long-lasting cumulative impact. Retrofitting buildings with energy-saving improvements can yield up to 20%–40% energy savings.⁶

Capacity building. The program introduced a technical assistance package that focused on supporting partner banks in the structuring, credit evaluation, and monitoring of energy efficiency loans. Initiated in 2014, this technical assistance will end in 2016. Several workshops shared knowledge and promoted energy efficiency activities among stakeholders, including financial institutions, government agencies, energy end users, and technology providers. Training included sessions on energy efficiency finance for bank headquarters and main branches, covering an introduction to energy-saving technologies in buildings, the economics of energy-saving equipment, sector analysis, international best practice in structuring energy efficiency loans, assessing energy efficiency cash flows, and marketing energy efficiency financial services. Additional topics will include credit underwriting, risk assessment, and portfolio management and reporting practices. The training will also help partner banks fine-tune a special unit for this program and develop and design an incentive mechanism for end borrowers (footnote 3).

⁶ ADB. 2011. ADB Supports Shanghai Pudong Development Bank Lending for Green Buildings. News release. 16 May. <http://www.adb.org/news/adb-supports-shanghai-pudong-development-bank-lending-green-buildings>



Workers conduct a massive retrofit of an iron plant to recapture previously wasted energy previously wasted in Guangdong, People's Republic of China.

Photo credit: ADB Photo Library.

Results

Partnerships. The program now has the Shanghai Pudong Development Bank (SPDB) as the local bank partner, with a PCG limit of CNY300 million. Thus far, SPDB has reviewed more than 10 projects, with two approved pilot energy efficiency loans for the building sector. It also established a special credit evaluation channel, a marketing channel, and various new procedures. In partnership with ADB, SPDB has conducted various internal training workshops (footnote 6). This successful partnership is instrumental to increasing end users' access to energy efficiency loans.

A technical partner, Johnson Controls (JCI), gives partner banks much-needed and ongoing technical assistance. JCI is a global leader in delivering integrated energy efficiency solutions.⁷

Increased capacity of partner bank. Training sessions for energy efficiency finance are well under way, and scheduled workshops will disseminate the lessons learned. Both trainings and workshops will be completed by 2016. Concurrently, the program has been developing a building energy efficiency manual for credit analysis and loan processing of various energy efficiency projects.

⁷ ADB. 2008. ADB, Standard Chartered Bank Promote Private Sector Investment in Energy-Efficient Projects in PRC. News release. 3 May.

Projected increase in private sector investments. The program envisions that lending for energy efficiency projects without ADB's partial credit guarantee will reach at least CNY500 million, and guaranteed loans will exceed CNY1.8 billion by 2018. In addition, the targeted repayment rate for energy efficiency loans will exceed 95%. These investments should produce at least 500 million m² of retrofitted buildings by 2020, and 15% of new buildings will comply with the green building standard (footnote 3).

Lessons

Flexibility in credit criteria. A major lesson from this program is the need for flexible credit criteria. Many banks have credit requirements (e.g., short payment periods and high collateral) that can hinder energy efficiency financing. For example, local banks frequently collateralize 200% of the loan amount. Others are rigid in implementing short payment periods. Flexibility will allow banks to accommodate the highly technical nature of energy efficiency projects.

Awareness and capacity for energy efficiency projects. Program implementers can help more banks accommodate energy finance projects by increasing the latter's awareness about energy efficiency financing. Banks also need specialized credit training to readily assess and process energy efficiency projects. Systematic training will enhance energy efficiency capabilities and create better awareness among commercial banks.

Availability of technical partner. This case story demonstrates the importance of a readily available technical partner, especially during the initial phase of program implementation. A technical partner can provide training on energy efficiency finance, risk assessment, portfolio management, and reporting practices. In addition, a technical partner can actively support banks in the appraisal and risk assessment of energy efficiency projects. Thus, the technical partner can further enhance banks' performance beyond lecture- or training-based knowledge sharing.

Keywords:

Energy, energy financing, energy efficiency, energy loans, energy lending, green buildings, retrofitting, People's Republic of China, PRC

For further reading:

- ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Credit Guarantee to the People's Republic of China for the Energy Efficiency Multi-Project Financing Program*. Manila. <http://www.adb.org/projects/documents/proposed-credit-guarantee-energy-efficiency-multi-project-financing-program>
- ADB. 2011. ADB Supports Shanghai Pudong Development Bank Lending for Green Buildings. News release. 16 May. <http://www.adb.org/news/adb-supports-shanghai-pudong-development-bank-lending-green-buildings>

For further information:

Hisaka Kimura, head, Private Sector Infrastructure Finance, East Asia Unit, Private Sector Operations Development (hkimura@adb.org)

Aiming Zhou, senior energy specialist, Sector Advisory Service Division, Sustainable Development and Climate Change Department (azhou@adb.org)

Dongxiang Li, advisor, Economic Research and Regional Cooperation Department (dongxiangli@adb.org)

ANNEX 9

Sample Knowledge Product in the Transport Sector

Western Yunnan Roads Development Project: Optimal Solutions to Geological, Environmental, and Safety Challenges in Highway Construction and Operation

- Poverty in Western Yunnan, People's Republic of China, was further aggravated by its remoteness. Residents had to travel for more than three hours to get to the nearest health clinic, market, or school.
- In 2003, the Asian Development Bank helped the People's Republic of China implement the Western Yunnan Roads Development Project which built an expressway and link roads, and rehabilitated over two hundred kilometers of local roads.
- The expressway was customized to adjust to the complex geological conditions, steep mountains, and frequent soil erosion of the project site. More than half of its length is made up of tunnels and bridges, with strategic locations and road spans that ensured road safety and environmental protection.
- Since it opened in 2008, the expressway has contributed to marked increases in incomes in the province, significant reductions in poverty rates, and drastic decreases in road accidents

PROJECT SNAPSHOT

Loan Approval Date: October 2003

Loan Amount: \$250 million

Borrower: People's Republic of China

Executing Agency: Yunnan Provincial
Department of Transport

Geographic Location: Yunnan, PRC

Type of Transport Project: Road transport

Project Completion Date: June 2009

Context

In the remote yet breathtaking mountains of Western Yunnan, People's Republic of China (PRC), lies an expressway borne from a people-focused initiative financed by the Asian Development Bank (ADB)—the Western Yunnan Roads Development Project. The expressway has benefited particularly Baoshan Prefecture and its population of around 2.4 million. It connected them to basic services, markets, and the Greater Mekong



The Western Yunnan Roads Development Project built a four-lane expressway that helped connect the remote province of Western Yunnan to markets and basic services.

Photo credit: Project Team for the Western Yunnan Roads Development Project.

Subregion (GMS), drastically decreasing travel times while increasing incomes, amid complex geological hazards and challenges posed by the province's mountainous terrain.

Initiated in 2003, the project connected Baoshan in Yunnan to Longling through a 77-kilometer (km) four-lane expressway. It starts at Daguanshi Village in Longyang, crosses eight other villages, and then connects with Da-Bao Expressway (from Dali to Baoshan City). It ends at Longshanka in Longling County. It also upgraded 294 km of local roads to improve access to poor and ethnic minority areas.

This expanded and improved road network was badly needed. Yunnan was previously a largely underdeveloped province, isolated from markets and basic services by poor-quality and insufficient roads that were usually congested and prone to landslides and fog during the rainy season.¹ Seventy-three of its 128 counties were officially identified as poor;² and the inadequate road condition had pushed many of them further into poverty. Yunnan's gross domestic product (GDP) in 2001 was CNY4,837 in 2001—64% of the national average. Baoshan's poverty incidence was 29%, a rate higher than the national average. The project aimed to address these issues through its threefold goal of promoting pro-poor economic growth, reducing poverty, and supporting regional development in the GMS.

¹ ADB. 2011. *Validation Report: Western Yunnan Roads Development Project in the People's Republic of China*. Manila.

² ADB. 2009. *Performance Monitoring & Evaluation (PPME) Report No. 8: Western Yunnan Road Development Project Baoshan–Longling Expressway Project*. July. Manila.

However, what seemed like an ordinary road expansion project actually necessitated a major construction feat. Western Yunnan has complex geological conditions and a fragile environment. It has crossing faults and incomplete folds lodged in a terrain of mountains and intermountain basins. It has a very fractured and highly variable rock substrate or surface, with inclined ridges above floodplains. Rockslides, severe slumping, and gully and sheet erosion are prevalent on many of its slopes. The geology and slope stability often change considerably over very short distances, with tilts averaging 20–45 degrees,³ resulting in a continuous climb or descent in many areas of the road. The site also passes through a government-declared soil erosion prevention area. A thorough study before the expressway construction revealed that the project site had 31 faults, 48 landslide-prone areas, and 8 karst subsidence areas. More than half of the expressway's length was deemed hazardous. All these factors affected the stability, safety, and design of the expressway.

Moreover, special care had to be given to the expressway's surrounding environment, as it also passes the Gaoligong Mountain National Nature Reserve—a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site, and a World Wide Fund for Nature protected area. It is a sanctuary for wild fauna and flora that have survived the Tertiary and Quaternary periods. It has been called a “global gene bank” due to its biodiversity.⁴ The project had to be particularly careful not to disrupt the natural environment.

Solutions

Given the enormous geological challenges, the project employed innovative design and implementation steps to ensure that the expressway will be structurally safe while proactively protecting the natural environment.

Treatment of geological hazards. Prior to road construction, the project conducted a thorough investigation of the site's geological conditions and treated geological hazards before cutting and excavation work. A specific soil erosion protection plan (SEPP) was prepared for the project, which detailed the various types of plants that will be used to revegetate the project site and help hold down the soil. In addition, the project ensured, before any excavation was done, that a replanting layout was developed for the site. This layout was illustrated on a topographic map which detailed replanting areas, type of plants used, and the maintenance program to be undertaken. The slopes, on the other hand, were stabilized through retaining structures designed and implemented based on *Highway Protection Guidelines and Technical Standards of Highway Projects*.

Synchronization of soil erosion protection and construction works. Another significant step taken by the project was the synchronization of soil erosion protection activities with the schedules of road construction. Embankment and slope protection and drainage works were executed simultaneously with the main works, while revegetation and landscaping promptly followed digging and earth waste disposal in some sites. However, for the project's

³ ADB. 2002. *Summary Environmental Impact Assessment: Western Yunnan Roads Development Project in the People's Republic of China*. December. Manila. <http://wcm.adb.org/sites/default/files/project-document/70805/prc-yunnan-roads.pdf>

⁴ ADB. 2012. *Transport in the People's Republic of China: Highway Brings Business*. November. <http://www.adb.org/results/transport-peoples-republic-china-highway-brings-business>



The expressway passes through the Gaoligong Mountain National Reserve, a sanctuary for wild fauna and flora.

Photo credit: Project Team for the Western Yunnan Roads Development Project.

waste area, preliminary protection activities preceded construction activities, such as the setup of cutoff trenches, drainage ditches, and arresting walls.

Technologically advanced expressway design. The expressway follows the contours of the mountains of Western Yunnan, with half of its length made up of tunnels and bridges. The tunnels pass through mountains, while the bridges span deep valleys, rivers, and tributaries below. The tunnels were especially difficult to construct, as they were mostly situated



The tunnels of the expressway pass through mountains, while the bridges span deep valleys, rivers, and tributaries below.

Photo credit: Project Team for the Western Yunnan Roads Development Project.

under the surface of mountain slopes made up of weathered rocks.⁵ They vary in length, from 125 to 2,920 meters, with a total length of 9.4 km. The tunnels are two-lane roads, with an emergency walkway in each side of the tunnels. They were designed with two-stage lining and the insides were sprayed with fire-protective material. At the end of expressway construction, the project had a total of 237 bridges, 203 passageways, 4 separated channels, and 9 double-arch tunnels. This technologically advanced highway design was complemented by the construction and rehabilitation of local roads that feed into the expressway, which has largely expanded the number of project beneficiaries.

Road safety features. With the active involvement of the police and automotive mechanical technicians, the project identified potential safety problems. It developed a three-dimensional simulation system to test the perception of driving and identify the safety black spots. The project introduced safety innovations, such as installing 11 escape ramps beside the areas of steep descents, as well as installing conspicuous caution signs to alert drivers. Traffic signs and guardrails were adequately provided along the route, and reinforced road signs were provided at tunnel entrances, in the tunnels, at sharp curves, and at the exits. Red road marks were applied at sharp curves and fog signs were provided in foggy areas. A solar-powered traffic monitoring system, which includes an emergency communication system, was provided along the project expressway.⁶

Preservation of the environment. The project utilized various approaches to preserve the environment. The strategic locations and lengths of the bridges and the tunnels helped preserve the environment by minimizing the need for deeper excavation works



The project installed 11 escape ramps beside the areas of steep descents and conspicuous caution signs to alert drivers.

Photo credit: Project Team for the Western Yunnan Roads Development Project.

⁵ COWI. 2009. Baoshan–Longling Expressway. http://www.cowi.dk/menu/project/Brotunnelogvandbygning/Tunneler/SCLogbjergtunneler/Documents/0233-1706-030e-09b_low.pdf

⁶ ADB. 2011. *Completion Report: Western Yunnan Roads Development Project in the People's Republic of China*. February. Manila.

on the mountains and their slopes, and damage to existing vegetation and the natural environment. To ensure water and soil conservation, landscaping and planting activities were implemented right after the completion of slope cutting. Bridge runoffs were piped into sedimentation ponds while roadway runoffs were diverted over grass. Energy-saving facilities were also installed in the tunnels and used for the all-day traffic monitoring system (footnote 6).

Integration with local cultural and tourism sites. An added value of the project is the way the expressway design integrated the scenery. It features pit stops where tourists and ordinary motorists alike can stop to rest and dine while enjoying the scenic view atop the Western Yunnan mountains. It also includes corridors to facilitate the migration of animals living in the heritage and protected sites along the expressway.

Results

Road safety and environmental protection. The project was completed in September 2008, with the expressway's design customized to suit the site's complicated geological conditions. The construction quality and the effectiveness of road safety control and environmental protection substantially exceeded expectations. Records of the Traffic Police Office of the Public Security Bureau of Baoshan showed that the number of traffic collisions in the project area was reduced to 16 in 2008 and 15 in 2009, as compared with 34 in 2006 and 23 in 2007. Casualties were also reduced to 32 persons in 2008 and 22 in 2009 from 90 in 2006 and 54 in 2007 (footnote 6). The project, while ensuring road safety, also strived to minimize environmental damage during project implementation. Almost 98% of land involved in construction activities was either treated or restored, and the vegetation recovery rate reached as high as 98.4%.



The expressway has helped reduce poverty and travel time in Western Yunnan.

Photo credit: Project Team for the Western Yunnan Roads Development Project.

Rural poverty reduction and socioeconomic impact. The expressway has also substantially contributed to reduced poverty levels and increased incomes, trade, and employment in the project site, while lowering transport costs. Rural poverty in Baoshan City was reduced to 8.6% in 2008, in Longyang District by 7.6%, and in Longling County by 15.8%. Per capita net income increased yearly by 14.0% in Baoshan, 12.2% in Longyang, and 11.8% in Longling.

The project also contributed to the annual increase of per capita GDP from 2004 to 2008 in the project area. In Baoshan, GDP increased an average of 17.7%, in Longyang District by 19%, and in Longling County by 20.9%—high, compared with the provincial average of 11.1% per year.

The project contributed to the increased incomes of the local populace. From 2004 to 2008, the farmers' per capita income increased annually, ranging from 7.7% to 15.9% in Longyang District and Longling County. During the construction of the expressway, the project was also able to contribute to job generation and increased incomes in the province. In 2006, the project was able to hire a total of 11,410 laborers from poor households to work on the construction site. The project also helped increase the locals' skills in construction. Some of the local road construction workers have already moved on to other construction projects. Upon completion and actual opening, the project also employed local people to act as traffic security guards, toll gate personnel, monitoring station personnel, and staff stationed in or near tunnels. Local villagers were also hired as road cleaners for the expressway.

Transport services. The expressway has also substantially reduced travel time in Yunnan. Before the highway was constructed, the trip between Longling and Baoshan took 4–5 hours by car and up to 6 hours by truck (footnote 3). Upon completion of the highway, the travel time was reduced to about 1.5 hours. Freight traffic increased to 197,400 tons in 2008 from 28,200 tons in 2004 and the number of passengers increased to 11.8 million from 8.4 million in 2004 (footnote 6). The project also increased access by the poor to markets and social services. A sample survey of 26 villages traversed by the expressway showed that 100% of the villagers, up from less than two-thirds in 2004, can reach markets and secondary schools in 30 minutes and health clinics in 10 minutes since the expressway was opened (footnote 1).

Clearly, the long, steep, and winding road of the Western Yunnan Expressway has led to multiple benefits for Yunnan and its residents, beyond the project's initial expectations. It features a highly tailored and innovative highway design, mixed and matched with various safety and environmental features. Now, this infrastructure is helping lift the lives of many impoverished people in the province.

Lessons

Innovations in highway design do not have to mean out-of-the-ordinary road architecture. In the Western Yunnan Road Project, the measures used to build the expressway were optimal because they embraced geohazard treatment, environmental protection, and road safety measures and integrated all of them into the road design, construction, and

operation. These are lessons that can be shared with other road projects faced with similar conditions.

Geohazard investigation. A thorough geohazard investigation done before construction can help guide the proper design of the highway in a geographically challenging location. This should be done during project design to ensure that steps to be taken during project implementation are informed and well thought-out. This would improve project quality and avoid costs in maintenance and operation.

Synchronization of construction and environmental protection activities. It is best to synchronize construction activities and environmental protection measures during road project implementation. Cleanup, restoration, and revegetation should be done immediately at the start of road operations. This step helps avoid soil erosion or landslides after the opening of the road.

Prioritizing road safety. Road safety should be a priority for road design and implementation. A three-dimensional simulation system used during road design can be an effective tool to identify safety black spots. Roadside resting areas at scenic viewpoints can provide drivers sufficient rest, reducing fatigue while driving. In addition, more visible and frequent road signs, guardrails, escape ramps, and sufficient lighting should be provided during road construction.

For further reading:

- ADB. China, People's Republic of: Western Yunnan Roads Development Project. <http://www.adb.org/projects/32336-013/main>
- ADB. 2014. *Highway in the Mountains: The Western Yunnan Roads Development Project*. Manila. <http://www.adb.org/publications/highway-mountains-western-yunnan-roads-development-project>

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For further information:

Chenglong Chu, senior portfolio management officer, PRC Resident Mission (cchu@adb.org)

Lloyd Wright, senior transport specialist, Sustainable Development and Climate Change Department (lwright@adb.org)

Dongxiang Li, advisor, Economic Research and Regional Cooperation Department (dongxiangli@adb.org)

Tapping into the Operations Knowledge

Gaps, Opportunities, and Options for Enhancing Cross-Project Learning at ADB

The Asian Development Bank (ADB) has generated a wealth of practical knowledge in the course of its development projects. This operations knowledge—if optimally captured, shared, and reused—will help improve the design and implementation of future ADB projects. This exercise of capturing and sharing knowledge from one project for reuse in another project is called “cross-project learning.” Based on an analysis of ADB’s knowledge cycle and project cycle and interviews conducted with ADB staff, this study identifies gaps and opportunities and offers methodologies for systematic enhancement of cross-project learning at ADB. It also provides guidelines, tips, and a template for capturing and documenting operations knowledge.

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ASIAN DEVELOPMENT BANK

6 ADB Avenue, Mandaluyong City

1550 Metro Manila, Philippines

www.adb.org