Independent Evaluation Group (IEG)
CN-Ningxia Desertification Control (P121289)

Implementation Completion Report (ICR) Review

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1. Project Data

Project ID P121289	**Project Name** CN-Ningxia Desertification Control
Country China	**Practice Area(Lead)** Environment, Natural Resources & the Blue Economy

L/C/TF Number(s) IBRD-81590	**Closing Date (Original)** 31-Mar-2018	**Total Project Cost (USD)** 68,511,790.34
Bank Approval Date 17-May-2012	**Closing Date (Actual)** 31-Jan-2020	

	IBRD/IDA (USD)	**Grants (USD)**
Original Commitment	80,000,000.00	0.00
Revised Commitment	68,511,790.34	0.00
Actual	68,511,790.34	0.00

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2. Project Objectives and Components

a. Objectives

According to the Project Appraisal Document (PAD) (p. 3) and the Loan Agreement of July 20, 2012, the objective of the project was "to control desertification and degradation and protect key farmland and infrastructure in strategically selected locations in Ningxia Hui Autonomous Region."

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

Yes

Did the Board approve the revised objectives/key associated outcome targets?
Yes

Date of Board Approval
10-Mar-2016

c. **Will a split evaluation be undertaken?**
Yes

d. **Components**
The project included three components:

Component 1: Controlling Desertification and Degradation (appraisal estimate US$89.4 million, actual US$89.3 million): This component included three sub-components:

  a. Moving Sand Stabilization: This sub-component was to finance a program to halt the movement of shifting sand dunes and prevent encroachment of shifting sand onto agricultural land, settlements and infrastructure through, inter alia, the establishment of straw checker boards combined with the seeding and planting of indigenous shrub and grass on about 19,000 hectares of moving and semi-moving sand dune areas in Ningxia. Also, this sub-component was to finance implementing fire control measures, including the construction of fire breaking tracks and passage routes, watch towers, and small buildings for technical staff and workers, information boards and warning signs.
  b. Degradation Control and Re-vegetation: This sub-component was to finance a program to control and reverse degradation of arid and semi-arid shrubland and steppe areas through, for example, closing, protecting and managing for natural re-vegetation about 42,000 hectares of degraded arid and semi-arid areas. Also, this sub-component was to finance shrub planting and assisted vegetation restoration in an additional 4,600 hectares, including construction of access tracks serving as fire breaks, watch towers and other infrastructure required to manage and monitor the rehabilitated areas.
  c. Integrated Land Management: This sub-component was to finance a program to mitigate any potential negative impacts on land users from desertification control and vegetation rehabilitation measures resulting from the implementation of sub-components 1 a) and b) of the project, including implementing the Project Process Framework for the Reduction of Resource Use Restrictions and Livelihood Impact, carrying out economic tree plantations and fodder production for livestock to compensate for access restrictions to grazing areas, and developing long-term land management arrangements for selected sites.

Component 2: Protective Shelterbelt Plantations (appraisal estimate US$17.37 million, actual US$4.08 million): This component was to finance a program to protect key farmland and infrastructure from desertification and sand encroachment through, for example, the establishment of multi-layer and multi-story tree and shrub shelterbelts in about 5,500 hectares along roads irrigation canals and around agricultural fields. Also, this component was to establish fruit orchards in selected locations, including installing supplemental irrigation systems to ensure the successful establishment of shelterbelt plantings. According to the Bank team (September 15, 2020) the actual cost of component 2 was substantially lower due to the removal of two project counties, Pingluo and Xinqing. The two counties were removed from the project due to land use planning changes. Shelterbelt plantation establishment area (the key activity

under Component 2) was disproportionately concentrated in the two dropped counties, and thus total planned area for this activity was reduced from 5,782 hectares to 1,657 hectares.

Component 3: Project Management, Capacity Building and M&E (appraisal estimate US$6.8 million, actual US$3.89 million): This component was to finance technical assistance support for carrying out: a) information and awareness campaigns for project beneficiaries and stakeholders; b) detailed technical design, field implementation and construction, construction supervision, final acceptance checks of desertification control works, safeguards supervision, and project progress reporting; c) applied research; d) training on the establishment, maintenance and post-management of desertification control and plantation investments for long-term sustainability; and e) desertification control impact monitoring and field demonstration, which is being integrated into the national and regional desertification monitoring systems. According to the Bank team (September 15, 2020) the actual cost of component 3 was substantially lower since some county-level trainings and planting quality monitoring activities were financed by county governments as parts of broader forestry sector capacity building and forest management activities (covering multiple projects). Although this financing contributed to the project's component 3, it was not recorded as project counterpart financing by the government.

e. **Comments on Project Cost, Financing, Borrower Contribution, and Dates**

Project Cost: The project was estimated to cost US$113.75 million actual cost was US$81.71 million due to the reduction of participating counties from seven to five and the financing of some county-level trainings and planting quality monitoring activities by county governments as parts of broader forestry sector capacity building and forest management activities.

Financing: The project was to be financed by a US$80.0 million Bank loan of which US$68.51 million disbursed since two project counties, Pingluo and Xinqing, were removed from the project due to land use planning changes, reducing participating counties from seven to five.

Borrower Contribution: The Borrower was to contribute US$33.75 million. Actual contribution was US$13.19 million.

Dates: The project was restructured twice:

- On March 10, 2016 the project was restructured to: i) reduce the number of counties from seven to five, and reallocate tasks and loan funds between the five counties which remain; ii) adjust the ratios of Bank loan disbursements from 74 percent to 90 percent for planting and vegetation restoration under Component 1 b) of the project and from 74 percent to 100 percent for community livelihood activities under Component 1 c) of the project, in both cases to address the shortfall in counterpart funding; iii) adjust loan reallocations in favor of project technical assistance; iv) extend the project closing date from March 31, 2018 to March 31, 2019 to facilitate the completion of activities essential to the achievement of the PDO; and v) adapt the Results Framework such as decreasing the targets of PDO 1 and PDO 2 and add, PDO 3 "decrease in wind erosion". Also, the targets for "planting targets for straw checks and shrubs for sand stabilization" and "shrub planting for degraded land restoration" were increased while the targets for "degraded land closure for vegetation restoration and restoration" and "shelterbelt plantation establishment area" were reduced (see Section 9 below for explanation).

- On October 23, 2018 the project was restructured to change the loan closing date from March 31, 2019 to January 31, 2020 to allow for the completion of the designated project loan disbursement process. The additional time was needed due to lower than estimated costs for planting and degraded land restoration as a result of the technology improvement and an efficient bidding process. This resulted in an increase in the planting area, as well as the change of planting locations, which caused some planting activities to be delayed.

3. Relevance of Objectives

Rationale

According to the PAD (p. 1) even though China has been addressing desertification threats for over 40 years, large areas continue to face ongoing desertification due to predominantly human-driven causes such as vegetation clearing, overgrazing, and depleting water resources. Over one quarter of the country's total territory has been decertified (approximately 2.62 million kilometers), especially, in the North and Northwest of the country. Desertification can result in biodiversity loss, airborne pollution from dust and sandstorms, loss of arable land and agricultural productivity. In addition, physical infrastructure such as roads, railways, buildings, and pipelines can be damaged.

According to the ICR (p. 5) in 2008, the State Council selected Ningxia, one of the poorest regions in China, as a national demonstration area for desertification control and environmental restoration. Ningxia is a dry climate agricultural region strongly depending on the Yellow River for irrigation. Desertification has been an issue for a long time due to overgrazing of vegetation resulting from Ningxia's semi-fixed and fixed dunes losing their protective vegetation cover and becoming mobile. 57 percent of Ningxia's territory (2.97 million hectares) was affected by desertification by 2010. Over 3 million people in 13 counties experienced the impact of the desertification including sandstorms, dust pollution, and low agricultural output, reduced soil fertility and threatening fields and infrastructure with sand burial. Also, sediment from degraded land got into the Yellow River, which resulted in lower water quality and increased the risk of flooding downstream.

The ICR (p. 6) stated that even though investments for diversification control and remediation have been made in the past, there has been a lack of financing. In 2010, the Ningxia Forestry Bureau asked the Bank to support its efforts in this area.

The objective of the project supports the government's 13th Five Year Plan aiming to improve land management, calling for measures to halt the expansion of desertification such as returning grazing lands to natural grasslands, restoring desert ecosystems, and speeding up efforts to improve governance of areas at the source of dust storms. Furthermore, the project's objective is also in line with the government's 2015 "integrated reform plan for ecological progress" aiming to improve anti-desertification through closed-off protection zones, infrastructure for land management, improved land governance and increased vegetation cover.

The objective of the project is in line with the Bank's most recent Country Partnership Framework (CPF) (FY2020-25), which aims under objective 2.3 for increased sustainable agricultural practices and safer and higher quality food systems. Also, under objective 2.4 the CPF stresses the importance of

continued improvements in land and water management within the Yellow River Basin, as well as with objective 2.2 on improving air and water pollution. The level of ambitiousness of the PDO was adequate.

Given the developmental constraint China was facing and the PDO's alignment with the Bank's most recent CPF, the relevance of the objective is rated High.

Rating
High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1
Objective
To control desertification and degradation in strategically selected locations in Ningxia Hui Autonomous Region

Rationale
According to the ICR (p. 7) the project made the following assumptions: i) seedling survival rates would be sufficient; ii) improved ecological models would exhibit their desired land stabilization and ecological restoration qualities; iii) regrowth and subsequent land stabilization would occur on timescales relevant to the project; iv) alternative livelihood activities would change farmers' gazing practices and lead to land restoration; v) restored areas of shelterbelts would be sufficient to protect agricultural and infrastructure assets in the long-term; and vi) climate change would undermine vegetation cover in the long-term.

The project's theory of change envisioned that project activities such as planting and shifting sand areas with indigenous shrubs and grasses, closing, protecting and managing of degraded areas for natural regeneration, and developing alternative livelihood activities were to result in outputs such as indigenous shrubs and grasses being established on shifting sand areas, degraded areas being enclosed and regenerated, and economically productive alternative livelihood activities being established.

Furthermore, the project's theory of change envisioned that project activities such as establishing tree and shrub shelterbelts around agricultural land and infrastructure was to result in outputs such as shelterbelts being established around vulnerable agricultural land and infrastructure. In addition, it was envisioned that project activities such as conducting training in ecological land restoration and reaching ecological land restoration methods would result in outputs such as officials and farmers being trained in land restoration, improved cost-effective land restoration methods being developed, and publications and patents being researched.

All these outputs stated above were to result in the PDO. See section 9 for a discussion of attribution.

Outputs:

- 15,953 hectares of closed areas reached a vegetation cover of over 30 percent, not achieving the original target of 17,000 hectares.
- 12,837 hectares of sand areas reached shrub vegetation cover above 30 percent, surpassing the original target of 10,000 hectares.
- 3,561 hectares of degraded land was restored with forest and shrubs with a cover of over 40 percent, surpassing the original target of 3,000 hectares.
- 261 households were involved in project management arrangements, not achieving the target of 300 households. Households were involved in auxiliary management of project construction work, work supervision, patrols in the project area and maintenance of project facilities. The ICR (p. 44) stated that the achieved value differs from the much larger number of household beneficiaries since it measures households who helped to organize and manage work activities.
- 17,702 client days of training were provided surpassing the original target of 11,500 days. Trainings included project management training, and field-based training for officials and beneficiaries covering topics such as project planning, design, and planting.

Outcomes:

- An area of 32,351 hectares, which was previously degraded, returned vegetation cover, surpassing the original target of 30,000 hectares.

Achievement of the first objective was Substantial before restructuring, given that 3 of 5 output targets were surpassed (the 3rd and 4th outputs were 6 and 13 percent below target, respectively). The single outcome target was surpassed.

Rating
Substantial

OBJECTIVE 1 REVISION 1
Revised Objective
The objective did not change, but four targets were increased, one target was reduced and control groups or baselines were established (see section 9 for further discussion of changes in targets)

Revised Rationale
Outputs:

- 15,953 hectares of closed areas reached a vegetation cover of over 30 percent, surpassing the revised target of 10,100 hectares (compared with an original target of 17,000 hectares).
- 12,837 hectares of sand areas reached shrub vegetation cover above 30 percent, surpassing the revised target of 11,100 hectares (compared with an original target of 10,000 hectares).
- 3,561 hectares of degraded land was restored with a forest and shrubs cover of over 40 percent surpassing the revised target of 3,300 hectares (compared with an original target of 3,000 hectares).
- 17,702 client days of training were provided surpassing the revised target of 11,800 days (compared with an original target of 11,500 days).

Outcomes:

- An area of 32,351 hectares, which was previously degraded, returned vegetation cover, surpassing the revised target of 25,500 hectares (compared with an original target of 30,000 hectares).
- As a result of new planting techniques that minimized soil disturbance and water loss and improved species selection, the project's seedling survival rate was above 70 percent being at least five percent higher than survival rates previously achieved by the Bureau.
- Average plot vegetation cover across monitored models increased over the monitoring period (2015-2019) by 28 percentage points, relative to a 16 percentage points increase in non-project control plots.
- Species diversity increased in some project areas, indicating a reversal of degradation processes, as non-degraded ecosystems are typically more bio-diverse than degraded ecosystems. Model 1 (straw checks and shrubs for moving sand stabilization) increased from approximately 0.2 to 0.6 average species diversity between 2015 and 2019. Model 2 (closure for degradation control) increased from above 1 to 1.2 of average species diversity between 2015 and 2019. Model 3 (shrub planting for degradation control) increased from 1.4 to 1.7 of average species diversity between 2015 and 2018.
- According to the ICR (p.18) perennial herbaceous plants were replaced by annual herbaceous plants indicating a more mature, complex, and ecological community (with community succession being evident indicating sustainability).
- Soil quality improved as measured by soil biocrust development (biological soil crusts are a thin layers of lichens, cyanobacteria, arid land mosses and microorganisms supporting the retaining of water and nutrients). According to the ICR (p. 19) biological soil crusts get damaged during desertification and if these crusts return, it can be seen as an indicator for the recovery of the ecosystem. The improvement of the proportion of measurement plots covered with biocrust was statistically significant under models 1 to 3 compared to control plots observed under models 2 and 3. Extrapolation of sample plot results to the total area covered by these three models indicates an area of biocrust coverage formation equivalent to 16,718 hectares by project end relative to the baseline.
- Some soil chemical properties (measured though the concentration of organic matter and related enzyme activity) improved but not significantly. This might suggest an increase in fertility and improvement of conditions for continued vegetation growth. The availability of potassium and alkali-hydrolyzed nitrogen improved relative to the baseline and relative to non-project sites. Changes in other soil physical properties such as water holding capacity, bulk density, and porosity were not observed to be significant due to project activities. The ICR (p. 19) stated that this might be due to these changes needing more time to materialize.
- The ICR (p. 19) also stated that pest and disease incidence improved such as population density of rodents decreasing, variety of rodent species increasing, and overall damage levels to project planting remaining constant. This might be a result of the project's approach to control pests and diseases through a mixed species approach.
- The carbon stored in plant biomass per unit area increased substantially under desertification control plantings, ranging from a net increase of 203-2014 grams per square meter after five years of growth under model 1, 92-146 grams per square meter under model 2, 117grams per square meters under
- model 3 to over 900 grams per square meter for tree-based shelterbelts. The total carbon sequestration estimated at project closure compared to the baseline was over 88,000 tones.

Given that outputs and outcomes exceeded their revised objectives or control group or baseline values, the achievement of the first revised objective is rated Substantial.

Revised Rating
Substantial

OBJECTIVE 2

Objective
To protect key farmland and infrastructure in strategically selected locations in Ningxia Hui Autonomous Region

Rationale
Outputs:

- 514 kilometers of road and railway infrastructure were protected not achieving the original target of 600 kilometers. Protective shelterbelts to reduce windblown dust and lower temperatures to prolong the life of roads, were established, for example, along sides of the Wining Road in Zhongwei Industrial Park, along Lingzhou Avenue in Lingwu City, and along the Wuma Highway in Qingtongxia.
- 3,800 hectares of farmland were protected under the project, not achieving the original target of 8.000 kilometers.

Outcomes:

- Farmland and infrastructure in the total value of US$25.2 billion was within or near the project area (within 10 kilometers), not achieving the original target of US$30.0 million. The ICR stated that it can be assumed that the project activities had some impact on the protection of these assets.
- Avoided erosion in the project's areas (estimated as difference in soil loss between project and non-project areas by project closure) is expected to reduce siltation in the Yellow River and therefore downstream costs by around US$200 million, positively impacting flood protection of infrastructure and reducing the need for water quality treatment.
- Shelterbelt plantings reduced wind speed in their immediate proximity. While there were on average approximately 12.4 sand blowing days per year across the three largest project counties before the project, this decreased to approximately nine days per year during project implementation. Also, the number of sand storm days decreased from one day to 0.23 days per year. This pattern is driven by the number of strong wind days, which also decreased on average.

Achievement of the second objective before restructuring was Modest since both the output targets were not achieved.

Rating
Modest

OBJECTIVE 2 REVISION 1

Revised Objective

The objective did not change, but three targets were reduced and a new target was introduced in the revised version of Objective 2 (see section 9 for further discussion of changes in targets)

Revised Rationale
Outputs:

- 514 kilometers of road and railway infrastructure were protected, surpassing the revised target of 400 kilometers, but achieving the original target of 514 kilometers.
- 3,800 hectares of farmland were protected under the project achieving the revised target of 3,200 kilometers. But not achieving the original target of 8,000 hectares.

Outcomes:

- Farmland and infrastructure in the total value of US$25.2 billion was within or near the project area (within 10 kilometers) surpassing the revised target of US$25.2 billion, but not achieving the original target of $30 billion.
- 3,396 metric tons of soil loss was avoided each year between 2016 and 2020, surpassing the revised target of 3,310 metric tons (this indicator was introduced at the 2016 restructuring. Therefore, there is no original target). Erosion was estimated from the depth of soil lost to wind each year within project areas based on monitoring from 2016 to 2018 (comparing to without-project areas).

Achievement of the revised objective was rated Substantial since both of the revised outcome targets were achieved. Also, both revised output targets were achieved. However, the output target for farmland protection was reduced by 52 percent.

Revised Rating
Substantial

OVERALL EFFICACY
Rationale
Before restructuring, achievement of the first objective was Substantial and that of the second objective was Modest. According to the IEG Evaluator Guidelines (pp.35-36), in this case the overall pre-restructuring efficacy rating may be derived by rounding. Rounding to a Substantial overall efficacy rating requires a judgement that the Substantial rating is strong. This is evidenced by the fact that 3 of 5 outputs surpassed their targets and that the outcome exceeded its target. This results in a Substantial overall pre-restructuring efficacy rating.

Overall Efficacy Rating

Substantial

OVERALL EFFICACY REVISION 1
Overall Efficacy Revision 1 Rationale
Post-restructuring, achievement of both objectives is rated Substantial, resulting in an overall Substantial efficacy rating.

Overall Efficacy Revision 1 Rating

Substantial

5. Efficiency

Economic efficiency:

Neither the PAD nor the ICR conducted a benefit-cost analysis. The PAD (p. 9) stated that the project was part of a wider government strategy including several benefits making attribution of outcomes to solely this project challenging. Also, benefits may extend across parts of northern and northwestern China, including areas as far away as Beijing or Tianjin, having both time and a spatial dimension beyond the project duration and project area and therefore making a quantification challenging. Instead, the PAD presented a number of cost effectiveness considerations that were taken into account to justify a cost-effective use of project funds.

First, site selection: The project site selection process focused on areas with the highest possible impact such as the Yindong Chemical Production Base on the east bank of the Yellow River, and important farmland resources, along the Yellow River. The site selection was carried out in a consultative manner and participation of stakeholders in the project was voluntary.

Second, desertification control model: The project was to use a combination of mechanical wind break (such as straw checker boards) and biological measures (seeding and planting), which is being considered to be much more cost effective in the long-run compared to traditional tree-based land management approaches. The choice of material, type and age of seedlings, and planting densities proposed for the project resulted from pilots and long-term implementation experience in Ningxia.

Third, competitive contracting: Implementation of plantation works was to follow competitive procurement procedures to select contractors, which were expected to result in significant cost savings compared to the government's standard implementation procedures.

Fourth, local acceptance and sustainability: cost effectiveness was to be assured by paying attention to the involvement of local communities in project design such as ensuring the use of regulations and management plans for closed areas, along with compensatory livelihood measures, was to generate sufficient interest and acceptance among local farmers to maintain and protect project investments.

And fifth, fiscal impact. The public goods investments in desertification control and rehabilitation were not expected to have significant fiscal impacts. The participating counties, districts and cities were selected based on their strong fiscal positions due to revenues from vibrant industry, mining and agriculture sectors.

The ICR (p. 24) included site selection, desertification control model selection, technical innovations (mentioning the patented tool for check construction significantly reducing costs), and competitive contracting as cost effectiveness aspects.

In regards to technical innovations, the ICR (p. 55) stated that the project developed a new tool for shrub planting, which reduced the planting cost from approximately US$280 to US$80 per hectare. Also due to the tool's deeper planting and soil moisture conversation benefits the seedling survival rate increased from 45-55 percent to 70-75 percent. The ICR stated that in total the project saved approximately US$29.71 million from different factors such as competitive contracting, technical innovations, market prices etc.

While these considerations seem reasonable, a benefit cost analysis might have been the preferred tool for the project to better illustrate the most cost effective option.

Operational efficiency:

The project experienced implementation delays until project restructuring in 2016 due to insufficient counterpart funding and the reallocation of tasks and loan funds between the five remaining counties. Also, the project experienced delays due to weak technical capacity. In total, the project's duration was extended by 22 months. The ICR (p. 25) stated that while all project activities were implemented the project's costs were US$11.49 million lower than planned due to exchange rate fluctuations, savings from competitive bidding, and planting technique improvements.

Taking the economic efficiency and operational efficiency together, the project's efficiency is rated Substantial.

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		0	0 ☐ Not Applicable
ICR Estimate		0	0 ☐ Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The relevance of the original and revised objective was rated High given Ningxia's ongoing desertification and its impact on biodiversity loss, airborne pollution from dust and sandstorms, loss of arable land and agricultural productivity. In addition, desertification can potentially damage physical infrastructure such as roads, railways, buildings, and pipelines. The efficacy of achievements before the restructuring was Substantial even with a modest rating for one of the objectives. Efficacy of achievements after restructuring was Substantial. Efficiency was rated Substantial. Hence the outcome is Satisfactory.

a. **Outcome Rating**
    Satisfactory

7. Risk to Development Outcome

The risks to development outcome can be categorized accordingly:

Government commitment: According to the ICR (p. 38) the government continues to be committed to the objective of the project and it was reported that the government is currently preparing the 14th Five-Year Plan, incorporating lessons learned from the project. Furthermore, there are several government programs and policies which include subsidies for stall-raised agriculture and per-hectare compensation for restricted grazing access that complement project outcomes. Also, the project supported ownership by handing over the responsibility for area/parcel management to township governments, nature reserves, forest farms, and county-level forest and grassland bureaus.

Financial: While there is an ongoing need for financial resources for activities such as weed and pest control, enforcement of grazing bans, and prevention of fires, the regional and local governments have the financial means to meet these needs.

Environment: The ICR (p. 35) stated that the Yellow River Basin and North China Plain (where Ningxia is located) have been going through a climate change related drying trend over the last 50 years. Therefore, the project outcomes might be subject to an extended dry period, negatively affecting plantations and the effectiveness of sand control. Also, the area might face the risk of lack of availability or increase in price of water. Some of the risks might be mitigated through the project's use of drought-tolerant shrubs for extensive sand dune plantings, use of efficient drip irrigation as well as shelterbelts, which reliance on irrigation will decrease once they have matured.

8. Assessment of Bank Performance

a. **Quality-at-Entry**

According to the PAD (p. 6) the project design built on experiences gained in national programs and on other Bank-financed projects on resource management, ecosystem restoration, and public environmental goods provision in China.

Key lessons learned included: i) embedding the project into government programs and priorities; ii) working through existing institutions and drawing on experience and expertise developed and available locally; iii) building on existing monitoring and evaluation methods and working through the government's mandated M&E institutions; iv) building on simple but locally proven technologies and limiting complex or challenging innovations in an implementation environment with weak capacity and little experience with Bank projects and procedures; and v) promoting local ownership through integrating local stakeholders and providing tangible benefits through project participation.

The PAD (p. 9) identified relevant risks to project implementation such as weak capacity at the implementing agencies at the regional and county levels to implement the project, especially in regards to Bank procurement and financial management requirements and contract management monitoring. The Bank mitigated these risks by adopting a Project Implementation Manual, and conducting procurement and financial management training for relevant staff, especially at the county level.

Two shortcomings are apparent. First, there were issues with counterpart funding. The Bank and counterparts had limited room to negotiate on tthis issue, as at the time the Central Government required at least 30 percent counterpart funding. At the time of project preparation, most other projects in China were required to include 50 percent counterpart funding. However, given the poor financial situation in Ningxia, 30 percent was the lowest proportion of counterpart funding the Central Government would agree to, and hence there was no way to proceed otherwise. Instead, the team sought written assurances that the required percentage would be forthcoming and would be fully budgeted. It is not clear that there are any additional actions the Bank could have taken at entry that would have made a difference. However, the restructuring during implementation largely helped to overcome the issues.

Second, there were issues regarding the risk of drought and the availability of land. There is evidence that the drought risks were well-understood and considered in terms of technical design. The planting models were designed specifically to be able to handle very harsh climatic conditions, including drought. While "drought" per se was not discussed in the PAD, climate considerations were front and center in the choice of hardy, local-provenance and resilient species. These models, along with the low-soil disturbance planting techniques, were innovations over the government's traditional approaches and did enable the project to seek a solution to several marginal land quality issues.

According to the ICR (p. 37) the project was embedded into existing government structures and built on the established government M&E system. The project's Results Framework was adequate (see section 9a for more details). Given these features, quality at entry is rated satisfactory.

Quality-at-Entry Rating
Satisfactory

b. Quality of supervision

According to the ICR (p. 37) the Bank conducted thirteen supervision missions throughout project implementation (an annual average of 1.6 per year over 8 years). The project only experienced one change in

Task Team Leader ensuring implementation continuity. The ICR further stated that the Bank regularly supervised fiduciary and safeguard aspects and submitted candid performance reporting.

According to the ICR (p. 30) delayed and lack of counterpart funding resulted in an unsatisfactory implementation progress during the first half of the project. With almost two years into implementation, only 10 percent of the required funding was allocated by September 2014, resulting in delays in planting entities being paid, deficient quality of monitoring and verification of plantation, and training activities not focusing on quality of project outputs (see Section 9 a and b below for further discussion). . The Bank addressed these issues through a project restructuring in 2016 and reallocating loan financing to cover a larger part of counterpart obligations, resulting in timely payments of contractors and implementation progress improving.

The ICR p. 32) stated that in July and August 2013 the project experienced implementation issues due to temporary drought conditions resulting in damage to some young plantations needing to replant plants and slowing down implementation. The project addressed these issues by adapting the site-species matching process and by being more flexible about which plants to plant. Also, the project experienced challenges related to land becoming unavailable due to rapid urban, industrial, and agricultural development, resulting in 20 percent of land planned for project activities not being any longer available by the time of the Mid-Term-Review. The Bank addressed these challenges by making some adaptations during the 2016 project restructuring. Based on a land-availability survey, which was conducted by the Project Management Offices (PMOs), it was decided that the two most affected counties would be dropped, and activities were prioritized on remaining available land.

Given the Bank's proactive actions when challenges arose, the quality of supervision rating is Satisfactory.

Quality of Supervision Rating
Satisfactory

Overall Bank Performance Rating
Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design
The project's objective was clearly specified in the theory of change and how project outputs were to lead to certain outcomes was sound and reflected in the Results Framework. The intermediate outcome indicators were adequate to capture the contribution of the project's activities towards achieving the PDO. Also, the selected indicators were specific, measurable and achievable. However, while all indicators had a target, the vast majority did not have a baseline.

The Results Framework included PDO and intermediate outcome indicators to measure the first and second objective of the project. According to the ICR (p. 32), even though environmental outcomes require time to fully materialize, the project was able to measure desertification control on the project's timescale.

The project did not track outcomes from the third component, which included research and training activities that were to positively impact the achievement of the PDO. Instead, the project measured outputs

such as client days of training provided. However, measuring outcomes attributable to the project, such as "knowledge gained" and "productivity increased," would have been challenging.

According to the PAD (p. 7) input and output monitoring was to be undertaken by the PMOs, which were to be coordinated and verified by the RPMO. Impact monitoring was to be integrated into the government's existing Monitoring and Evaluation (M&E) framework for desertification control. The Ningxia Forestry Planning and Design Institute, responsible for the periodic assessments of the government's desertification control programs, was to conduct the project impact monitoring and for integrating project outcomes into the M&E framework of the region.

According to the ICR (p. 33) the project benefitted from the M&E of the government's desertification control program, which collected field data on soil physical and chemical properties, erosion, pest and disease incidence, species diversity, as well as socio-economic data on returns from alternative livelihood activities. This additional data allowed for comparing planting models with each other and adapting models during implementation and replicating models.

The ICR (p. 33) stated that the M&E program also included data from non-project sites, which allowed for a controlled comparison of ecological outcomes. The ICR further stated that non-project sites were collected based on biophysical similarity and proximity to project monitoring sites. (See Section 9b for further discussion of attribution).

b. M&E Implementation

According to the ICR (p. 33) data collection methods were mostly appropriate and well documented. The North China University of Water Resources and Electric Power monitored additional socioeconomic impacts.

The project faced some issues regarding the controlled comparison with non-project sites. The ICR (p. 17) stated that control sites might have experienced increases due to factors affecting non-project and project areas equally such as temporarily favorable climate conditions, reduced human or livestock impacts beyond the project areas or positive spillovers from project to non-project sites. Positive spillovers could be when planting in project-site results in better vegetation growth in a non-project site due to wind. According to the ICR (p. 33) this resulted in a smaller difference between the project-sites and non-project sites and a potential underestimation of project impacts. Therefore, M&E implementation would have been more rigorous and credible if selected non-project sites were further away from project sites. Also, a larger number of sample sites would have allowed for a better understanding of variation across planting models and counties. Also, the ICR (p. 33) stated that even though the project sites were located in sand areas instead of active farmland, the project obtained reasonable proxies for soil erosion

on farmland. However, direct measurement of monitoring sites on active farmland would have been more credible and beneficial.

In March 2016, the Results Framework was adapted to: decrease the targets of PDO 1 and PDO 2 and add PDO 3 "decrease in wind erosion". Also, the targets for "planting targets for straw checks and shrubs for sand stabilization" and "shrub planting for degraded land restoration" were increased while the targets for "degraded land closure for vegetation restoration and restoration" and "shelterbelt plantation establishment area" were reduced.

According to the ICR (p. 34) some of the project's M&E activities experienced some delays such as ecological monitoring, which only took place in 2015 and 2019, and for some sites only in 2017. Earlier monitoring would have allowed for a better identification of ecological impacts that take time to show, such as changes to soil properties. Furthermore, household surveys were conducted in 2014 and 2018 for an approximate before-after comparison. However, no control group data was collected. Therefore, it was challenging to attribute the project's activities to socio-economic impacts such as environmental improvement impacts on agricultural incomes.

c. M&E Utilization

The ICR (p. 34) stated that M&E data was used to monitor progress towards achieving the project's objective. Also, M&E data was used to refine planting models for uses in future projects. Furthermore, project results have been shared with provincial and international partners through trainings and field visits.

Overall M&E Quality is rated Substantial owing to minor to moderate shortcomings in M&E design and implementation, as well as a rather general and very brief section on utilization.

M&E Quality Rating
Substantial

10. Other Issues

a. Safeguards

The project was classified as category B and triggered the Bank's safeguard policies OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitats), OP/BP 4.09 (Pest Management), and OP/BP 4.12 (Involuntary Resettlement). According to the ICR (p. 35) an Environmental Impact Assessment was publicly disclosed and a grievance redress mechanism was operational throughout project implementation and reported to the CPMOs and RPMO. The project prepared an Environmental Management Plan (EMP) comprising Environmental Protection Guidelines and a Pest Management Plan. While the project experienced delays in systematic monitoring of the project's ecological impacts, monitoring of the EMP was conducted throughout implementation. Due to the project's impact on restrictions on land access for gazing and replanting in some areas, the Bank's policy OP/BP 4.12 (Involuntary Resettlement) was triggered.

The Bank team stated (September 15, 2020) that a Process Framework was developed to guide implementation of the safeguards measures and provide a framework for community and household participation in the project. The framework defined mechanisms for information dissemination, training, and the participation of affected people in the design and implementation of the project and in the design and implementation of compensatory measures to restore income losses. Guided by this framework, the consultations were conducted and the mitigation plans were developed and implemented to mitigate any negative impacts occurred during the project implementation.

According to the ICR (p. 35) the project's safeguard compliance was satisfactory throughout implementation.

b. Fiduciary Compliance
Procurement:

According to the ICR (p. 36) the project procured a total of 146 contracts and the procurement post reviews did not find any irregularities. Also, the project used the Bank's competitive bidding processes instead of the Bureau's typical procurement procedure, which resulted in major cost savings based on a competitive dialogue method.

Financial Management:

According to the ICR (p. 36) all of the audit reports had unqualified opinions and were submitted to the Bank in a timely manner after the first year of implementation. Also, the Interim Financial Reports (IFRs) were of acceptable quality but experienced submission delays.

The ICR (p. 36) stated that the project experienced Financial Management related issues due to the reduction in counterpart financing resulting in delayed payments to contractors, a paused research program, and slow disbursement. Also, the RPMO withheld payments for completed intermediate steps to ensure that contractors would complete final contract steps. However, the resulting lengthened time was not in compliance with contract terms.

c. Unintended impacts (Positive or Negative)
NA

d. Other
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11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	
Bank Performance	Satisfactory	Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The ICR (p. 39-40) provided lessons learned which were modified by IEG:

- **Greater flexibility in regards to project financing to allow for rapid reallocations of Bank financing in case of lacking counterpart financing is critical for filling financing gaps and avoiding implementation delays.** In this project, lack of counterpart financing resulted in implementation bottlenecks such as planting entities not receiving timely payments on contracts, plantation quality monitoring and verification being deficient, and training activities not taking place until the project was restructured in 2016 and financing was reallocated to cover a large proportion of counterpart obligations.
- **Landscape projects benefit from incorporating policy actions to address underlying adverse drivers.** This project addressed the impacts of desertification and implemented policy measures to avoid future desertification. However, the ICR (p. 39) stated that based on the experience of this project, a similar project could also benefit from providing technical assistance to prevent land degradation in the first place such as setting ecological limits, improving land use zoning, and mandating improved land and water use practices.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provided an adequate overview of project preparation and implementation. Also, the ICR was internally consistent and sufficiently critical where needed. In addition, the ICR was outcome driven and also used data outside the project's Results Framework, which contributed to the quality of its assessment. Furthermore, the ICR provided very useful and specific lessons learned that could benefit similar future Bank projects. However, the ICR did not include a benefit-cost analysis, although that would have been difficult in view of lack of data, particularly for valuation of benefits.

a. Quality of ICR Rating
Substantial