



1. Project Data

Project ID
P101829

Project Name
CN Xining Flood and Watershed Mgmt

Country
China

Practice Area(Lead)
Water

L/C/TF Number(s)
IBRD-77120

Closing Date (Original)
31-Dec-2014

Total Project Cost (USD)
188,000,000.00

Bank Approval Date
02-Jun-2009

Closing Date (Actual)
31-Dec-2015

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	100,000,000.00	0.00
Revised Commitment	100,000,000.00	0.00
Actual	100,000,000.00	0.00

Sector(s)
Other Water Supply, Sanitation and Waste Management(42%):Social Protection(20%):Public Administration - Water, Sanitation and Waste Management(12%):Other Transportation(9%):Other Public Administration(9%):Sanitation(8%)

Theme(s)
City-wide Infrastructure and Service Delivery(47%):Natural disaster management(28%):Water resource management(22%):Land administration and management(2%):Participation and civic engagement(1%)

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2. Project Objectives and Components

a. Objectives

According to the Loan Agreement (page 4) and the Project Appraisal Document (PAD, page 3), the project objectives were as follows:

- To improve protection of property and safety of people from flood events; and
- To bring about sustainable utilization of land and water resources within Xining Municipality of Qinghai Province.



- b. Were the project objectives/key associated outcome targets revised during implementation?

No

- c. Components

1. Flood Control and Management (Appraisal: US\$ 105.02 million; Actual: US\$ 131.52 million): This component aimed to improve flood control and management ability in Xining Municipality and three surrounding counties, through both structural and non-structural interventions. Activities included: strengthening of dikes and gullies along approximately 53.76 km of main rivers and 35 km of minor tributaries and drainage courses; development of flood forecasting, flood warning, and emergency preparedness systems; and construction of three recreational areas to improve public environmental use.
2. Wastewater Collection (Appraisal: US\$ 10.13 million; Actual: US\$ 11.95 million): This component aimed to develop and wastewater and urban storm water collection system. Activities included: construction of wastewater interception pipes and rainstorm water collection pipes, which would be connected to four existing/planned wastewater treatment plants.
3. Watershed Management (Appraisal: US\$ 19.49 million; Actual: US\$ 16.64 million): This component aimed to reduce silt inflow into the Huangshui River, by regulating surface runoff, providing flood flow retardation, and improving flood control in upstream catchment areas. Activities included: afforestation and re-vegetation; construction of check dams and terracing; and provision of alternative livelihood opportunities for affected farmers. The latter activity is intended to offset negative impact on farmer livelihoods while at the same time introducing more sustainable land and water use practices. This activity would use participatory approaches to determine which alternative livelihood interventions are introduced in each village, but would include the following options: animal husbandry, renewable energy sources, green houses, and access roads.
4. Capacity Building (Appraisal: US\$ 11.12 million; Actual: US\$ 7.59 million): This component supported construction of a flood warning center, technical assistance, and research and training.
5. Resettlement and Environment (Appraisal: US\$ 35.0 million; Actual: US\$ 31.06 million) This component supported actions for managing adverse environmental impacts and resettlement needs.
6. Project Management (Appraisal: US\$ 18.11 million; Actual: US\$ 13.44 million): This component supported development of a management information system and project management functions of the Xining Municipality.

- d. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project cost

- The appraised project cost was US\$ 207.57 million. The actual cost was US\$ 216.62 million.

Financing

- The project was financed in part by an IBRD Loan of US\$ 100.0 million, which disbursed in full.

Borrower contribution

- Counterpart funding in the total amount of US\$ 107.57 million was to be provided by the Xining Municipality (US\$ 72.59 million), Datong County (US\$ 15.57 million), Huangyuan County (US\$ 15.09 million), and Huangzhong County (US\$ 4.32 million). The actual amount provided was US\$ 116.62 million.

Dates

- *May 2014*: The project was restructured such that several project activities were dropped (due to availability of local financing to fund such activities) and others were added in replacement. The nature of the activities was consistent with the original project design, while their location was revised. The project closing date was extended from December 2014 to December 2015, to allow for completion of the newly added



activities.

3. Relevance of Objectives & Design

a. Relevance of Objectives

The capital of Qinghai Province in China, Xining, is located in the Huangshui River Basin (part of the upper Yellow River system). This river basin and accompanying floodplains are home to the bulk of the Province's population, but the area has been heavily impacted by human activity, leaving the municipality highly vulnerable to soil erosion, intense rainfall episodes, and severe flooding. As noted in the PAD (page 1), "the City is exposed to periodic floods that are characteristically concentrated, high velocity, short duration events caused by high intensity rainfall in the steep catchment areas upstream of the city." Disruption and loss of life and property, as well as negative environmental impacts, are significant, exacerbated by the lack of proper sewage and drainage collection systems that lead to direct disposal of wastewater into open waterways.

The Bank's Country Partnership Strategy for 2006-2010, relevant at the time of project appraisal, identifies managing resource scarcity and environmental challenges as a key pillar. The Country Strategy for 2013-2016, currently in place, highlights "supporting greener growth" as a strategic theme, including enhancing urban environment services. The country's 11th Five-Year Plan for 2006-2010 also recognizes the challenges of pollution and natural resource depletion, while the Ministry of Water Resource's Yellow River Basin Water Resources Master Plan aims to promote sustainable use of land and water resources, while also addressing flood management challenges.

Rating

High

b. Relevance of Design

The project design supported a comprehensive, integrated approach to flood management in order to mitigate the impacts of severe flooding, rather than a more narrow focus on flood control only. Increased flood protection through structural outputs (dikes, re-vegetation) and also non-structural interventions (flood forecasting) while also decreasing wastewater and rainwater volumes were key to this integrated approach. The project also aimed for sustainability of flood/soil erosion control measures by including O&M arrangements and informing local communities about land and water conservation practices, as part of alternative livelihood training to increase incentives to change current practices. The participatory nature of the livelihood training contributed to relevance and ownership by the local communities. The comprehensive scope of these activities - structural and non-structural interventions, short-term and longer-term - ensured high relevance of project design to achieving the intended outcomes.

Rating

High

4. Achievement of Objectives (Efficacy)

Objective 1

Objective

To improve protection of property and safety of people from flood events

Rationale

Note: There were no changes to the project objective or the key outcome indicators, although targets for several indicators were increased in accordance with the revised project activities. As these are considered *upward* revisions (i.e. not a decrease in project



scope), this Review will not apply a split rating.

The Xining Municipal region has a population of 2.12 million, of which approximately 414,300 people live in the watershed catchment areas.

Outputs

- Construction and/or rehabilitation of 62 km of dikes (original target: 53.7 km; revised target: 61.2 km) and 35 km of gullies.
- Establishment of a flood warning and forecasting system, including construction of a Flood Warning Center, data collection system for rainfall, meteorological, and engineering monitoring, and information technology hardware.
- Creation of 293.2 sq. km of landscapes and green belts (target: 278.6 sq. km). The project also financed 1.76 sq. km. of recreation areas.

Outcomes

- The land area protected by flood control structures was 36.2 sq. km. This exceeded the original target of 31.4 sq. km and the revised target of 35.8 sq. km.
- The number of people living within the protected land area was 434,440. This exceeded the original target of 414,300 and the revised target of 426,300.
- The total economic value of the areas protected from flooding was 5.8 billion RMB. This exceeded the original target of 5.3 billion RMB and the revised target of 5.7 billion RMB.

Achievement is rated High due to surpassing of targets in coverage of flood control measures.

Rating
High

Objective 2

Objective

To bring about sustainable utilization of land and water resources within Xining Municipality of Qinghai Province.

Rationale

Outputs

- Construction and/or upgrading of 87.1 km of wastewater collection networks (original target: 72.3 km; revised target: 86.1 km). This network included the Xining Wastewater main pipe, the Xiaoqiao Rainstorm collection network, Huangzhong Rainwater Drainage trunk pipe, and Qiaotou Drainage main pipe.
- Educational campaigns to promote soil and water conservation practices.
- Construction of 222 small check dams, 407.07 hectares of terraces, afforestation of 944.96 hectares, and re-vegetation of 1848.6 hectares.
- Training of 16,061 farmers on alternative livelihood options (target: 2,695) to support adoption of sustainable land and water use practices. The ICR reports that this high level of participation resulted from community participatory approach, ensuring that activities were adjusted to the specific needs of each local community. Activities included: road construction, animal farming development, and animal shelter construction. Participating households were grouped according to income levels (rich, middle, poor), with the poor households receiving up to 50% of the project subsidies and middle-income households receiving 25%.
- Training of 3,330 Municipality and County staff (target: 2,328) on procurement, contracts, and project management.

Outcomes



- 100% of wastewater produced is being collected by the wastewater network.
- Urban wastewater discharge into rivers decreased by 4.8 million tons annually. This surpassed the original target of 2.0 million tons and the revised target of 2.4 million tons. The ICR (Data Sheet) reports that this overachievement was due to higher than expected economic development in Xining, thereby creating additional wastewater discharge.
- Soil erosion and water conservation measures are being applied to 10,233.3 hectares of land. This achieved the target of 10,034 hectares.
- Soil erosion decreased by 1.1 million tons annually. This surpassed the original target of 0.9 million tons.

However,

- There is limited evidence that farmers who participated in the alternative livelihood training reduced unsustainable land use practices.

Achievement is rated Substantial due to decreased wastewater discharge and soil erosion levels; however, there is limited evidence of adoption of more sustainable land use practices.

Rating
Substantial

5. Efficiency

The ICR (Annex 3) provides an economic analysis of estimated benefits and costs of the project. For the flood control and wastewater management activities, benefits consisted of avoided flood damages (calculated according to historical data), and amenity and land value increases. Economic costs are identified as capital costs and O&M costs. The economic internal rate of return is estimated as 29.4%. For the watershed management activities, benefits consisted of increased agricultural (and income) production, and reduced soil erosion. Economic costs are identified as capital and O&M costs. The economic internal rate of return for this component is estimated as 15.1%, with an aggregate rate of 26.9% for all three types of activities. This compares favorably to the similar analysis in the PAD (Annex 9), which calculated rates of return as follows: 22.1% for the flood control and wastewater activities, 13.8% for watershed management activities, and an aggregate rate of return of 21.4%. The ICR (page 14) suggests that the higher than expected rate of return is due to the values of residential and commercial lands along the rehabilitated riverbanks increasing more than anticipated at appraisal.

Efficiency in the use of project resources is also reflected by the exceeding of output targets (some of which were revised upward) for several key activities including kilometers of dikes constructed, kilometers of wastewater collection pipes constructed, and number of farmers participating in alternative livelihood training. These were implemented within the original budget envelope, albeit with a one year project extension due to extensive delays in domestic review and approval of the project restructuring proposal. Although the extension did not ultimately affect project outcomes, the bureaucratic delay indicates that efficiency in the use of project resources was diminished somewhat.

Efficiency Rating
Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	21.40	55.48 <input type="checkbox"/> Not Applicable



ICR Estimate	✓	26.90	66.23 <input type="checkbox"/> Not Applicable
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* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of the project objectives and project design are rated High. Achievement of the objective to improve protection of property and safety of people from flood events is rated High due to implementation of flood control measures that met targets in coverage of land and population. Achievement of the objective to bring about sustainable utilization of land and water resources is rated Substantial due to decreased wastewater discharge and soil erosion levels; however, there is limited evidence of adoption of more sustainable land use practices. Efficiency is rated Substantial.

- a. Outcome Rating
Satisfactory

7. Rationale for Risk to Development Outcome Rating

The government continues its strong commitment to the project objectives to improve flood management and support sustainable land and water use practice. Fiscal analysis of the local entities indicates that Xining Municipality and the three counties are all "in a reliable fiscal position to repay the Bank's loan and cover O&M costs for the infrastructure works" (ICR, page 14). Clear O&M arrangements (including procedures to ensure adequate funding), as well as increased local capacity will also likely contribute to sustained project outcomes. However, the extent of sustainable land use practices adopted by local farmers is unclear. The ICR (page 16) refers to "moderate" risks due to technical risks but does not provide details.

- a. Risk to Development Outcome Rating
Modest

8. Assessment of Bank Performance

- a. Quality-at-Entry

The project design was technically sound, drawing upon international best practices on flood control, while also integrating a more comprehensive approach to ensure sustainable practices. The project design also included a strong focus on O&M arrangements. Key success factors identified from prior Bank experience included use of technical expertise panels, commitment of counterpart funds prior to project start, and active involvement of local stakeholders (government and farmers) to increase ownership, buy-in, optimal size of projects, and sustainability. The overall risk level was rated, with "significant" risks identified as lack of timely provision of counterpart funds, failure to adhere to environmental and safeguard guidelines, and financial sustainability of operations, with mitigation measures overall effective. The M&E design was overall satisfactory.

Quality-at-Entry Rating
Satisfactory

- b. Quality of supervision

The Bank team provided effective multi-disciplinary support, conducting regular field visits to local communities to ensure project activities were appropriate and feasible for local conditions. This support was supplemented by expert panels which provided strong technical support (i.e. on the use of environment-friendly concrete). Extensive capacity building support was also provided after project approval to address weak local



capacity - this resulted in a lengthy period of 24 months before project effectiveness, but ensured a strong project start. Changes in the availability of local financing and stricter government guidelines on study tours and equipment procurement led to slight modifications in the project design, but these remained consistent with intended development impact. There were no major safeguards or fiduciary problems reported, in part owing to effective capacity building support.

Quality of Supervision Rating
Satisfactory

Overall Bank Performance Rating
Satisfactory

9. Assessment of Borrower Performance

a. Government Performance

The central and local governments were strongly committed to addressing flood control issues. Acceptance of the integrated watershed approach, feasibility studies and environmental impact assessments all took place early on in the project preparation period. However, although the Project Management Office recommended project restructuring soon after the Mid-Term Review (June 2012), long domestic review and approval procedures delayed the submission of the formal restructuring request, which was only approved in May 2014, and therefore a project extension was needed. Counterpart funding, which comprised 50% of project costs, was provided in full. An initial shortage of counterpart funds directly affected payments to contractors at the county level, but this was resolved before any adverse impact on project implementation or outcomes.

Government Performance Rating
Satisfactory

b. Implementing Agency Performance

The project was to be implemented in Xining Municipality and three surrounding counties (Datong, Huangyuan, Huangzhong) by their respective Water Affairs Bureaus. The Xining Project Management Office (PMO) which was overseeing day-to-day implementation had no prior experience with Bank projects (this was the first Bank project approved for the Xining Municipality) but developed adequate skills as a result of extensive capacity building efforts. The ICR (page 6) reports that PMO staff "developed a good and lasting relationship with the local population. The resulting mutual trust created an enabling environment for smooth project implementation at the watershed level." Community level project committees included female and ethnic minority representation, ensuring relevance of activities and positive impacts on those groups. M&E and fiduciary performance were satisfactory, with no major problems reported.

Implementing Agency Performance Rating
Satisfactory

Overall Borrower Performance Rating
Satisfactory

10. M&E Design, Implementation, & Utilization

a. M&E Design

The results framework was sound, with relevant and measurable indicators for both infrastructure and capacity development. M&E arrangements were clear and included development of an information system and capacity building support to the PMO, which was responsible for compiling data from the various implementing entities.



b. M&E Implementation

The PMO, with the support of an independent external monitoring agency, provided regular detailed reports, and the ICR (page 7) reports that these reports "maintained data consistency and integrity throughout implementation." The ICR (page 7) refers to participatory M&E methods implemented at the local level, especially for water and soil conservation activities.

c. M&E Utilization

M&E data were used during project restructuring discussions to assess implementation progress and inform the length of project extension. Monitoring data was also used to track resettlement compensation payments.

M&E Quality Rating
Substantial

11. Other Issues

a. Safeguards

The project was classified as a Category "A" project, triggering safeguard policies on Environmental Assessment (OP 4.01), Involuntary Resettlement (OP 4.12), Indigenous Peoples (OP 4.10), Safety of Dams (OP 4.37), and Pest Management (OP 4.09). A full environmental assessment report and Environmental Management Plan (EMP) were prepared, included a supplemental EMP for the activities added at project restructuring. The ICR (page 8) provides comprehensive information to confirm satisfactory safeguards performance, including that mitigation measures were implemented, progress reports were submitted regularly, and compliance with EMP guidelines was satisfactory. A resettlement action plan (RAP) was developed due to resettlement needs in downtown Xining and Hangyuan County (land acquisition and house demolition). The ICR (page 8) reports that the RAP guidelines were implemented in a satisfactory manner and that interviews with farmers reflected high satisfaction with the compensations provided.

An Ethnic Minorities Development Plan (EMDP) was developed due to the presence of eight ethnic minority groups in the project areas. Two types of project activities were carried out to benefit those groups, including soil and water conservation activities and livelihood improvement activities. The ICR (page 8) reports full compliance with the EMDP, and also notes (page 15) that the key negative impact on minority groups (reduced grazing activities) is expected to be offset by the positive impacts of reduced erosion and flooding, although these positive impacts would not be experienced for at least three years.

A panel of dam safety experts provided support in monitoring and evaluating dam safety issues, due to the presence of 20 dams in the project area that are over 15 meters in height. A dam safety report was developed, followed by a dam safety plan and emergency preparedness plans for each of the large- and medium-sized dams.

A Pest Management Plan was developed, in anticipation of reforestation and greenhouse project activities, which would likely include increased use of local pesticides. The ICR reports that measures in the Plan were implemented in a satisfactory manner.

b. Fiduciary Compliance

Procurement: There were initial challenges due to lack of familiarity with Bank procurement procedures; however, the PMO increased capacity to manage contracts and was able to submit regular updated procurement plans to the Bank. No incidents of misprocurement or corruption were reported.

Financial management: There were initial challenges due to lack of implementing agency experience with Bank financial management procedures. However, the Bank team provided intensive fiduciary support, and these challenges were overcome. Audit reports were timely and had unqualified opinions. The ICR (page 9) notes in particular that there was effective coordination with local and provincial and finance bureaus and that there was smooth communication between the finance and engineering departments to ensure consistent project disbursement.



c. Unintended impacts (Positive or Negative)

d. Other

12. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	---
Risk to Development Outcome	Modest	Modest	---
Bank Performance	Satisfactory	Satisfactory	---
Borrower Performance	Satisfactory	Satisfactory	---
Quality of ICR		Substantial	---

Note

When insufficient information is provided by the Bank for IEG to arrive at a clear rating, IEG will downgrade the relevant ratings as warranted beginning July 1, 2006.

The "Reason for Disagreement/Comments" column could cross-reference other sections of the ICR Review, as appropriate.

13. Lessons

Lessons drawn from the ICR (page 20), adapted by IEG:

- A mix of engineering (infrastructural) and non-engineering (conservative techniques) measures comprised a well-balanced mix of flood management interventions. The promotion of conservative techniques helped to address root causes of soil erosion, while modern equipment and structures helped to safeguard property during actual flood events.

Also,

- A strong focus on O&M arrangements ensured smooth post-project transition. This includes financing of O&M costs and capacity development to ensure technical and institutional capacity for O&M,

14. Assessment Recommended?

No

15. Comments on Quality of ICR

The ICR was very concise in reporting project achievements and project performance. The quality of the data is satisfactory, providing clear evidence that outputs were implemented and coverage of flood protection activities was high. One shortcoming noted was the lack of evidence on adoption of sustainable land use practices by local farmers. Reporting on safeguards performance was detailed and comprehensive.



- a. Quality of ICR Rating
Substantial